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THE PHARMACOGNOSY OF THE NITRITES.

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(From the Materia Medica Department, University of Edinburgh.)

The importance with which the compounds of nitrous acid are regarded in therapeutics, especially in the treatment of certain diseases of the circulatory, respiratory, nervous, and urinary systems, and the pharmacological knowledge we possess regarding the nitrites as a class, make their pharmacognosy worthy of careful consideration.

Although one of the organic nitrites—nitrite of ethyl—in mixtures bearing various names, as hyponitrous ether, spirit of nitric ether, sweet spirits of nitre, and now, officially, spirit of nitrous ether, has been used as a remedy both domestically and professionally since the thirteenth century, it is only within the last twenty years that the great scientific interest and therapeutical powers the nitrites possess have been fully recognized. Any combination of nitrous acid, either to form a metallic salt, or an ether, acts much in the same way. Minor differences in action, or in use, of individual inorganic or organic salts, depend on intrinsic activity in the base, or on different physical characters possessed by different combinations, or both these factors may be combined; the salts formed being most tuited for administration in some cases by inhalasion, in others in solution by the alimentary canal.

In connection with nitrites, we must consider nitroglycerine, which, discovered by Sobrero in 1846, possesses on the one hand an action almost identical with that of nitrites—but much more intense—and on the other, has a stability under conditions of gastric digestion possessed by no nitrite. Hay, indeed, from his careful experiments, regards the action of nitroglycerine as due to the decomposition of it by the alkaline blood. Nitroglycerine has for long been commonly described as the trinitrate of glyceryl, $C_3H_5(O.NO_2)_3$, and has further been stated by some workers to consist of this only; by others, notably Hess, to contain mono- and di- as well as tri-nitrate. To decide the question, Hay and Masson conducted an investigation as to the elementary composition of the body ('Trans. Roy. Soc. Edin.,' vol. xxxii., p. 87), and pointed out that thoroughly washed nitroglycerine consists of tri-nitrate of glyceryl, and of tri-nitrate alone, the lower nitrates, if formed in manufacturing the compounds, are probably much more soluble in water, and are comparatively readily washed away. Further, Hay (*op. cit.*, vol. xxxii., p. 67) shows, in opposition to Railton and Williamson, that nitroglycerine when treated (especially if heat be applied) in watery or alcoholic solution with fixed alkalies, with solution of ammonia, with alkaline carbonates, with phosphate of sodium (sodium hydrogen phosphate), etc., etc., decomposes with the reduction of two thirds of its nitric to nitrous acid, forming a nitrite of the base used to effect the decomposition, almost the remaining third appearing as nitrate of the base; other products, as acetate and oxalate of the base, are formed, and a reddish-brown aldehydic resin and a body gelatinizing in alcohol, but no glycerine is produced. The same decomposition occurs if nitroglycerine be boiled with water, the water here acting as a weak base. Recently Forster Morley, in his 'Outlines of Organic Chemistry,' repeats Williamson's statement that glycerine is formed, and Ince (*Pharm. Journ.*, Jan. 23, 1886) also states this, but gives no reasons for the alleged fact. I have repeated several of Hay's experiments and have never been able to obtain any evidence of the presence of glycerine, and were any glycerine formed I certainly consider the processes detailed by Hay would show its presence.

So much by way of prelude, and we may now discuss the question—What nitrites are most suitable in the treatment of disease? Anhydrous nitrous acid (we cannot consider the hydric salt HNO_2 as it is very doubtful if it exist as a definite body), which is a blue mobile liquid boiling at 14° F., rapidly decomposing spontaneously (except at very low or high temperatures) into nitrogen, nitric oxide, and peroxide of nitrogen, or in aqueous solution with the production of nitric acid and nitric oxide (unless the temperature be kept at zero), can scarcely be held a suitable medicine. Extremely dilute solutions can be distilled with only slight deomposition; but I find that if solutions, even as dilute 1 in 1,000,000, be kept at 60° F. and occasionally opened, and especially if kept in half-filled bottles,—all conditions which occur in a patient's bedroom,—in a few days the nitrous acid has almost disappeared. Stronger solutions similarly treated exhibit a marked loss in a few hours. These properties alone condemn nitrous acid both for inhalation and administration by the stomach; but it would further be useless for internal administration from the presence of mucus and other oxidizable matter in the stomach, by which it would be decomposed. We must therefore regard the salts of nitrous acid as alone to be recommended in practice, and these salts may conveniently be considered under the two heads of the inorganic and the organic. The inorganic nitrites are somewhat numerous; many from pharmaceutical and phar-

macological reasons are unsuitable for use in medicine, and we may restrict our considerations to the nitrites of potassium, of sodium, and of ammonium, and to that double nitrite of potassium and cobalt known as cobalt yellow or Fischer's salt, from the name of its discoverer (*Pogg. Ann.*, lxxiv., 124), which has had some attention drawn to it by Professor Leech's paper on the duration of the action of medicines (*Brit. Med. Journ.*, Nov. 28, 1885).

The nitrite of ammonium I do not regard as commendable; it is an extremely deliquescent unstable salt, breaking up into nitrogen and water even if in solution, unless the solution contain free ammonia; moreover, its taste is somewhat pungent and unpleasant. It is usually sold in solution, but the solutions are of varying and uncertain strength. The nitrite of potassium occurs either as deliquescent sticks or masses of an almost pure white colour, slightly alkaline in reaction, with a saline, somewhat acrid, taste. It is readily soluble in water, but very slightly in ethylic alcohol. Nitrite of sodium occurs in sticks and in small, somewhat prismatic, crystals, almost colourless, and like the potassium salt slightly alkaline. It has a feebly saline, not unpleasant, taste, and is but slightly deliquescent. Water dissolves it very freely, and ethylic alcohol more than nitrite of potassium. Both these nitrites are anhydrous salts. The potassium cobalt nitrite is a yellow crystalline powder, practically tasteless, feebly acid in reaction, and very slightly soluble in water; it is insoluble in alcohol. Of these three nitrites we have to consider which is the most generally useful. I object to the double nitrite of potassium and cobalt, partly because it contains a varying amount of water of crystallization—1 to 4 molecules according to the degree of concentration of the solutions employed in making it—or it may be anhydrous, $K_6Co_2(NO_2)_{12}$, but my chief objection is owing to the ease with which hydrochloric acid (the acid of the gastric juice) decomposes it, liberating free nitrous acid, and the facilities which occur in the stomach with this salt for this decomposition.

If we take the acidity of the gastric juice as being equal to 0·2 per cent. of hydrochloric acid (an acidity which, while higher than that usually given, is probably correct if we accept the most recent researches, and confirms the observations of Schmidt and Richet), and make a solution of this strength, keeping it at 100° F. (approximately the temperature of the stomach), we find that free nitrous acid, tested by the starch iodide method, is produced by all the three salts very markedly and immediately. If the strength of the acid be 0·02 per cent., with cobalt yellow the nitrous reaction is obtained in fourteen or fifteen seconds; with potassium or sodium nitrite in five or six minutes. If the quantity be as low as 0·005 per cent., cobalt yellow gives the reaction in four or five minutes; potassium or sodium nitrite in about thirty minutes. Ethyl and amyl nitrite, I may here mention, in as pure a form as possible gave the reaction immediately with the faintest trace of hydrochloric acid, and even without it almost immediately. Leech gave the cobalt salt in doses of from 4 to 7 grains, and since a saturated aqueous solution is very weak, containing, I find, but 1 in 10,000 at 60° F., it is practically impossible to administer the compound except in powder or pill, or some similar form, and while at first sight it might be recommended in certain circumstances on account of its slow absorption, producing an action extending over a comparatively long period, certainly a desideratum in some of the diseases for which nitrites are administered, it must be borne in mind that even in a stomach whose reaction is alkaline, the amount of the salt (presuming it be given as a powder) passing into solution and being absorbed will depend upon the quantity of fluid in the stomach, never great normally when no digestion is in progress. Further, the salt will more or less lie against the stomach wall, or be mixed with any food present during digestion, and will thus be very liable to decomposition.

The reaction in the stomach during the day is probably constantly acid, or only alkaline for a brief period between the completion of digestion of one meal and the ingestion of the next; during the night, when many occasions doubtless arise for the exhibition of nitrites, the gastric reaction will, or rather may, be alkaline, provided no food have been taken for three or four hours (compare Hay on the reaction of the gastric secretion, *Brit. Med. Journal*, March 13, 1886). Under circumstances so adverse it is not surprising that Leech found its action somewhat irregular, and also late in appearing, while the duration of its action was generally not more considerable than that of the nitrite of sodium or potassium. Indeed, if one compare the sphygmographic tracings given by Leech in the paper I have already referred to, it will be observed that as marked an effect is produced with the smaller as with the larger dose. The question of superiority lies now between nitrite of sodium and nitrite of potassium, and I decidedly give preference to the sodium salt, as besides its more workable physical properties, and the purer state I have generally found it in as compared with the potassium compound (it usually containing nitrous acid equal to 94 or 95 per cent. of nitrite of sodium against 84 to 86 per cent. in the potassium salt), its action is practically merely that of the nitrous radical, as sodium compared with potassium is almost inert in its pharmacological actions. Although potassium salts are more readily absorbed than sodium, the small doses employed practically abolish this objection; but, further, it is certain that both in the stomach and in the blood some of the potassic will become sodic nitrite. Nitrite of sodium then must be regarded as the inorganic nitrite to be recommended in medicine, although it, too, is open to the objection that decomposition will occur in the stomach if that organ contain much acid, a decomposition evidenced by the eructations of nitrous compounds occurring occasionally after the administration of this salt, and by the vomiting, and even diarrhœa produced by large doses. Nitrite of sodium, as I have above mentioned, is now generally sold in a fairly pure state, and the purer specimens are those of the crystallized salt, the sticks usually containing a considerable trace of iron, although this, too, is not an infrequent impurity to a slight extent in the crystals. Potassium nitrite, too, usually contains some. Probably the solutions are evaporated in iron vessels. The solubility of nitrite of sodium I find to be 1 in 1·14 of distilled water, 1 in 30 of rectified spirit, and 1 in 160 of ethylic alcohol, all at 60° F. The method of estimating the amount of nitrite present with which I have obtained the most accurate results is the permanganate process, an abstract of a

paper on which I published in this Journal on March 20, 1886. Fairly accurate results can well enough be obtained by Eykman's or Allen's process for the estimation of ethyl nitrite, as Mr. Allen pointed out in regard to his own process in the *Journal of Chemical Industry* for March 30, 1885. Nitrites in nature are, when percolating through the earth, readily converted into nitrates, probably by the influence of bacteria, as Warington especially has shown, with the additional information that darkness is apparently essential to the action of the nitrifying germs (*Journal of the Chem. Soc.*, xxxiii, 44, and xxxv., 429). Moreover, nitrites are stated, in solution or not, gradually to become converted into nitrates by the absorption of oxygen. It is therefore important to consider the stability of nitrite of sodium either in its solid state or in watery solution. The salt is described as deliquescent; in an ordinarily dry room it is so only to a slight extent, if exposed uncorked it does absorb water somewhat, but if kept in a well-corked bottle however frequently opened no change practically occurs. I have kept thoroughly dried powdered nitrite of sodium thus, occasionally leaving the cork out for hours, and after four or five months it had gained barely 1 per cent. by weight, and after being re-dried it contained almost absolutely the same amount of nitrous acid as before exposure. I have kept the similarly dried powdered salt on the water-bath for eighteen to twenty hours with the loss of an infinitesimal proportion of nitrite, the small quantity lost being probably converted into nitrate. I have also boiled solutions of varying strength in distilled water for several hours, and have by an appropriate arrangement bubbled air through solutions of the salt for days with like results. Thus, then, we see, nitrite of sodium in solution, in the absence of stronger acids than nitrous, and of ferments, is a perfectly stable salt. Its watery solution is however somewhat apt to be the seat of the growth of a form of mould if exposed to the air, and such a growth naturally causes considerable deterioration in the strength of the solution.

We now pass to the organic nitrites, and with them, as already I have mentioned, I wish to consider nitroglycerine. Of the organic nitrites the nitrites of methyl, ethyl and amyl alone need detain us. Nitrite of methyl (CH_3NO_2), although it has been administered, is unsuitable, as boiling below 32° F. it is always sold in alcoholic solution, and even this deteriorates very rapidly. Ethyl nitrite is specially considered in relation to spirit of nitrous ether, and so much has in recent years appeared in this Journal concerning this substance and its estimation that I can comparatively briefly dismiss it. It is very generally agreed that the pharmacopœial solution is not stable, especially when prescribed with water; its decomposition in this connection has been pointed out by Mr. Allen (*Pharm. Journ.*, Nov. 21, 1885) and I can quite confirm his results. It is very commonly prescribed with solution of acetate or citrate of ammonium. With these preparations naturally a certain amount of double decomposition will occur, but as to the nitrous element, deterioration though still rapid is not quite so rapid as when water alone is employed. This spirit of nitrous ether while not then to be considered reliable as to its most important constituent, and therefore not suited for the more valuable uses to which nitrites are put, yet contains other constituents which make it useful as a mild diuretic and diaphoretic, and it will probably long continue to be so used in medicine. The exact value of these other constituents I hope ere long to ascertain. It has been proposed to make a solution of ethyl nitrite in ethylic alcohol or even in rectified spirit; these preserve the nitrite much better, especially the ethylic alcohol solution, but decomposition rapidly occurs when they are mixed with water, while for purposes of inhalation nitrite of amyl is preferable, as here both acid and base act somewhat in the same direction. The method of estimating the amount of nitrite present in spirit of nitrous ether is now generally recognized to be by measuring the nitric oxide gas given by the decomposed acid radical, either Eykman's or Allen's process being employed. These two processes have been very fairly compared and criticized by Dott (*Pharm. Journal*, Feb. 28, 1885), and I have made many comparative experiments with the two methods, following Eykman's directions as given in this Journal (July 22, 1882), and Allen's as published in the number for November, 21, 1885. I used both aqueous and alcoholic solutions of standardized nitrite of sodium and found either method gave almost accurate results. Allen's, of course, is much more easily worked, and, as he mentions, while his formula is roughly correct, you get more satisfactory results by correcting for temperature, pressure and aqueous tension. I certainly object to his statement that a pipette is unnecessary to measure the solution to be tested, and I always employ one. Further, agitation by a purely tranverse movement is generally insufficient; I use transverse agitation first, and then after a few minutes with one hand close the indiarubber tube, and with the other give a not very vigorous vertical movement. The closure of the connecting tube prevents agitation of the lower strata of fluid; the vertical agitation causes decomposition of any volatilized nitrite. I do not find cooling the tube in water, and correcting for the temperature of the water, gives more accurate results than merely allowing it to stand in the clamp until two readings are the same and correcting at the temperature of the air. A source of fallacy to be avoided is the admission of air mixed with or dissolved by the solutions, but with care this need not occur. By waiting until all air bubbles have floated out I get quite as good results as by cooling boiling solutions of the substances to be used in an atmosphere of coal gas and filling the tubes in a similar atmosphere by a properly constructed apparatus. Almost identical amounts of nitric oxide gas were obtained by either Allen's or Eykman's method from various average samples of spirit of nitrous ether; if the samples were very defective in nitrite Eykman's process gave distinctly lower, and, I think, more accurate results than Allen's. Here one was using from 10 to 20 c.c. of the spirit, and the high tension of the other constituents was probably the cause of the difference. To sum up, Eykman's process, as one might conjecture, is more accurate than Allen's, but more open to experimental errors and much more difficult to employ. Allen's is the method which meets our ordinary wants most conveniently.

Nitrite of amyl has still to be discussed. It is much more stable than the corresponding salt of ethyl, and if preserved in well-stoppered bottles, protected from the light, it takes some years to become even approximately inert. Good specimens when

fresh have usually from 75 to 80 per cent. of actual nitrite, and even after more than a year with bottles occasionally opened and not very carefully preserved I generally find about 50 per cent. The chief products of decomposition are amyl alcohol, amyl valerianate and valerianic acid. The strength as to the nitrite is rapidly tested in the same way as spirit of nitrous ether; the decomposition of the compound is not quite so rapid however. Various menstrua and combinations of menstrua have been recommended for the internal administration of amyl nitrite, but I cannot regard any of them as commendable. Nitrite of amyl should be employed for inhalation alone.

Finally we pass to nitroglycerine, the trinitrate of glyceryl, propenyl trinitrate, trinitrin or glonoin, of which I have said much above. There are several other nitrates somewhat allied to nitroglycerine, which probably behave in a similar manner, as nitrosaccharose, nitroamylum and nitrocellulose—the last certainly (Hay, *Practitioner*, May, 1883). None however, is so suitable as nitroglycerine. This compound ether, as I already have mentioned, is regarded, by Hay especially, as owing its activity to its decomposition in the blood with the production of a nitrite—a matter still, I think, *sub judice*. The drug, however, is practically unacted on by the gastric juice, a point of great importance, where we wish absorption without decomposition. Nitroglycerine is a sweet colourless body, with a slightly pungent taste; its solubility in menstrua other than water is correctly enough stated as a rule, in water many authorities note it as almost or quite insoluble, Hay (in various papers) as 1 in 800. I find it to be 1 in 760, but it requires four or five days to dissolve to this extent, and the bottle requires frequent agitation. When prescribed with water, the water must always be distilled, or decomposition will occur, the rapidity of decomposition varying directly as the amount of salts in the various waters. Its watery solution (in distilled water) is quite stable, provided the nitroglycerine be pure. Solutions in alcohol keep equally well. The tablets of the pharmacopœia are generally fairly uniform as to their strength—no one would expect them to be mathematically exact—and are quite stable. I should suggest a 1 per 1000 aqueous solution of nitroglycerine be employed in therapeutics, the average dose being 5–30 minims. Some clinicians have stated that the alcoholic or watery solution acts more rapidly than the tablets do, and I agree with them; the difference, however, is very slight, but the tablets hold their position from their convenience alone. The name nitroglycerine being alarming to some persons, trinitrin has been used instead; propenyl trinitrate may also be introduced into medical parlance, but I should give preference over all to trinitrate of glyceryl (glyceryl trinitras), which expresses its composition and is an accurate name. Nitroglycerine leads one to suppose we are dealing with a nitro-substitution body. I may mention I estimated the strength of the nitroglycerine solutions by decomposing the ether with caustic potash, and calculating the amount of nitrite formed by comparison with a standardized solution of nitrite of sodium as recommended by Hay, using both the starch iodide reaction and Williams's modification of Griess's metaphenylenediamine test. To this latter the production of the resinous body I have referred to is a slight objection, but practically it does not interfere with the delicacy of the reaction, the amount of dilution being so great. Further, I dissolved weighed quanties of nitroglycerine in water so as to prove that 760 parts of distilled water would dissolve 1 part of nitroglycerine.

In conclusion, the object of this somewhat lengthy paper is to show that of the nitrite group (including nitroglycerine) there are but three compounds which according to our present knowledge are worthy of a permanent place in therapeutics. Nitrite of amyl for inhalation, nitrite of sodium and nitroglycerine for administration by the stomach. For subcutaneous injection any one of the three may be used, but I would prefer nitrite of sodium. Nitroglycerine being practically stable in all conditions of the stomach would be more suited than nitrite of sodium for exhibition through this viscus, were it not for the intense headache it is so apt to produce, a headache only obviated by custom and not always then. It is perhaps not superfluous to add that the decomposition of such a body as nitrite of sodium by the gastric juice can be largely or entirely obviated by prescribing it with carbonate or bicarbonate of sodium, or with solution of soda. Personally I have usually found the bicarbonate sufficient. Some therapeutists have talked of an ideal body acting as a nitrite does, which passing from the stomach into the alkaline intestine would there become decomposed very slowly, producing a small and more or less constant supply of a nitrite. I doubt if such a body will be found, and I much question if the physiological conditions holding in the gastro-intestinal tract would permit of a constant or nearly constant decomposition. A body soluble enough to be absorbed entirely from the stomach into the blood I am almost certain would not.

I have to express my thanks to my friend, Mr. Dott, who has put at my disposal all his profound pharmaceutical knowledge and has given me various specimens of the drugs which I have just considered.

THE COLONIAL AND INDIAN EXHIBITION AT SOUTH KENSINGTON.

The Straits Settlements.

One of the most important exhibits in the Straits Settlements Court consists of a large series of specimens of gutta-percha and of the plants yielding it. Herbarium specimens of the latter collected by Mr. L. Wray, of Perak, may be seen on the walls, and include the following plants:—"Gutta taban merah," recently identified by Dr. Treub as *Palaquium oblongifolium*, Treub.; "gutta taban simpor" (*Dichopsis* (or *Payena*) *Maingayi*); "gutta taban sutra" (*Dichopsis obovata*?); "gutta taban chaier" (*Dichopsis pustulata*); "gutta sundek" (*Payena Leerii*); "gutta gahru" (*Bassia Motleyana*); "gutta singret" (*Leuconotis Griffithii*); and "gutta putih" (Dichopsis gutta)." According to Dr. Treub the last named plant, which he refers to the genus *Palaquium*, is no longer known to exist in the wild state, notwithstanding that it was formerly the principal source of gutta-percha around Singapore. Although it is now only forty-three years since Dr. D'Almeida brought to Europe, in 1843, for the first time a small quantity of gutta-percha as a curiosity, which he divided between the Society of Arts and the Royal Society,* the trees had in 1848 already been felled

* *Journ. E. I. Archipelago*, 1848, p. 149.

to such an extent by the Malays that the forests of Singapore were pretty well denuded of the tree. This wholesale destruction was partly due to the fact that the gutta putih yielded a juice that did not flow readily, and the quickest way to obtain the milk was to fell the tree and ring its bark at short intervals, placing cocoa-nut shells or palm spathes under the trunk to collect the juice. The mode of giving the gutta a uniform texture is by boiling it down. The article which is now substituted for the true gutta putih at Singapore is, according to Mr. L. Wray, gutta taban simpor (*Payena Maingayi*). Dr. Treub has shown that the guttas of commerce, although passing under several names, are almost invariably composed of the milky juice of several trees which differ according to the country in which they are collected, and that if it were possible to obtain the product of each species separately, a much more uniform gutta might be supplied. He considers the pure gutta of *Palaquium oblongifolium* to be far superior to any now met with in commerce.

The Dutch Government, with the promptitude and practical wisdom displayed also so markedly in respect to cinchona culture, have already availed themselves of the researches of Dr. Treub and have commenced the cultivation of this tree, as well as of the true gutta putih, of which at present there are only two small plants in Java (obtained from the only known tree growing in a garden at Singapore), these two species yielding the best gutta.* It may be here mentioned that Dr. Treub states† that the only other species known to him as yielding gutta-percha suitable for commercial purposes are *P. Borneense*, *P. Treubii*, its variety *parvifolium*, and *Payena Leerii*. It may be hoped that the British Government will speedily follow the example set by the Dutch and take such measures as may be necessary to prevent the wholesale destruction of existing trees and to prevent in future years the trade in gutta-percha passing entirely into the hands of the Dutch.

Besides the herbarium specimens there is a series of eleven different kinds of gutta-percha, in hermetically sealed tins, exhibited by Chi Hung Bong. The specimens of commercial gutta-percha shown include gutta merah from Pahang, gutta putih (*Payena Maingayi*?) from Tringanu, gutta taban, gutta cras and gutta jelutong (*Dyera laxiflora*, Hook.)‡ from Selangor; gutta susu (*Willoughbeia Burbidgei*?) from Labuan, and gutta kelulute and gutta terap exhibited by Mr. J. E. Westerhout. The specimens of gutta exhibited differ considerably in quality. One labelled "gutta putih" is quite hard and somewhat brittle, another marked "gutta taban merah" is elastic and slightly fibrous, and a third "gutta jelutong," is not really a gutta-percha, but an india-rubber, and is black, dirty and sticky; another, known as "gutta" Lembut-Jawa, is soft enough to be used as birdlime,§ like the "gutta burong," and the juice of *Artocarpus incisa*. It should be here remarked that the name gutta (apparently of Malay origin, and which is variously spelt getah, gittah, guttah and in Dutch ngiatoe) is applied to any product derived from the milky juice of a tree. Thus the gutta susu from Labuan and gutta jelutong are indiarubbers, getah rambong* is the name given to the indiarubber of *Ficus elastica* and gutta gambir is catechu.

Among the herbarium specimens of gutta-percha may be noticed one of the "tuba" plant, which has been identified as *Derris elliptica*. The root of this plant is one deserving of chemical and physiological investigation. It is chiefly used by the natives for throwing into streams, etc., to poison the fish, the root being pounded and thrown into the water. This causes the fish to rise to the surface, when they are netted or speared. A decoction of the root of this plant is stated by Mr. Oxley† to afford the best remedy known to him for killing the insect that infects the leaves of the nutmeg tree and causes them to turn yellow. The root has an extremely persistent acrid taste; it would doubtless yield an active principle and might prove valuable as an insecticide. Indeed, this use of it has been suggested in the 'Kew Gardens Report,' 1877, p. 43. Tuba root is also an ingredient in the "ipoh" poison used by the Malays for tipping their arrows.

Of this poison three kinds are prepared, according to Newbold.‡ Of these one, called "ipoh kroki," is made from the root and bark of the "ipoh" tree, *Antiaris toxicaria*, the root of "kopah" and the root of "tuba," mixed with red sulphide of arsenic and lime juice. Another, called "ipoh tennik," is made of the same ingredients with the exception of tuba root. A third, named "ipoh mallaye," is prepared from the roots of a shrub called "mallaye," and from "perachi," "kopah" and "chey" roots. This is considered the strongest, and an arrow poisoned with it is said to kill a man in less than an hour, and a tiger in less than three hours. If these poisonous plants could be obtained they might be found worthy of chemical and physiological investigation.

The poison, which is of a dark liver-brown colour, of the consistence of an extract, is smeared over the point of the arrow for about an inch; when dry the arrow is cut slightly just above the poison, so that when it strikes an animal it usually breaks off, leaving the poisonous part in the wound. It is also used to poison the iron tips of bamboo arrows used with cross bows. The symptoms produced in animals poisoned by the arrows are given at length by Newbold.

There is an antidote used by the natives, which consists of the recent juice of the "lemmah kopiting," which is rubbed into the wound. Specimens of blow tubes and a quiver of the arrows of "ipoh bark" may be seen in the Straits Settlements Court.

Several specimens of gambier are shown, which appear to differ a good deal in price as well as in quality. The common gambier, in cubes or oblong pieces, is of a more or less dark brown colour, and is used for tanning and dyeing purposes, but the gambier, of a very pale brown colour and somewhat friable consistence, is used chiefly for chewing with the betel leaf. Of the former a specimen labelled "Singapore gambier," in oblong pieces, is valued at 5 dollars 70 cents per picul, and one of Siak gambier,

* *Annales du Jardin Bot. de Buitenzorg*, vol. v., part 2, pp. 24, 25.
† *L.c.*, pp. 73, 74.
‡ 'Kew Report,' 1881, p. 42.
§ *Ibid.*, 1878, p. 39.

* 'Kew Report,' 1880, p. 47.
† *Journ. E.I. Archipelago*, 1848, p. 646.
‡ Newbold, 'Brit. Settlements in Malacca,' ii., pp. 399, 400, 406.

in flat circular pieces, about the same diameter but twice the thickness of a penny piece, is priced at 30 dollars per picul. According to Newbold (*loc. cit.*, i., p. 367) the pale sort is prepared from the younger leaves of the plant. Its colour may, however, be in some measure due to an admixture of sago flour, which is said to be not unfrequently used as an adulterant, especially in Sumatra. The leaves, after extraction, form a valuable manure for the pepper plant, and partly for this reason the pepper and gambier cultivation are usually combined by the Chinese. Some idea of the extensive trade done in this article may be gathered from the statement that the Straits Settlements alone exported to Great Britain, in 1884, as much as 21,421 tons of gambier and cutch, valued at £538,902.

In this exhibit there are also shown several boxes of brass apparatus used for holding the betel leaf, gambier or catechu, lime or chunam, and tobacco, which are used in chewing. The very general use of gambier in the East probably does not depend solely upon its astringency, but partly on its effect as a nerve tonic, as pointed out by Dr. Haygarth Addison,* and referred by him to the catechuic acid contained in it.

Malay pharmacy is represented by several boxes of pills, prepared by Malays; pastilles, in shape resembling suppositories, some bottles of Malay medicines and boxes of ointment, stones for grinding medicines and granite pestles and mortars. The pills are nicely rounded and are evidently considered more valuable than pills are in Europe, since they are contained in nicely lacquered wooden boxes. The ointments are not particularly attractive preparations, but a tendency to elegant pharmacy is manifested in a series of medicines of unknown composition, but which take the attractive form of liqueurs.

Chinese pharmacy—for there are large numbers of Chinese resident in the Straits Settlements—is represented by two hundred and fifty-four bottles of Chinese drugs, exhibited by Mr. Khu Bu Ann, of Province Wellesley, the majority of which are evidently of Chinese origin; by a curious trough-shaped iron mortar, a steelyard or balance and a hinged slicing knife with which the beautiful sections of roots to be seen in this, as in other collections of Chinese drugs, are made. Collections of medicinal barks, roots, etc., used by the Malays are exhibited by Mr. J. E. Westerhout, Mr. Syed Hamid of Tampin, and by the Government of Sungei Ujong. An excellent collection of herbarium specimens of the native medicinal plants is contributed by Dr. T. Irvine Rowell. These specimens are each accompanied by a printed label, giving an account of the uses and doses, etc. An examination of the specimens showed that a large number are identical with those used in India and Java, and comparatively few with those used in China. The following, however, appear worthy of notice.

Leucas linifolia ("ketambak") is used, in the form of a decoction of the leaves, for lumbrici. A decoction of the roots and leaves of *Morinda umbellata* ("mengkû dulhûtan") and *Elephantopus scaber* are also employed as vermifuges; also pomegranate bark, the seeds of *Cucurbita Pepo*, areca nuts, and the fruits of *Quisqualis indica*.

Among the remedies employed for skin diseases, turmeric generally forms an ingredient, and the juice of the leaves of *Cassia alata* is commonly used, as in India. The oil of *Calophyllum inophyllum*, or "pudek," better known in this country as ndilo oil, is used for ringworm, and the juice of the leaves in obstinate ophthalmia. *Smilax ovalifolia* ("akar bana") is given as an alterative tonic in skin diseases, syphilis and rheumatic affections. The juice of the fruit of *Thespesia populnea* forms an external application for itch and other skin diseases. Henna leaves are also considered of value in beri-beri and cutaneous diseases. In leprosy *Hydrocotyle asiatica* is frequently used; also *Rourea fulgens*, chiefly in the form of tincture of the root, two to four fluid drachms being given in water before meals; and a beautiful little scarlet fungus, *Polyporus sanguineus* ("chêndawan bering") is used, in the form of powder mixed with eau de cologne, for dispersing the incipient tubercles of leprosy. This fungus is also used as medicine in China and Java.

Jasminum Sambac is employed in the form of an infusion of the flowers, as a wash for sore eyes. It is also said to possess lactifuge properties, arresting very quickly the secretion of milk. A rutaceous plant, *Euodia triphylla*, is credited with emmenagogue properties, and the fruit of *Morinda citrifolia* and the seeds of the papaw are also given for the same purpose; the young leaves of the last-named plant are also boiled and given for indigestion.

The juice of the fruit of *Plocoglottis javanica* is used for ear-ache, being first warmed and then dropped into the ear; another remedy for the same malady is the juice of the previously heated rhizomes of *Dendrobium crumenatum*. A species of *Cissus*, named "riang riang asam," is said to be useful in pulmonary hæmorrhage, a complaint to which the Chinese and Malays are more subject than the Europeans. The leaves and roots of the pretty climbing fern, *Lygodium scandens*, are also used for the same purpose as well as in dysentery, etc.

The pounded roots of a species of *Solanum* and the expressed juice of the flowers of *Bidens pilosa* are employed locally in toothache; and *Viscum monogynum*, a kind of mistletoe parasitic on the nux vomica plant, and credited with poisonous properties, is applied externally to the temples to relieve face-ache.

The juice of the leaves of *Coleus atropurpureus* is said to act as a resolvent on buboes and glandular swellings, and is also employed in epilepsy. The leaves of *Plumbago rosea* are applied externally to buboes and glandular swellings, and from their acrid properties most likely serve as a local stimulant.

A decoction of the leaves and flowers of *Canavalia virosa* and of the fragrant bark of *Alyxia stellata* are given for gonorrhœa.

Concerning a plant called "tiang-sin-chee," which has not been identified botanically, Dr. Rowell remarks, "the minute lens-shaped seeds kneaded in a tumbler with cold water make a most excellent drawing poultice which adheres of itself and is better than any poultice ordered in the British Pharmacopœia."

Datura alba appear to be used, as in China and India, for criminal purposes, but it is also employed in medicine, the bruised leaves, or the seeds pounded in oil, being applied as a poultice to boils and swellings and syphilitic nodes to allay the pain, and internally in spasmodic asthma; it is moreover considered to be an antidote to the poison of the tetraodon, a poisonous fish called "buntal" in the Straits.

* *Pharm. Journ.*, [3], xvi., p. 720.

The juice of *Thevetia neriifolia* is chiefly used for killing tigers, but the plant is also employed in medicine as a febrifuge and antiperiodic. These are only a few of the remedies used, but there are a large number of others which being possessed only of astringent, demulcent or carminative properties do not demand a special notice. Several fixed oils are shown which are not known in commerce in this country; of these may be mentioned Gehor oil, obtained from a kind of horse-chestnut, oil of tea seed, and kruin oil, an oleoresin obtained from the trunk of *Dipterocarpus Lowii*, a large tree, and used for filling bamboos to make torches. A very curious fatty substance, used as butter, is obtained from the oil sac of the cocoa nut crab. This crab is so called because it feeds on the cocoa nuts, so that this animal fat may be regarded in the light of metamorphosed cocoa nut oil. It is remarkable that the cocoa nuts growing on this island are frequently split and distorted in various ways during their growth.

Several tanning barks are exhibited under the names of "kulit kayu," "poko klat," "poko kulim" (*Scorodocarpus Borneensis*), "poko paga anak," "poko samak serai," "bakau" (*Rhizophora conjugata*) and "poko samak palut." Most of these barks are of a dark colour; the last is considered to be the best tanning bark in the country. Several of them are already under examination and will probably be reported on in these pages before the close of the Exhibition. The term "kulit," *i.e.*, bark, forms part of the name given in Europe to the aromatic bark of *Cinnamomum Kulilawan*, *i.e.*, Kulit Lawan. Here, as in other exhibits, the pods of *Eriodendron anfractuosum* are shown filled with the beautifully silky cotton or kapok which is now such a favourite substance for stuffing pillows, mattresses, etc. The seeds yield an oil, which is not used as yet in the Straits Settlements, although probably equal in value to cotton seed oil. Pepper is not so largely represented in this collection as might have been expected, seeing that it forms an extensive article of cultivation in the neighbourhood of Singapore, and in fact wherever gambier is produced. A fine spike of fruit, preserved in spirit, is, however, exhibited by Mrs. Connington. An account of the mode of cultivation usually adopted by the Chinese may be found in a previous number of this Journal, [3], vol. ix., p. 46.

The specimens of beeswax exhibited are not of first rate quality, but this is not surprising when it is remembered that the natives prefer to eat the comb after a fashion of their own; they wait until the young bees are well formed in the cells and then wrap a portion of the comb in a piece of plantain leaf, put it upon the fire for a few minutes, and then wax and animals are devoured together as a delicate morsel.*

We must not conclude the notice of this section without acknowledging the courteous treatment experienced at the hands of Mr. N. P. Trevenen, the Assistant Executive Commissioner, who not only took the trouble to point out numerous objects of interest which might otherwise have easily escaped notice in so extensive and varied a collection, but also placed at our disposal an early proof of the catalogue and contributed much valuable information concerning the exhibits which could not otherwise have been obtained.

* *Journ. E. I. Archipelago*, 1848, p. 261.

PHARMACY AT THE NEW ZEALAND INDUSTRIAL EXHIBITION.

During the winter of last year was held at Wellington an Exhibition of the Industrial Arts and Manufactures of the Colony of New Zealand. It was promoted and guaranteed by the Colonial Government, and was the first of series to be held at intervals of three or five years in the various centres of population throughout the colony, in order to show from time to time the advances made by our manufacturers in their different departments, and possibly also with a view to the adjustment of protective duties on such industries as are worth the fostering care of Government. Apart from the financial aspect it proved a success, visitors and colonists alike were surprised at the wide range and sterling excellence in the various classes of exhibits. In visiting this exhibition the writer had specially in view the efforts made by our colonial pharmacists for the advancement of their craft, and for showing that as far as skill and ability were concerned they were not behind manufacturers in other departments. In this expectation a disappointment was experienced, for as far as pharmacy proper was interested it was a failure, there being in that department but one exhibit, and that of a very limited character; this, however, it is but fair to say, would have embraced a wider scope but for an unaccountable requirement on the part of the Secretary to the Commissioners, which stipulated that all raw material used in the manufacture of goods exhibited must be entirely of colonial production. It is needless to say, that had this regulation been carried out the Exhibition could have had no existence. The writer was the exhibitor alluded to, and but for this blunder it was his intention to have exhibited a series of chemical and galenical preparations of his own manufacture, with the object of showing that such an industry could be carried on in the colony; as it was, the exhibit alluded to consisted solely of the glycerine preparations, liquid and solid, enumerated in the 'Extra Pharmacopœia,' and prepared from a very excellent glycerine of colonial production. This met with favourable notice from the medical profession and the press, and was awarded "Honourable Mention" by the jurors.

A brief notice of such exhibits as had a bearing, direct or indirect, on the practice of pharmacy may be of interest. In addition to that already alluded to, Barraud and Son, Druggists, Wellington, exhibited a case of tastefully got up preparations, consisting chiefly of proprietary goods, for which they have a local reputation. Sharland and Co., Wholesale Druggists, Auckland, showed a collection of proprietary articles of similar character to the above. The New Zealand Drug Company (Kempthorne, Prosser and Co.) exhibited chemical and pharmaceutical products, mineral acids and artificial manures, all of their own manufacture. In the latter department this Company turns out very excellent goods, and in price and quality are able to hold their own against the imported article.

The New Zealand Frozen Meat Company of Auckland, and a like company at Tauranga, were exhibitors of sulphuric acid and other sulphur compounds, also of artificial manures. The Southern Cross Petroleum Company of Gisborne exhibited refined oil, paraffin butter and wax with other mineral oil products. Another exhibit of this class was shown

by an Auckland manufacturer, with the addition of varnishes and dyes. The Dunedin Municipal Corporation sent chemical products, connected with gas manufacture, and the Wellington Gas Company exhibited ammonia sulphate, asphalt and various oils and dyes from coal tar. A first-class sample of glycerine, made by Kitching and Son, Limited, Wellington, was found among the exhibits of that firm. This was quite equal to the average of glycerine imported; but the output is limited, and consequently it cannot supplant the home article. Several firms exhibited stearin in different forms; also soaps, toilet and ordinary, hard and soft.

A fine sample of lavender, suitable for distillation, grown in the Wellington province was shown; and from Dunedin was sent excellent samples of linseed, its meal, oil and cake. Among sundry other items of interest were noticed such samples as writing inks, cod liver oil, gunpowder, hæmatite paints and ores, and a very fine specimen of antimony, from Queen Charlotte's Sound; this last item promises to be a very important industry at no distant date. As showing the small beginnings of a new industry, the Kaiapoi Glass Company exhibited specimens of their glass bottles, consisting chiefly of the commoner and cheaper sorts of glass-ware; so in the very far-off future we may possibly look to colonial manufacturers for our supply of medicine bottles.

In the class of "Appliances used in Chemistry, Pharmacy and Tanning" (*sic*) was shown a "compound decoction of *Phormium Tenax*, an antiseptic granulating agent in surgery." The efficacy of this plant as a healing agent in cases of solution of continuity of surface has long been known locally, and is worthy of more extended and scientific investigation. In the same class a colonial physician exhibited an "improved aspirator for emptying cysts, improved leg splints, and a self-acting galvanic ecraseur." Also in the same department was an invalid bedstead, and one specially designed for cases of fracture. The city of Nelson contributed an excellent show of artificial limbs, made by Jabez A. Packer, he having for many years made this work a specialty; and Christchurch, through a lady exhibitor—Mrs. Sharland—sent very good work in corsets and surgical belts. In the "Alimentary Products" class starches, corn flour and dextrin found several exhibitors, while the little Norfolk Island home of the "Pitcairn" descendants, was represented by arrow-root.

As might be expected in a meat-producing country, as this undoubtedly is, preserved meats and provisions of all kinds formed a distinguishing feature, even the much persecuted rabbit contributing largely towards this end; it is needless to say that these goods were of the very highest quality, and many of the brands are now known in all the markets of the world. As a wine-growing country, also, this colony makes a show, now small it is true, but destined ultimately to become an important industry; the south-western part of the North Island possesses climate and soil suitable for vine culture, much of the latter being of volcanic origin. An old Spanish wine grower, long settled in that part, contributed specimens of his products, which have been highly commended, and for which he has a ready sale. Aerated beverages of all kinds were represented from almost all parts of the colony; as yet the manufacturers thereof are undisturbed in mind by the reports of analysts, who delight in finding infinitesimal amounts of lead in their refreshing beverages, the enormously increased comsumption of which may fairly be attributed to the spread of temperance principles.

Taking into consideration the nature and variety of the exhibits displayed, a colonist cannot but feel highly gratified at the progress his adopted country has made in art, science and manufactures, and he may be pardoned if he possesses an unbounded belief in its future prosperity. Still, it is a matter of regret that the art in which we as pharmacists are so greatly interested has not come more to the front. Judged by the great strides evidenced in other manufactures, pharmacy has made but little material advance since its introduction, but is yet in its veriest infancy. Still, we may reasonably hope that from the small beginnings already made the colonial pharmacists will in future industrial exhibitions be able to show by their works that there is not only vitality in their ranks, but a healthy progress as well as an earnest desire to excel in the practice of their profession.

The general subject of pharmacy in New Zealand may afford matter for a future communication.

HAMAMELIS VIRGINICA.*

BY DRS. JOHN MARSHALL AND H. C. WOOD, PHILADELPHIA.

Thirty years ago every American housewife, at least every one in the neighbourhood of Philadelphia, gathered the flowers of St. John's wort, soaked them in sweet oil that they might impart their virtues to it, and reverently labelled it "red oil." The red liquid thus obtained was carefully hoarded for the comfort of battered young humanity. A little later than this, in the local history of our forefathers, arnica was the sovereign remedy, without which no household could be contented. To bring up a child without arnica was considered almost as hopeless as to bring him up without the Bible or the rod of Solomon. Probably owing to the enterprising, if not praiseworthy, efforts of an American drug firm, the days of arnica have been superseded by those of hamamelis, a herb whose reputation has waxed greater and greater until it has reached even a high point with the medical profession.

The enormous sale and mysterious properties of hamamelis have led us to undertake an investigation of the drug.

Unfortunately, the records of the physiological experiments have been mislaid, and we have been unable to give the exact strength of the preparations used in the experimentations. Some pounds, however, of the powdered drug were allowed to macerate several days in water and then distilled. The first six ounces of the distillate were kept separate and used physiologically.

It will be seen that if the activity of hamamelis depends upon a volatile principle, the distillate which we employed was many times stronger than that sold in the drug stores. Nevertheless, it was thrown into frogs until they were so full that their skins would hold no more, and the effects produced were no greater and no less than those which would have been caused by injections of similar quantities of distilled water. A single experiment was made upon mammals, with no more positive result, and we must conclude, therefore, that so far as the frog is concerned, and probably also mammals, the watery distillate of hamamelis has precisely the physiological value of water. It may be well to add that the distillate used had a very strong odour of the drug, but a chemical examination showed that it contained only the faintest trace of the volatile oil. In order to test the matter further a complete elaborate analysis of the drug was made, as follows:—

Three kilograms of the finely-powdered dry root

* From the *Therapeutic Gazette*. Reprinted from the *Canadian Pharmaceutical Journal*, June.

were macerated ten days with 6 litres petroleum spirit (boiling-point not over 45° C.). A small portion (2 c.c.) of the resulting extract, in an appropriate vessel, was placed under a bell glass, and a stream of dry carbon dioxide passed over it until the odour of petroleum spirit was hardly perceptible. The vessel containing the evaporated extract was then immediately covered and weighed. It was then uncovered and exposed to the air exactly one minute and then weighed. No loss of weight was observed. It was again uncovered and exposed to the air for one minute and weighed, without noticeable loss in weight. From this it was concluded that if a volatile oil were present in the volume (2 c.c.) of extract employed, it was in such small quantity as to be unweighable; therefore a larger volume (100 c.c.) of the petroleum spirit extract was employed in the same manner as above described, but no loss of weight was observed.

The remaining quantity (about 4 litres) of petroleum spirit extract was allowed to evaporate spontaneously until the odour of the petroleum was entirely dissipated. The residue possessed the odour which is peculiar to the aqueous and alcoholic distillates of the root, but this odour lasted only a few minutes. The odour was most likely due to the presence of a volatile oil, but its quantity was so small, or it was so exceedingly volatile, that it could not be isolated qualitatively or estimated quantitatively. The fixed residue remaining in the vessel in which the evaporation took place consisted of fats and wax, which were not further investigated.

One kilogram of the root, which had been previously extracted with petroleum spirit and washed with about 2 litres of the same fluid, was macerated ten days with 2 litres of ethyl ether. The other extract was collected and evaporated spontaneously, and the remaining residue, which was very small and consisted mostly of fat which had escaped solution by the previous treatment with petroleum ether, was treated with water containing a couple of drops of dilute sulphuric acid, filtered and allowed to evaporate. Nothing was obtained.

The above mentioned quantity (1 kilogram) of the powdered root which had been macerated with ethyl ether was now macerated ten days with strong alcohol. The extract obtained was dark-brown in colour, and contained only tannic acid and colouring matters.

The same powdered root which had been macerated with strong alcohol was dried at 35° C., and macerated twenty-four hours with 3 litres distilled water. The evaporated aqueous extract contained nothing but tannic acid and colouring matter which had not been wholly extracted by the previous treatment with strong alcohol.

The wet mass of the powdered root, after the extraction with water, was macerated twenty-four hours with 2 litres distilled water containing a very small quantity of sodium hydroxide. Nothing other than tannic acid and colouring matter was found in this extract.

The same mass of powdered root which had been extracted with water containing sodium hydroxide was now washed with distilled water and macerated twenty-four hours with water containing 1 per cent. hydrochloric acid. Nothing but a trace of calcium oxalate was found in the evaporated extract.

A portion of the powdered root which previously had been macerated in turn with petroleum ether, ethyl ether, and strong alcohol, was treated in turn with chloroform, carbon disulphide, and benzol without obtaining anything other than fat which had escaped removal by the former treatment.

An examination was now made of the distillate obtained by distilling the powdered root separately with water and with alcohol.

One kilogram of the powdered root was distilled with water, and the distillate concentrated by several distillations until the final distillate amounted to 150 c.c. This was divided in three equal portions, and to one portion a couple of drops of dilute acetic acid were added, to the second portion a couple of drops of very dilute sodium hydroxide solution were added, and to the third portion nothing was added. The three portions were evaporated in a stream of dry air, but no organic principle could be detected in any of them.

A quantity of water was added to 4 kilograms of the powdered root in a large copper retort, and to the latter a long Liebig's condenser was attached. Three litres of distillate, possessing the peculiar hamamelis odour, were collected, and a portion (1 litre) placed in a stoppered cylinder, a quantity of petroleum spirit was added, and the two liquids thoroughly agitated, and the mixture allowed to stand twelve hours. By means of a pipette the separated petroleum spirit was removed from the cylinder and placed in a suitable vessel and allowed to evaporate under a bell jar in a current of dry carbon dioxide until the odour of petroleum spirit had disappeared. There remained a slight quantity of water possessing the odour noticed in ordinary aqueous distillates of hamamelis, but in more marked degree. Upon warming gently on a water-bath the odour entirely disappeared, and upon continuing the evaporation no fixed residue was left in the vessel.

The remaining 2 litres of the above mentioned distillate were redistilled several times in order to concentrate the volatile substance in small volume of water. The final distillate, amounting to about 400 c.c., was placed in a stoppered cylinder and agitated with petroleum spirit, and allowed to stand twelve hours. The petroleum spirit was removed with a pipette and evaporated in a stream of dry carbon dioxide until the odour of petroleum spirit was no longer perceptible. The residue consisted of a slight quantity of water in which was observed what appeared to be an exceedingly small globule of oil, and which disappeared in very little time. The odour was strongly hamamelis-like, and disappeared upon warming on the water-bath, as did also the remainder of the liquid in the vessel without leaving any solid matter.

Four kilograms of the powdered root were distilled with alcohol until 3 litres of distillate were obtained. The 3 litres were twice redistilled, and the distillate obtained in the final distillation, which amounted to 300 c.c., was placed in a stoppered cylinder and agitated, and allowed to stand twelve hours. The petroleum spirit was removed and allowed to evaporate in a stream of dry carbon dioxide. When the petroleum spirit had completely evaporated there remained several minute globules of oil, hardly sufficient to produce the tiniest grease-spot on a piece of paper. It possessed the hamamelis odour, which disappeared in a little time.

The results which we have reached with hamamelis are in accord with those of Dr. Hector Guy, of Paris, who came to the conclusion, as the result of numerous experiments, that hamamelis virginica is not toxic; that it has no special physiological action on the vascular system; and that it contains no alkaloid. We have shown that there is a very large percentage of tannic or gallic acid in the fluid extract, and the results which have been obtained by some physicians by the use of this fluid extract in cases of hæmorrhoids and varicose veins are apparently explained by the presence of the astringent principle. The tannic acid, of course, would not come over in the distillation; therefore the much-used and still more lauded witch-hazel, or the so-called distillates of witch-hazel, must depend for their virtues upon the alcohol which they contain and the faith which they inspire.

ICHTHYOL.*

BY DR. JOSEPH SCHMIDT, BERLIN.

Ichthyol, or fish-oil (ἰχθυς—ὀλεῖον), was first prepared by Schröter, a chemist of Hamburg, and represents the distillation product of a peculiar bituminous sulphurous mineral obtained from the deposits of fossil fish. According to Baumann and Schotten, ichthyol, or

* From the *Therapeutic Gazette*, June 15.

the ichthyosulphate of sodium, has the following composition :—

Carbon	55·05 per cent.
Hydrogen	6·06 per cent.
Sulphur	15·27 per cent.
Sodium	7·78 per cent.
Oxygen	15·83 per cent.
	99·99 per cent.

Its chemical formula is $C_{26}H_{36}S_3Na_2O_6$.

Ichthyosulphate of sodium is obtained by the action of concentrated sulphuric acid upon the distillation product of the mineral and subsequent neutralization with sodium. The specimen at my disposal presents a tar-like appearance and odour, an alkaline reaction, and the consistency of vaseline. The drug is perfectly soluble in water, partly so in ether or alcohol, but readily soluble again in ether and alcohol combined; with fats and vaseline it can be incorporated in every desired proportion.

Its sulphurous constituents belong partly to the sulpho group, and are partly attached to the carbon. As the sulpho acids exercise themselves little or no action on the animal organism, the therapeutic action of ichthyol must be referred to the sulphur attached to the carbon. Through the introduction of the sulpho group into a sulphur-containing oil, the latter is rendered both soluble and resorbable. This feature distinguishes ichthyol from other organic sulphurous compounds previously proposed as therapeutic agents. "Alongside of the considerable percentage of oxygen," says Unna, "the sulphurous constituents of ichthyol represent its essential and active principle."

"The extreme solubility of ichthyol," says Professor Ziemssen, "enhances the practical value of the remedy."

The following preparations of ichthyol have been (with the exception of the two last) examined and employed by the author :—

1. Ichthyosulphate of sodium, pure or diluted.*
2. Ichthyol in an alcoholo-ethereal solution (5 per cent.).
3. Ichthyol cotton.
4. Ichthyol plaster.
5. Ichthyol soap.
6. Ichthyol vaseline.

The somewhat unpleasant odour and taste of the preparations intended for internal administration can be satisfactorily disguised by the addition of a few drops of alcohol in which equal parts of cumarine and vanilline are dissolved.

The physiological experiments hitherto instituted with ichthyol are too deficient to claim our attention, and give no clue to the therapeutic efficacy of the drug.

THE INCOMPATIBILITY OF CHLORAL HYDRATE IN THE PRESENCE OF POTASSIUM BROMIDE AND ALCOHOL.†

BY PROFESSOR GEO. F. H. MARKOE, BOSTON, MASS.

In the 'Proceedings of the Massachusetts State Pharmaceutical Association for 1885,' the writer presented a volunteer paper with the above title. The paper was reprinted by many of the pharmaceutical journals, and gave occasion to a variety of criticisms, some of which it is the object of this note to answer.

The original prescription, in which the incompatibility was first noticed, was composed of the ingredients shown by the following copy :—

℞. Potass. bromid.
Chloral hydrat. . . . . āā ℥ iij.
Tr. opii et camph.
Syr. zingiber . . . . . āā ℥ jss.

Misce. S. One or two teaspoonfuls in half a wine glass of water every two to six hours. For sleep.

* A potassium and an ammonium salt are likewise prepared from ichthyol.

† Read before the Massachusetts State Pharmaceutical Association. From the *Pharmaceutical Record*, June 15.

When this mixture is made up it always results in the formation of two layers—a dark coloured liquid floating upon a light coloured denser liquid.

The writer explained this decomposition as due to the change of the chloral hydrate into the less soluble chloral alcoholate, the alcohol being furnished by the paregoric elixir called for in the prescription.

Three experiments were then detailed, in which the endeavour was made to prove that the alcohol was the sole cause of the trouble.

These experiments were printed in the following form in the volume of the 'Proceedings,' as well as in all the reprints of the paper :—

1. Potass. bromid. . . . . 60 grains.
Chloral hydrate. . . . 60 grains.
Water. . . . . 3 fluid drachms.
Syrup of ginger. . . . 6 fluid drachms.

These articles formed a perfect solution, which did not separate on standing.

2. Potass. bromid. . . . 60 grains.
Chloral hydrate. . . . 60 grains.
Water. . . . . 3 fluid drachms.
Alcohol . . . . . 3 fluid drachms.
Syrup of ginger. . . . 6 fluid drachms.

In this experiment it will be noted that the ingredients differ from the original only in the substitution of diluted alcohol for the paregoric. After standing a short time this mixture separated into two layers, the upper being of a light straw colour.

3. This experiment was with the same ingredients as in No. 2, except that the alcohol was not added until after the mixture had been standing an hour. No separaration took place before the addition of the three fluid drachms of alcohol, but the separation occurred promptly after the addition of the alcohol. These experiments prove that the alcohol is the cause of the trouble, and the writer thinks that the chloral hydrate is changed into the less soluble chloral alcholate.

A careful reader would have readily seen that the writer's intention was to take just one-half the quantity of the original prescription for the experiments 1, 2, 3, which would require ninety grains of each of the salts ordered in place of the sixty grains as printed. Most of our critics did not take the trouble to try the experiment with the original prescription, but repeated experiments 2 and 3, using only sixty grains of each of the salts, and, finding no separation, at once jumped to the conclusion that the thing was all wrong. The misprint, due to a blunder in making hectograph copies of the original paper, was corrected in some of the pharmaceutical journals.

An English critic, in a very courteous note to the *Pharmaceutical Journal*, took exceptions to the statement that alcohol was the sole cause of the decomposition, and claimed that the presence of sugar was necessary for the separation of the chloral compound. The following experiments will dispose of this criticism :—

4. Potassium bromide . . 90 grains.
Chloral hydrate. . . . 90 grains.
Water. . . . . 4 fluid drachms.
Alcohol . . . . . 2 fluid drachms.

The salts were dissolved in the water, forming a clear solution; on the addition of the alcohol and shaking together, the mixture became milky, and on standing separated into two layers, the upper forming somewhat more than a fourth of the whole.

5. Like No. 4, but having three fluid drachms of alcohol; behaviour like No. 4.

It will be seen, therefore, that the presence of sugar is not needed to produce the separation of chloral; it is only necessary that we have very strong solutions of chloral and bromide. The addition of more alcohol, or dilution with water, will restore a perfect solution of the separated chloral compound.

The presence of sugar will greatly facilitate the decomposition, by allowing it to take place in weaker solutions.

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THE SYNTHESIS OF SALICYLIC ACID.

THE views entertained as to the precise nature of the process by which salicylic acid was produced artificially have never been very decided. Even KOLBE was led, by further investigation, to give up his original idea that salicylic acid was phenylcarbonic acid, and the reasons why only half the carbolic acid was converted have not been ascertained until quite recently. An hypothesis of some importance in regard to this point was put forward by BAUMANN in 1878. Guided by his observations with salts of phenylsulphuric acid and by the fact that sodium phenylsulphate, when heated in a sealed tube, undergoes almost entire conversion into paraphenolsulphonate, he inferred that in the reaction between carbonic anhydride and sodium phenol there is at first a formation of sodium phenylcarbonate $\begin{matrix}C_6H_5O\\NaO\end{matrix}CO$, and that this salt, at a higher temperature, undergoes a molecular conversion into sodium phenolcarbonate or salicylate $C_6H_4\begin{cases}OH\\COONa.\end{cases}$ But the production of disodic salicylate and of free phenol in the synthesis of salicylic acid by KOLBE'S method was not in accordance with this view of the matter, and to explain this BAUMANN conjectured that those products resulted from a secondary reaction of the free caustic soda in sodium phenol which converted the monosodic salicylate into a disodic compound, while the water formed by this reaction decomposed part of the sodium phenylcarbonate into bicarbonate and phenol. However, as he did not succeed in preparing the sodium phenylcarbonate he was unable to test this view experimentally.

At a later period experiments were made in this direction by HENTSCHEL, which led in the first place to an improved mode of preparing diphenylcarbonate, and to the conversion of this ether into ordinary salicylate by heating it with sodium phenol. By this interesting synthesis the intimate connection of salicylic acid with ethyl phenylcarbonate was clearly revealed. It had already been suggested by the production of salicylic ether by the reaction of ethyl chlorocarbonate with phenol and sodium observed by WILM and WISCHIN in 1868, but that observation threw no light on the chemical nature of KOLBE'S reaction. In HENTSCHEL'S further experiments he proceeded from the point of view that the first product of the action of carbonic anhydride upon sodium phenol was phenylcarbonate, and that this salt was not converted by heat into monosodic salicylate, but that by reaction with sodium phenol it gave rise to disodic salicylate and free phenol. He was of opinion that he had proved this, but his experimental data were not conclusive. SCHMITT has since taken this subject up, and by operating upon very carefully prepared dry sodium phenol he has ascertained that it readily absorbs carbonic anhydride even below 100° C., but as the temperature rises above 140° C., phenol begins to distil off, the absorption of gas slackening, and eventually ceasing. When no more phenol vapour was given off, analysis of the residue showed that two molecules of sodium phenol yielded one molecule of phenol and one molecule of salicylic acid. Consequently BAUMANN'S assumption that the formation of disodic salicylate is due to the presence of free soda in the sodium phenol cannot be admitted as correct.

The next point to be ascertained was the behaviour of sodium phenylcarbonate. While seeking to prepare this salt SCHMITT conjectured that it would resemble the ethylcarbonate in being very sensitive to the influence of heat and water, and therefore he exposed pure dry sodium phenol for several days to the action of dry carbonic anhydride at the ordinary temperature. This was done in such a way that the quantity of gas absorbed could be ascertained from time to time by weighing. The absorption of gas was at first rapid, but it gradually became very slow, and it was eventually found that when the gas that had been absorbed corresponded with the quantity necessary for the formation of phenylcarbonate there was no further increase of weight in the apparatus. The product thus obtained was a white powder, closely resembling sodium phenol, but not so highly hygroscopic as that salt. Analyses showed that its composition agreed with that of phenylcarbonate. This salt is readily decomposed by water with evolution of carbonic acid and separation of phenol. When heated gradually to 120° C. carbonic anhydride is disengaged and sodium phenol remains; when the temperature is rapidly raised to about 200° C. less gas is given off, but with it some phenol vapour and the residue then contains salicylate. This behaviour suggested the desirability of heating in a closed vessel in order to obtain a better result, as in the case of potassium phenylsulphate, which is thus converted almost perfectly into phenolsulphonate. On trial that was found to be the case with the phenylcarbonate, which was wholly converted into monosodic salicylate when heated for some hours in a closed tube to 120° or 130° C. BAUMANN'S conjecture as to the first stage of

the reaction was thus shown to be correct, and there is no doubt that in the production of salicylic acid by KOLBE'S process phenylcarbonate is formed. The absorption of carbonic anhydride at the commencement of the operation is rapid, because that is the period during which phenylcarbonate is formed, but only part of the sodium phenol is so converted, for when the temperature has risen to 130° C. the molecular alteration of the phenylcarbonate takes place without separation of phenol. This change is independent of the reaction between phenylcarbonate and sodium phenol assumed by HENTSCHEL to give rise to the formation of salicylic acid. The origin of the disodic salicylate in KOLBE'S process is to be ascribed to the reaction between sodium phenol and monosodic salicylate at a later stage of the operation, and it is also by this reaction that phenol is produced.

The practical result of these investigations is that salicylic acid can now be manufactured with only half the quantity of soda and of carbolic acid that were formerly required to produce it.

We take the liberty of reminding those of our readers who are subscribers to the British Orphan Asylum at Slough, that votes and interest at the election, which takes place on the 13th inst., have been requested on behalf of Stanley Hewitt (No. 11 on the list), John Harold Lees (No. 16), and Kate Elizabeth Butterworth (No. 36), all of them orphans of registered chemists and druggists. Proxies may be sent to the Secretary, Mr. Richard Bremridge, 17, Bloomsbury Square.

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The introduction of a Poisons Bill into the Cape Legislature appears to have stimulated the chemists and druggists of Cape Town to concerted action. A meeting was held and after considerable discussion it was agreed that the Bill as it stood was incomplete and inapplicable to the requirements of the public or of chemists and druggists. Thereupon the member of the Legislature who had charge of the Bill, who was present by invitation, offered to withdraw it for the session, provided that a provisional committee was appointed to arrange for the formation of a Pharmaceutical Society that would be representative and capable of dealing with the subject. In the discussion, also, an opinion was expressed unanimously as to the inutility of the Colonial Medical Board as an examining body for pharmacists and in favour of it being reconstituted so that pharmacy should be strongly represented and that the examination of candidates for chemists' licences should be conducted by practical pharmacists.

* * *

We learn from a Birmingham correspondent that there is to be an exhibition in connection with the meeting of the British Association about to be held in that town, and that Messrs. Southall Bros. and Barclay are desirous of representing an ancient alchemist's laboratory as one of the exhibits. They have already received most generous assistance in their attempt from Professor Redwood, Mr. Henry Irving, Messrs. Corbyn, Messrs. Godfrey and Cooke and others, but they will be greatly obliged to any gentleman who may be in possession of old utensils, implements, etc., if they will forward particulars in case they are disposed to lend them for the occasion. This exhibition will commence the latter part of August and remain open about six weeks.

* * *

A meeting of the Local Committee for making arrangements in connection with the forthcoming meeting of the British Pharmaceutical Conference was held at the Grand Hotel, Birmingham, on Tuesday last. Among other business the Committee had under its consideration an offer made on behalf of the pharmacists of Leamington to provide a luncheon for 150 members on the occasion of the excursion.

* * *

In connection with the movement known as the collective investigation of disease, initiated by the British Medical Association, general inquiries as to the therapeutic value of hamamelis and pure terebene have been issued, and a report on the subject will be presented to the Section of Therapeutics at the annual meeting of the Association.

* * *

A short time since, reference was made in these columns (before, p. 849) to a nostrum that had been put forward in the United States, under the name "kaskine," as a substitute for quinine, and that had proved on examination to be simply finely powdered sugar. The claims of kaskine appear to have been bolstered up by what purported to be testimonials from medical men of respectable standing. But Dr. Loomis and Dr. Drake, indignant at their names being used for this purpose and failing to reach any responsible head of the "Kaskine Company," commenced an action against a Mr. Crittenton, an agent, for the sum of ten thousand dollars for damages sustained in the circulation of an advertisement pamphlet in which it was stated that they had reported favourably on the effects of the nostrum. Mr. Crittenton having pleaded that the pamphlet was circulated by his house in the ordinary course of business, without any suspicion that it contained anything libellous, and having given satisfactory assurance that he had no special monetary interest in the sale beyond the agency, the plaintiffs discontinued the action on payment of costs.

* * *

In a further communication to the *Pharmaceutische Zeitung* (June 30), the njimo wood referred to last week in "The Month" (p. 1085) is spoken of as being identical with doundaké wood and bark (*Sarcocephalus esculentus*), which formed the subject of a recent investigation by Messrs. Heckel and Schlagdenhauffen.

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On another page will be found some information as to the exhibits of pharmaceutical interest in the recent Industrial Exhibition in New Zealand, which has been forwarded to us by an old contributor to the Journal, now resident in that country.

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It is stated that in working the natural gas wells in Pennsylvania refrigeration, due to the expansion of the gas on escaping from pressure, frequently takes places to an extent that causes inconvenience, by the freezing of water or oil through which the gas may have to pass on its way to the surface.

Proceedings of Societies in London.

CONFERENCES AT THE COLONIAL AND INDIAN EXHIBITION.

The Indigenous Vegetation of Australia, with Special Reference to the Eucalypti.*

BY JOSEPH BOSISTO, M.P., J.P.,

President of the Royal Commission for Victoria.

The subject of my paper, namely, the Vegetation of Australia, cannot be better introduced to your notice than by quoting the fable of the "Lauristinus and the Rose-tree."

In the quarters of a shrubbery where decidous plants and evergreens were intermingled with an air of negligence, it happened that a Rose grew not far from a Lauristinus. The Rose, enlivened by the breath of Time and attired in all its gorgeous blossoms, looked with much contempt on the Lauristinus, which had nothing to display but the dusty verdure of its leaves. "What a wretched neighbourhood," cried the Rose, "is this: and how unworthy to partake the honour of my company! Better to bloom and die in the desert than to associate myself here with such low and dirty vegetables. And this is my lot at last, whom every nation has agreed to honour, and every poet conspired to reverence as the undoubted sovereign of the field and garden! If I really am so, let my subjects at least keep their distance, and let a circle remain vacant around me, suitable to the state my rank requires. Here, gardener, bring thy hatchet, prithee, cut down this Lauristinus, or at least remove it to its proper sphere." "Be pacified, my lovely Rose," replied the gardener; "enjoy thy sovereignty with moderation, and thou shalt receive all the homage which thy beauty can require. But remember that in winter, when neither thou, nor any of thy tribe will produce one flower or leaf to cheer me, this faithful shrub which thou despisest will become the glory of my garden. Prudence, therefore, as well as gratitude, is concerned in the protection of a friend that will show his friendship in adversity."

The indigenous vegetation of Australia is evergreen. In England it is deciduous—that is, trees that annually lose their leaves. England may therefore be compared to the Rose, Australia to the Lauristinus.

The fresh green scenery of June over the face of England is ever absent in primitive Australia. The daisies and buttercups, primroses and cowslips, do not deck her pasture lands; neither do her people behold the mayflower hedges or view the chestnut leaf, or the glossy dark copper foliage of the beech. And yet Australian flowers are gay in colour, and the plant life is varied and pleasing. Sundews and orchids, wild geraniums and native fuchsiæ, and heath blossoms in almost endless coloured tints, abound in many parts in reckless profusion; these and many other flowering and foliage plants intermingle their varied hues over the surface of the land. Along the side of the creeks and watercourses may be seen, during many months of the year, the mimosa trees in full bloom, the tufted bunches hanging like golden balls, and perfuming the air with the sweet scent of the cassie. Even in the forests around, evergreen fern trees grow in luxuriance and beauty under the shade of tall timber trees, where can be seen pretty tiny flowers peeping up between the broken pieces of the fallen shed bark from the gum trees. Parrots and cockatoos scream their wild notes, wrens and robins and other gay-coloured birds twitter about the scene, and all over reigns a bright sunny sky. These and other tropical and subtropical beauties greatly compensate for the absence of England's native flowers.

But lively scenery and the pretty flowers of Australia are not so much the object of this paper as it is to give some interesting facts of a peculiar vegetation known as the Eucalyptus, which exists and reigns almost supreme over the greater portion of Australia and Tasmania, although entirely absent in the other islands of the south, with the exception of a few species in New Guinea. There can scarcely be a doubt but that at some period of the world's history Tasmania and New Guinea formed a part of Australia; hence the eucalyptus may be considered as a vegetation purely Australian. Strong evidences exist proving that the eucalyptus is an ancient Australian vegetation. River beds of great antiquity have been met with, at depths varying from 100 to 200 feet, and even deeper, in various alluvial gold mining districts of Victoria, revealing occasionally massive timber trees without any sign of decay, belonging to the family of the Eucalyptus, chiefly those of the red gum (*Rostrata*) and the iron bark (*Leucoxylon*) species. Some species growing at the present day on the alluvial flats, mountainous ranges, and in the valleys, attain a prodigious size, both as to girth and height, bespeaking their longevity, possibly contemporaneous with the Cedars of Lebanon.

The word "eucalyptus," from *eu*, "well," and *kalypto*, "to cover," is aptly chosen to distinguish this splendid family of plants from all others. This characteristic is observable in the limb of the calyx, completely covering the flower before expansion; and during its gradual development, the operculum, or lid, is uplifted in shape like an extinguisher, which falls off immediately the flower becomes matured. The chief characters of all eucalypts are in the firmness of the calyx, the absence of petals, the numerous rows of stamens inserted close to the edge of the calyx tube, the stamens being nearly always fertile, and also the many form variations of the anthers in the different species. This systematic arrangement was made by the late venerable Bentham, and acquiesced in by our Government botanist, Baron von Mueller, as being the wisest to adopt.

The eucalyptus is an evergreen. It casts its bark annually; but this does not take place, like the falling leaf of England, at one given period of the year, hence there is always a rough and ragged appearance on the trunk of the tree. In those pictures in the Victoria Court which depict Australian bush scenery this is to be noticed, and is not therefore the fault of the painter, as some persons have imagined.

In the vegetable kingdom the Eucalypti belong to the myrtle family, so placed on account of their bearing certain botanical outlines similar to those of the garden myrtle of England; but the physical characters, as well as some peculiar botanical features of the eucalypts, place them as a distinct genus in the myrtle family of plants. Considering the vast area of the Australian continent, consisting of something over three millions of square miles, and measuring 2500 miles from west to east, and 2000 miles from north to south, it is surprising to find one tribe of trees forming at the present day four-fifths of the whole of the indigenous vegetation. An Australian traveller frequently feels the monotony of the scenery; but this is greatly dispelled by noticing the interesting variations in the leaf formation, in the colour both of leaf and flower, in the appearances of the tree-bark, and in the shape and varied stature of the trees.

Of the one hundred and fifty kinds or species found existing over Australia, it can easily be understood that the variations must be very great indeed.

On the mountains and in the valleys, and on alluvial flats where the woodman's axe is but seldom heard, stand gigantic eucalyptus timber trees, in girth varying from 16 feet to 80 feet, and in height from 200 to 420 feet, and that often without a branch, the top being capped with radiating branches (like the ribs of an umbrella) full of foliage.

On the undulating lands, although bearing many acacias and a variety of other kinds of trees, the prevailing feature is the eucalyptus; no matter where the traveller journeys this vegetation is generally present.

* Lecture delivered in the Conference Room at the Colonial and Indian Exhibition, Monday, June 28.

Throughout Australia it may be viewed as a firm friend to man and beast. To the cattle depasturing and to the tens of thousands of sheep grazing over the pasture lands of the country it gives shelter from the midday sun and from dewy night. The wandering swagsman, or the travelling bushman, reaching no homestead at sundown, finds rest under its wide-spreading branches, and often shelter within some patriarchal gum tree, which, although standing firm and erect, has become through old age hollow in the centre, sufficient to give him, or even half a dozen other persons, a comfortable rest-house for the night. To many of the early pioneers of Australia have these trees given a nightly home, and many a meal of damper and mutton, and many a smoke pipe of peace have been partaken inside their cavernous recesses.

In the scant rain tracts of Australia there are many millions of acres on which grow a scrub of dwarf eucalypti, averaging in height not more than eight feet ; this scrub is so dense that it almost shuts out the sight of sun and sky. Once an untutored traveller loses the track, and gets entangled but a small distance in this forest of sticks and leaves, the chances are that he never returns either to kith or kin again. Many persons travelling through this country have died for the want of water, and yet there is always a supply sufficient to sustain life close at hand did they but know it ; for in one kind of this dwarf vegetation there is lodged in the stem about half a pint of pure water. As a bushman generally carries a tin pannikin and a small tomahawk, he has nothing to do but to cut down one of these stick-like stems and place the lower end of it into this vessel, when he will in a short time obtain water. The question of interest that arises here is, whence comes this fluid, and how is it so stored ? To this question I will endeavour to give the answer presently. This strange tract of country I have traversed ; there is not a sound of life to break the solemn silence, scarce a bird to be seen, and not a stone or a pebble to be obtained the size of a marble ; a few dingoes or wild dogs prowl about here and there at night. Native wells scattered far apart over an area extending some thousands of square miles are to be met with, but they are more frequently found dried up than otherwise ; and yet the soil in many parts is well adapted for wheat growing ; it is a mixture of sand, decomposed ironstone and vegetation, with a substratum of limestone. Weird is the scene ; still the vegetation found growing jungle-like over these lands contains health principles both for climate and for suffering humanity.

The Government of Victoria is, I am happy to say, fully alive to the advantages of irrigation. Only in last Saturday's London papers appears a cable message from Melbourne, stating that the Hon. Alfred Deakin, Chief Secretary, has introduced a Bill in the House of Assembly providing for a system of irrigation embracing an area of 3,250,000 acres, to be carried out under the management of the Water Trust, but vesting the supreme control of the works in the Government. The system is expected to prove of immense benefit to farming interests. The expense is estimated at £3,800,000.

Thus far I have taken you rapidly over the general aspect of Australia in relation to its plant llfe ; to end here would leave out the most interesting portion of the peculiar characteristics of Australian chief vegetation, which covers so vast an area, almost as large as the whole of Europe. It is the eucalyptus which has given character to Australia, both in climate and in the health and comfort of her people. From the heavily timbered eucalyptus forests down to the scrub I have just mentioned, every variety of wood is obtainable, whether it be for ship or house building, or for docks, or bridges, for carriages or waggons, for land fencing or garden ornamentation, or for fuel, its variety is unbounded and its durability is in many cases equal to its longevity. In the several Australian courts the timber trophies consist chiefly of the many species of the eucalyptus, or, as they are termed in Australia, gum trees ; an examination of these will satisfy any person that I have not exaggerated the timber value of these trees.

Although the leading forest timbers of Australia consist of the eucalyptus, yet there are a variety of other kinds. In the eucalyptus the wood varies in character quite as much as do other kinds obtainable from other timber trees. For instance, the well-known blue gum (*Eu. globulus*) is a hard light-coloured timber of great strength and tenacity, as well as durability, extensively used for beams and joists in buildings and for railway sleepers, also piers and bridges. A comparative test has been made between some blue gum, English oak, and Indian teak. The blue gum carried 14 lbs. weight more than the oak and 17¼ lbs. more than the teak per square inch.

The red gum tree (*Eu. rostrata*) is a very hard compact wood, possessing a handsome curled but short grain, red in colour, well adapted for many purposes in shipbuilding, such as heavy framing, beams, and knees ; it is also used in the construction of culverts, bridges, and wharfs, and by wheelwrights for the felloes of heavy wheels, and is employed in Australia for railway sleepers and engine buffers. Owing to an acid it contains, termed "eucalyptic acid," it resists the attack of the *Teredo Navalis*, or sea-worm. The iron bark gum tree is one of the hardest and heaviest of our native woods.

The stringy bark tree (*Eu. obliqua*) is an easy splitting wood, and is usually employed for palings, shingles, and posts ; in like manner do all the varieties change. Many varieties of tree acacias are met with in all the forests of Australia, such as the myall and the wattles, also pines, banksias, casuarinas, pittosporums, eugenias, melaleucas, and others too numerous to mention.

It is to be deplored that just now the country is being subjected to a wasteful destruction of many kinds of the eucalyptus. Some of the varieties in various districts are totally disappearing, and without some determined and immediate action on the part of the Governments of Australia, but few decades will pass before a timber dearth sets in. The subject of forestry has attracted the attention of most countries of the world ; even in Australia, botanists, builders, contractors and legislators have uttered a warning voice. The lands of Australia at present are full of the seed of timber trees ; the selectors of our lands know this right well. Let them but neglect to cultivate their farms for a season or two, they find them covered over with a growth of young timber plants consisting of the eucalyptus and acacias ; but timber seeds, although covered with an epicarp in order to protect the germ from an early loss of life, yet cannot retain their power of germination for many years when the lands are kept under cultivation. Vegetation aids materially in equalizing the temperature and climate of a country. There can be no doubt that the climate of Australia, speaking in general terms, is not so hot as it was forty years ago. The modification is produced by cultivation and the opening up of land which formerly were covered with dense forests, tangled bushes, ferns, climbing plants, lichens and mosses. But the climate of an extended area like Australia cannot be dealt with in one general statement. The highest mountain is less than 10,000 feet high, and few exceed 6500 feet in height. Majestic alpine chains of ranges stretch through many parts. The snow line of Australia is less in altitude than most other countries, arising probably from the cold Antartic winds receiving their first break on these bleak mountain ranges. Aerial, oceanic and terrestrial magnetic currents produce many changes over so vast a continent. The rainfall of Australia varies considerably in many parts : in the hill districts approximately it may be stated to be fifty inches per annum ; in the undulating woodland districts, from thirty to fifty inches ; on the adjoining plains twenty inches ; over the wide expansive plains away from mountains or hills, from five to fifteen inches ; while farther on into

the interior, rain has been known to be absent for two or three years together. All these things affect climate, but there is nothing in the physical features of Australia to promote miasma. Its lagoons and swamps are not extensive; most of them are dry during the summer months; and even where they remain otherwise, there are surroundings of a healthy character, especially the tan barks and leaves of the eucalyptus, which fall in, obviating thereby any ill effect.

The physical geography of Australia does not differ in its general outline from that of other countries. The first Victorian geologist—now Professor Selwyn, the Government geologist of Canada—reported that: "In general structure, character and composition in geological sequence, and in physical and palæontological relations, the rock formations are in all respects analogous to those of other regions." But there is a factor at work throughout Australia which makes the climate so acceptable to human life, and that is the eucalyptus vegetation, belonging, as I have before intimated, to the myrtle amily of plants. . It is full of aromatizing odours. The sense of smell when in our forests, or even travelling in the country, bears ample testimony to the presence of its volatile bodies in the air, for there is no mistaking the odour, as it is different from all others. There is not a single species but what possesses in its leaves a volatile essence; each kind varies in percentage of yield; but still of the vast number they can be reduced for practical illustration under eight types, or species, namely :—

The Viminalis, or manna-yielding eucalyptus.
The Odorata, or sweet smelling.
The Rostrata, or red gum tree.
The Obliqua, or stringy bark.
The Leucoxylon, or iron bark.
The Globulus, or blue gum.
The Dumosa, or mallee.
The Amygdalina, or peppermint-scented eucalyptus.

The eight kinds I have mentioned supply the minimum to the maximum; the minimum yielding seven fluid ounces of the volatile essence, and the maximum 500 fluid ounces, or 25 imperial pints, from every 1000 pounds weight of fresh leaves. No vegetation occupying so vast a country contains so much volatile odour in its leaf portion as the eucalyptus. Assessing alone the whole colony of Victoria (being that part of Australia in which most of my experiments were made) at the low average of supply of 20 ounces, or one pint to the acre, we have 9,730,500 gallons of an essential and volatile substance held at one and the same time in the eucalyptus vegetation.

So far as I have been able to proceed in this investigation over the continent of Australia, similar conditions exist; so that it may be safely asserted that in the whole of the leaf surface of the eucalypts in Australia there is continually 96,877,440,000 gallons of this volatile material. If therefore the whole of the odorous principles were retained in the leaves until set free by the art of man, in that case its effect on climate would fail; but if they are given up freely by the natural forces of the tree under the aid of light, heat, or electricity as existing around, or by some or all of these forces in combination, then we have good reason to value the eucalyptus vegetation beyond all others in being capable of influencing the climate of a country for purposes of health. Leaves of trees necessarily are in close connection with the roots; together they keep up a continuous action of exhalation and replenishment; evergreen trees, especially the eucalyptus, unlike deciduous trees which sleep during many months of the year, work constantly, though at times less energetically. Deciduous leaves generally perform their functions on one side only, that is, they change the sap juices of the plant on the side turned upward to the sun; but in the case of the eucalyptus it is quite different, these have a double action. There is no difference in the anatomy of the two sides of the leaf; breathing pores abound on each side, and the cells containing the volatile oil run through the leaf. These oil cells in most cases are visible to the naked eye, and can be counted in hundreds. Light and warmth operate alike on both sides of the leaf; each being suspended in a line with the axis of the tree, giving facility for the remarkable and interesting movement of the petiole or leaf stalk, which is continuous in its action under the warm currents of the air, or the direct rays of the sun, keeping one side or the other of the leaf's surface to face the sun or the warm air current, and so establishing perpetual leaf operation. Now it is by the natural forces of the tree and the leaf action acting in unison that the watery and odorous bodies are continually set free in the air, and in such minute and diffusive atoms that they may be expressed as the fragrant breath of the tree, requiring as it does thousands of its compound particles to form a single drop. Under such circumstances these odorous bodies speedily change their molecular condition, and supply to the atmosphere an extra amount of active oxygen; it is this unceasing health factor throughout Australia which makes its climate, on the whole, the finest in the world.

Victoria, the colony in Australia with which I am more particularly identified, possesses a low death rate, owing greatly to its pure and invigorating air. Formerly, in the days when the gold fever was at its height, during the years 1851, 1852 and 1853, when rapid colonization set in from Europe and America, typhoid and other fevers hovered over the dense population residing in the tented cities and towns; the insidious organic poison germs held high festival amongst the people, and for a time baffled the efforts of our then sanitary reformers. The remedy which then came to our rescue was a strong hot air current that had travelled hundreds of miles over the vast areas of our eucalypt vegetation. The hot winds came with their withering blast and entered into every habitation, destroying or attenuating the fever germs, speedily giving relief, and in most cases restoring the sufferers to a condition of health.

At the present day the severe virulent fever types but seldom take hold of the people. Sanitary laws are not so openly violated, and the population suffers more from the ills of life, either the result of inheritance or from their own individual trangression of one or more of nature's laws.

Ladies and gentlemen, I have endeavoured to briefly describe to you the vegetation of Australia; the limited time to-night at my disposal does not enable me to do full justice to the subject, still I trust I have made clear to you that the country is full of benignant surroundings. The early pioneers who still remain, together with their children, young Australia, live contentedly and happily on its soil. In the words of one of our best writers on Victoria, Mr. Julian Thomas: "During the gold fever, the brains and the blood, the mental courage, as well as the bone and muscle of Europe, flocked hither, and the fittest survived. Victoria has ever been a pioneer colony, it owed nothing to Government aid; in fact its early prosperity was retarded by Government interference. It was founded solely by individual energy, and its people have ever remained pioneers; it is in their blood. Victorians, Burke and Wills, were the first to cross the continent in 1860. They lost their lives, but made their names immortal; a massive monolith of granite was placed over their graves in Melbourne cemetery, and a fine bronze statue of the two explorers, from a design by Charles Summers, was for years the chief sight of Collins Street, an object lesson for our youth. The Burke and Wills expedition cost the people of Victoria £57,000. The end justified it, for within two years of the death of the leaders from starvation, 'tierces of beef were displayed in Melbourne, salted down from cattle pasturing on the spot where they perished.' Far away in the 'back blocks,' in the centre of the continent, in the sugar lands of the north, on every new gold field, Victorian muscle and energy and capital are to be found.

In the South Sea Islands, in the pearl fisheries of Torres Straits and Western Australia, Victorian pioneers are foremost; and Victorian enterprise has done much towards the exploration of New Guinea. Although they claim Victoria to be the richest, the most populous, the most prosperous, and the most energetic of all the Australian colonies, yet Victorians were the first to raise their voices for the federation of the colonies, the political unity of Australia. Then the people of all the provinces, at present divided by absurd local prejudices and jealousies, will be joined together for defence, and if need be, for defiance; and some day in the future, following out the manifest destiny of the British race, with the dear old mother country and her eldest born, the United States of America, will be linked together in a strong bond, ruling land and seas, and giving laws to all the world."

CHEMICAL SOCIETY.

A meeting of the Chemical Society was held on Thursday, June 17, Dr. Hugo Müller, F.R.S., President, in the chair. Several certificates having been read for the first time, the following were duly elected Fellows of the Society:—Thomas Akitt; James Blake, M.D.; Alfred Chaston; A. W. H. Chapman; Augusto Cæsar Diojo; Charles A. R. Jowitt; Charles Alexander Kohn; John Temple Leow; William Ray; Joseph Price Remington; William Richards; Forbes Rickard; William Saunders; Charles A. Smith. The following papers were read:—

The Electrolysis of Aqueous Solutions of Sulphuric Acid, with Special Reference to the Forms of Oxygen obtained. By Professor H. McLeod, F.R.S.—The experiments were instituted to determine the quantity of ozone that can be obtained by electrolysis. The negative electrode consisted of a small platinum plate, and the positive of a tube containing mercury, and with fine platinum wires of 0·045 mm. and 0·027 mm. in diameter fused into the glass. Several wires were used, the total length being about 6 mm. The electrolysis was carried out in a U-tube surrounded by ice and water; the hydrogen was collected over water, and the ozonized oxygen passed through a tube containing a solution of potassic iodide, the oxygen being afterwards collected. The quantity of ozone was determined by acidifying the potassic iodide solution, and decolorizing by a standard solution of sodic thiosulphate. In the electrolysed acid an oxidizing substance is present which is not hydroxyl, but is probably Berthelot's persulphuric acid. The amount of this "active oxygen" was found by adding potassic iodide to the liquid and decolorizing by the solution of thiosulphate. The electric current was measured by a tangent galvanometer, and the dimensions of the wires of the positive pole were determined; from these data the intensity of the current was calculated. Acids were used of relative densities varying between 1·025 and 1·7. The maximum quantity of ozone was obtained with solutions about 1·075 or 1·1 in density, the electrolytic oxygen containing about 16 or 17 per cent. of its weight of ozone. The maximum quantity of "active oxygen" in the oxidizing substance referred to was produced with acids about 1·2 to 1·25 in density, the proportion being 16 or 17 atoms to 100 atoms of hydrogen. The solubility of ozone was determined by one experiment and found to be much greater than that of oxygen. A note is added to the paper detailing some experiments on the action of oxygen on chlorhydric acid under the influence of light: it was found that a considerable quantity of chlorine was liberated.

Mr. Friswell said that Professor McLeod's observation explained a fact that had come under his notice years ago; viz., the constant presence of chlorine in muriatic acid.

The President said that he also had noticed this, and had found that chlorine was always contained in the acid if it had been exposed to the air.

Mr. Laurie suggested trying aluminium electrodes he had noticed a very distinct smell of ozone on electrolysing dilute sulphuric acid with poles of this metal.

Essential Oils (Part III.): Their Specific Refractive and Dispersive Power. By J. H. Gladstone, F.R.S.—Since the appearance of the author's former papers on essential oils in 1863 and 1872, many investigations have been published; but important divergences of opinion still exist among chemists as to the rational constitution of these compounds. He now brings forward arguments founded on the phenomena of refraction and dispersion, believing that in the conflict of opinions such arguments ought to have considerable force. For this purpose he employs the refraction equivalent for the solar line A, as compared with that calculated from the known values of carbon and hydrogen and the known increase on account of the double linking of carbon-atoms. But he also introduces a new conception, that of dispersion equivalents: being the difference between the refraction equivalents for the lines A and H, or $P\frac{\mu_H-\mu_A}{d}$ where μ and d are the refractive index and relative density and P the atomic weight. It is found that the dispersion equivalent of carbon may be taken at 0·25, and that of hydrogen at 0·045, as a first approximation, while in the case of benzenoid compounds the addition to be made to the dispersion equivalent on account of each double linking of carbon-atoms is fully 0·8. The paper deals mainly with the $C_{10}H_{16}$ hyydrocarbons. These are divisible on account of their physical and chemical properties into two large groups, the terpenes and the citrenes. There are also the solid camphenes and the cedrenes or $C_{15}H_{24}$ hydrocarbons. The optical properties of the terpenes are in close accordance with what may be expected from a compound in which one pair of carbon-atoms is double-linked; those of the citrenes indicate two pairs; while camphene has a slightly slower specific refraction and dispersion, however, than a terpene. The cedrenes appear to be strictly polymeric with the terpenes from an optical point of view. The optical properties of caoutchouc were also examined. Its principal constituent resembles the citrenes; so also does the liquid hydrocarbon, $C_{10}H_{16}$, that is produced by its dry distillation. Isoprene, C_5H_8, also, must have two pairs of its carbon-atoms double-linked, a result which agrees with Tilden's conclusions from its chemical properties.

	Refraction equivalent.		Dispersion equivalent.	
	Observed.	Calculated.	Observed.	Calculated.
Terpenes, natural .	73·0	73·0	4·0	4·02
Terpenes, artificial.	72·9	73·0	3·9	4·02
Camphene. . . .	71·9	73·0	3·7	4·02
Cedrenes	109·8	109·5	6·1	6·03
Citrenes, natural .	75·0	75·2	4·5	4·82
Citrenes, artificial .	75·1	75·2	4·6	4·82
Caoutchene . . .	75·3	75·2	5·0	4·82
Isoprene	40·3	39·8	3·2	3·21

Armstrong's cymhydrene, $C_{10}H_{20}$, Atkinson's menthene, $C_{10}H_{18}$, citrene, $C_{10}H_{16}$, and cymene, $C_{10}H_{14}$, form a series: the first being a saturated compound, and the others having respectively one, two and three pairs of carbon-atoms double-linked.

Professor Tilden asked whether Dr. Gladstone had made any special attempt to determine the composition of the cedrenes; they were commonly regarded as $C_{15}H_{24}$ hydrocarbons, but the difference in composition between $C_{15}H_{24}$ and $C_{15}H_{26}$ was so slight that it was conceivable that the cedrenes were in reality homologues of the terpenes.

Dr. Gladstone said that this suggestion was novel to him.

Dr. Armstrong thought that while Dr. Gladstone

observations agreed with the chemical evidence in assigning the terpenes to a position intermediate between the camphenes and citrenes, the chemical evidence did not harmonize with the assumption that the terpenes contained only a single pair of "double-linked" carbon-atoms; in this respect the terpenes and citrenes must be classed together. In point of fact the $C_{10}H_{16}$ hydrocarbons manifest peculiarities which at present do not admit of satisfactory representation by a symbolic expression.

The Formation and Destruction of Nitrates and Nitrites in Artificial Solutions and in River and Well Waters. By J. M. H. Munro, D.Sc.—Most of the experiments recorded in this paper were made in the years 1883 and 1884, the method followed being that adopted by R. Warington and described in his Second Report on Nitrification (1879). Many of the general conditions of nitrification, as stated by Schlœsing and Muntz, and by Warington, have been confirmed. For example, in no case has nitrification occurred in a solution sterilized by boiling after being seeded with soil and left unopened until tested after an interval of as much as three years. Mercuric chloride, lead acetate and chloroform are all equally fatal to nitrification. As an instance of the slowness of the process in some cases, a solution of 2 grams per litre of ammonium chloride seeded with 2 grams of soil commenced nitrifying only after an incubation of three months, and required two years and ten months for complete nitrification; but when a fresh solution of 1 gram per litre of ammonium chloride was added bodily to this nitrified solution, it commenced to nitrify after an incubation of only five days. Amongst nitrogenous bodies other than ammonium salts, *ethylamine hydrochloride*, *gelatin*, *potassium* and *ammonium thiocyanate* and *urea* are all easily susceptible of complete nitrification in contact with soil. In all these cases ammonia is first formed, and nitrite appears at a subsequent stage, finally passing into nitrate. Thiourea has resisted repeated attempts to nitrify it. Several experiments are cited to show that the organic carbon required in a solution prepared for nitrification is infinitesimal in proportion to the quantity of ammonium salt nitrified. Thus 63 mgrms. ammonium chloride have been completely nitrified to nitrite without any added organic carbon. When an alkaline tartrate or any similar organic matter is included in a solution prepared for nitrification (as has been the case in all published experiments), it delays nitrification, and even brings about a destruction of any nitrate that may pre-exist in the solution *unless all other germs than those of the nitrifying organism are rigorously excluded*. It does this because it encourages a growth of *denitrifying bacteria*, the germs of which exist in the air, in soil, in natural waters, and generally even in the few drops of nitrifying solution employed as seed. Until these bacteria have run their course and died, nitrification does not commence, and hence there is a period of apparent incubation even in solutions otherwise ready for immediate nitrification. By using soil as seed and excluding all other added organic matter, a first solution of ammonium chloride may be caused to commence nitrifying in three or four days; if after nitrification this is poured off and replaced by a second solution, nitrification commences in twenty-four hours; and a third solution employed in a similar manner may (under favourable circumstances) be seen to have commenced nitrifying in seven hours. Well and river waters, since they contain organic matter not fermentible by denitrifying bacteria, form suitable media for the study of nitrification. The salifiable base (calcium carbonate), and the traces of necessary minerals are also present in suitable proportions and in such a form as not to interfere with the perfect transparency of the solutions. Such waters, boiled and filtered and seeded with a little soil, or a few drops of a nitrifying solution, will nitrify added ammonium chloride to the full saturating capacity of the calcium carbonate contained in them. The process usually takes 30 to 40 days at the ordinary temperature. The question as to how far these natural waters contain the nitrifying organism independently of added soil has also been carefully tested. A suitable quantity of ammonium chloride solution (5 c.c. = 5 mgrm. NH_3) is boiled in a sterilized flask plugged with cotton-wool; on cooling, the plug is removed for a moment while the flask is half filled with the water to be examined. A cap of paper is then tied over the flask, which is placed in a warm place (not over 85° F.) for 18—30 days and then opened and tested. If the water possess any nitrifying power some nitrite will almost certainly be found at the end of this period by the metaphenylenediamine test. Eleven waters tested in this way were found to possess nitrifying powers in different degrees: they included river-water, seven well-waters, water from a coal-pit level, rain-water from a brick cistern and water from the Bristol Waterworks Company's main. The wells with sewage contamination, present and past, nitrified readily: probably because the nitrifying organism has already undergone a period of incubation and is in full activity. River water commences nitrifying after nine days, and finishes on the forty-sixth day, nitrite being present as late as the forty-second day. The addition of 1 per cent. of soil hastens the process and lessens the production of nitrite. The only water which failed to produce nitrification after an incubation of eighteen days at 80—85° F. was rain-water caught from the clouds in a sterilized beaker and added to boiled well-water. Well-water will produce a purely nitrous or a purely nitric fermentation, according to circumstances, and the nitrite may persist for at least two years without further oxidation. The nitrifying power of a well-water is not removed by filtration through Swedish paper, and is even increased by filtration through a charcoal filter in common use. The waters remain practically clear throughout, and the deposit is extremely slight; as they encourage the growth of the nitrifying organism almost exclusively (in the dark) they are probably well suited for microscopic observation of this organism. *Denitrification.*—An alkaline tartrate, acetate, or oxalate, sugar, glycerol, or in fact *any* fermentible organic matter, if added to well-water, produces a bacterial reduction or destruction of the nitrate pre-existing in the water. The tartrate, acetate, or oxalate is destroyed with formation of an alkaline carbonate. The water becomes opalescent in 3—4 days, and consistently with this a trace of nitrite is found. In a few more days all the nitrate may be reduced to nitrite. In good waters the reduction may go no further. In many polluted waters, the nitrate and nitrite are totally destroyed, nitrogen gas being evolved. The same effect is produced by the addition of a few drops of sewage to the water, *if the water contain any fermentible organic matter*. Even salicylic acid and phenol lend themselves to this reduction, although they are fatal to nitrification. MM. Gayon and Dupetit, in a memoir published since this paper was in MSS., have examined the phenomenon in great detail by the culture of the denitrifying bacteria in highly artificial solutions. The bacteria which effect the reduction to nitrite in presence of organic matter are common in the air, waters and soil. Those which destroy the nitrate or nitrite with evolution of nitrogen gas were obtained by MM. Gayon and Dupetit from sewage.

Water of Crystallization. By W. W. J. Nicol, M.A., D.Sc., F.R.S.E. The paper is a reply to Professor Pickering's criticism of the author's experiment on the molecular volumes of salts in solution. The author maintains the accuracy of his experiments and of the conclusions derived from them, which are that when a salt is dissolved water of crystallization is indistinguishable from solvent water, both having the same volume; and that water of constitution has in solution a volume markedly different from that of solvent water. Hence it seems certain that water of crystallization does *not* exist in solution, but that the whole of the water present

is in the same relation to the salt, no hydrate definite or indefinite existing in solution. This is supported by experiments on supersaturation, the author having prepared supersaturated solutions from dehydrated salt and *cold* water : the salt dissolving with evolution of heat but without the formation of a hydrate.

Mr. Pickering said that he did not wish for one moment to call in question Dr. Nicol's results, and he even agreed with him so far as to admit that the work showed no difference between combined water and water of solution ; but this was a very different thing to saying that it proved that no water was combined with the salt. He had ample reason for considering that this was a case in which negative evidence proved nothing. He considered that Dr. Nicol's experiments on the magnesium sulphates afforded the strongest evidence which we have of one of the water molecules contained in them being different from the rest. At the same time he thought that that evidence was far too slight to warrant any positive conclusion being drawn ; and even if it proved that such a difference did exist, it would not prove that this one molecule was so-called constitutional water. A discussion of the thermal phenomena attending dissolution would open the whole question of the nature of solution, into which it was impossible then to enter. Although Mr. Pickering could not accept Dr. Nicol's theory of solution, he by no means adhered to what is ordinarily understood by the "hydrate theory." It was impossible, he thought, to draw any general conclusions as to the nature of solution from the behaviour of one of the most exceptional salts which we know, sodium sulphate.

Dr. Nicol said that he was glad to hear that Mr. Pickering had no wish to call in question the accuracy of his results, for that was not the impression to be gathered from Mr. Pickering's paper. As to negative evidence proving nothing, he thought that it should have at least as much weight as an affirmative statement, unsupported by any evidence other perhaps than the colour of cobalt and copper chlorides. In using the term constitutional water, he had no intention of committing himself to more than the statement that one water molecule was differently related to the salt in solution from the remainder of the water. With regard to the dissolution of a dehyrated salt without the intermediate formation of a hydrate, he had used sodium sulphate as the most convenient, but had performed similar experiments with sodium thiosulphate, magnesium sulphate and other salts. He was of the opinion that such experiments are conclusive evidence against the existence in solution of hydrates of these salts.

Dr. Armstrong called attention to T. Thomsen's recent observations on the supposed division of the water between two bodies in solution (*J. pr. Chem.*, 1885, xxxii., 211 ; *Chem. Soc. Abs.*, 1886, 12).

A Method of investigating the Constitution of Azo-, Diazo- and Analogous Compounds. By R. Meldola, F.R.S., and F. W. Streatfeild.

The Estimation of Free Oxygen in Water. By Miss K. I. Williams and Professor W. Ramsay.—The authors have instituted a comparison of Schützenberger's methods of estimating free oxygen in water with each other and with the gasometric method with favourable results. Schützenberger's first method, which consists in adding sodium hyposulphite to a measured quantity of water, using indigo-carmine as an indicator, is stated by him to estimate only half the amount of free oxygen ; his second method in which water containing free oxygen is added to indigo-white, turning it blue, and the amount of oxidized indigo-white is estimated by hyposulphite, was regarded by him as the only accurate one. The authors disprove the assertion, and show that there is a preliminary stage in the first process when colour disappears ; but that on standing for some time a blue colour appears, to destroy which permanently requires such an addition of hyposulphite as to make the total amount equal to that employed in operating according to the second method. The proportion of hyposulphite used during the first stage of Method I. to the total amount used is 3 to 5 ; but they believe that this proportion was conditioned by the temperature and dilution prevailing during the experiments. It is also shown that hyposulphite of soda reacts to some extent with hydrogen dioxide, thus negativing the statements of Schützenberger.

Note as to the Existence of an Allotropic Modification of Nitrogen. By Miss K. I. Williams and Professor Ramsay.—Attention was some time ago directed to the existence of an allotropic modification of nitrogen by Mr. J. Stillingfleet Johnson, who stated that an active modification of this element could be prepared by heating a mixture of potassium nitrite and ammonium chloride solutions ; and that on passing the evolved gas over heated platinum sponge along with hydrogen, ammonia was formed. The support lately given to this statement by the experiments of Professors J. J. Thomson and Threlfall has suggested the propriety of testing Johnson's statement by further experiments ; the results, however, have been negative. The hydrogen used in the experiments was prepared by the action of chlorhydric acid on granulated zinc. It was collected in a gasholder and dried by passing it first through sulphuric acid and then over phosphoric anhydride. In preparing the nitrogen, 85 grams of potassium nitrite was dissolved in distilled water and added to a solution of 53·4 grams of ammonium chloride : some ammonia and then some crystals of cupric chloride were introduced. On the addition of a sufficient proportion of this latter compound a steady stream of gas came off and was collected in a gasholder. In order to dry it and remove any oxides of nitrogen or ammonia present in the gas, it was first passed through a tube containing pumice stone soaked in acid solution of ferrous sulphate, next through a wash-bottle partly filled with sulphuric acid, over pumice stone soaked with Nessler's reagent, then over pumice stone soaked with sulphuric acid, and then through a tube filled with phosphoric anhydride. At this point the two streams of gas were brought together by a T-tube, and the mixture passed over heated platinum sponge into bulbs containing chlorhydric acid. At the end of each experiment the contents of the bulbs was washed into an evaporating basin and evaporated over a water-bath ; the residue was then dissolved in distilled water and tested for ammonia with Nessler's reagent. The first experiment was made with about 4·38 litres of nitrogen prepared at a temperature of about 100° ; the result being that the Nessler's reagent was coloured merely a faint yellow. In a second experiment the nitrogen used was evolved at first from the mixed solution by external application of heat, but on adding more cupric chloride the reaction went on alone and the temperature was lower than in the first experiment. To get accurate results the capacity of the nitrogen gasholder was gauged; when full of water it contained 8·481 litres, equal to 7·7031 litres at 0° C. and 760 mm. After using the whole of this nitrogen, at the end of the experiment the same tint was obtained as that given by 1·10 c.c. of ammonium chloride solution in 100 c.c. of distilled water with Nessler's reagent, 1 c c. of the ammonium chloride containing 0·00019107 gram NH_4Cl or 0·00005 gram N. Therefore the amount of "active nitrogen" was only 0·000055 gram in the 7·7031 litres. To obtain better results, if possible, during the preparation of the next gasholder full of nitrogen, the flask from which it was evolved was carefully kept below 50° C., the temperature being watched by means of a thermometer placed in the cork of the flask. In this case the ammonia formed produced the same tint with Nessler's reagent as that given by 1·14 c.c. of the standard ammonium chloride solution, proving the presence of only 0·000057 gram "active nitrogen" in 7·7031 litres. It is evident, therefore, that these experiments fail to corroborate Mr. Johnson's results.

The Presence of a Reducing Agent, probably Hydrogen Peroxide, in Natural Water. By Professor Ramsay.—Distilled water, as well as ordinary tap water, has a reducing action on potassium permanganate. The amount of the reducing agent is increased by evaporation, even when all possibility of contamination with solid organic impurity is excluded. The amount of reduction is far too great to be ascribed to the nitrites present in the water. The experiments described in the paper show under what circumstances and to what extent this substance—which is probably hydrogen dioxide—is produced. If this supposition be correct and the active substance in natural water be really hydrogen peroxide, it becomes of importance to ascertain its action on organic impurities contained in many natural waters. Experiments were therefore made quantitatively on the action of dilute solutions of peroxide of hydrogen on urea, and it was found that the urea is slowly oxidized on standing; the rate of this action has also been measured. —(Comp. H. B. Dixon, *Chem. Soc. Trans.*, 1886, p. 108.)

Evaporation and Dissociation. Part IV. A Study of the Thermal Properties of Acetic Acid. By W. Ramsay, Ph.D., and Sydney Young, D.Sc.—This paper contains a record of measurements of the relative density of liquid acetic acid at 13·11° (water at 4°=1·0), the number obtained being 1·05682; its expansion up to a temperature of 280°, at which the volume of 1 gram is 1·5172 c.c.; its vapour-pressures, which reach 24600 mm. at 280°; and the density of its saturated and unsaturated vapour at different temperatures and pressures. The minimum value of the density of the saturated vapour is at 150°, and is equal to 50·06 (H=1·0); it increases both with rise and with fall of temperature. The values of $\frac{dp}{dt}$ have also been calculated, and from them and from the other data the heats of vaporization have been deduced. Here again, there is a maximum value at 110·6°; the latent heat at this point is 92·8 C., and decreases both with rise and fall of temperature. Diagrams are appended contrasting the behaviour of acetic acid with that of alcohol and of ether.

Note on the Vapour Densities of Chloral Ethyl-Alcoholate. By William Ramsay, Ph.D., and Sydney Young, D.Sc.—This paper contains an account of determinations of the densities of the saturated and unsaturated vapour of chloral ethyl-alcoholate. The amount of dissociation is always very great, the percentage number of molecules decomposed being never less than 75. Owing to the very small variation of vapour-density under different conditions of pressure and temperature, to the impossibility of obtaining very concordant results with such a substance, and to the fact, noticed to a smaller extent with acetic acid, that on decreasing the volume condensation begins before the pressure has reached its maximum, it is impossible to draw any very definite conclusion regarding the relation of the density of the saturated vapour of this body to the temperature, but it may be stated that a rise in the density of the saturated vapour with fall of temperature could not be detected. The density of the unsaturated vapour diminishes with rise of temperature at constant pressure, and with fall of pressure at constant temperature.

The Nature of Liquids as shown by a Study of the Thermal Properties of Stable and of Dissociable Bodies. By William Ramsay, Ph.D., and Sydney Young, D.Sc.—After Deville advanced the theory of dissociation, its opponents endeavoured to explain the abnormality of the vapour-density of unstable bodies by ascribing it to a deviation from Avogadro's law supposed to occur in many liquids at temperatures and pressures near their condensation points. No complete research having been made to compare the behaviour of stable and of dissociable bodies in this respect, the authors have investigated the thermal properties of alcohol, ether, acetic acid and chloral alcoholate. In all cases, they have found abnormality at high pressures. But whereas with alcohol and with ether the density of the saturated vapour becomes and remains normal below certain temperatures, with acetic acid the density when at its lowest is abnormally high and increases with fall as well as with rise of temperature. The two theories alluded to above, by which attempts have been made to explain this abnormal density, are (1) that the gaseous molecules exercising attraction on one another are thereby drawn closer together, and (2) that gaseous molecules combine to form more complex molecules such as are by many supposed to exist in liquids. It appears to the authors inconceivable that this effect should be produced by the same cause under conditions so totally different: for at low temperatures the stability of a saturated vapour is greater while the molecules are necessarily further apart; and at high temperatures, owing to the high pressure, the molecules are in closer proximity, while the stability is necessarily decreased. With acetic acid, it appears therefore that the abnormality at high temperatures is due to a physical cause, common to all liquids, but at low temperatures must be ascribed to some sort of chemical combination between the gaseous molecules.

The Electromotive Forces developed during the combination of Cadmium and Iodine in Presence of Water. By A. P. Laurie, B.A., B.Sc.—The author has determined by means of a Thomson electrometer the electromotive forces of cells consisting of a cadmium and a platinum plate immersed in a solution of cadmium iodide containing free iodine. In one set of experiments, the amount of cadmium iodide in solution was constant, and the amount of iodine was varied; in another the amount of cadmium iodide varied, the solution being in each case saturated with iodine; in a third, a constant amount of iodine, but varying amounts of cadmium iodide were used. The result of the experiments is to show that if cadmium and water containing cadmium iodide and free iodine are brought together, a considerable electromotive force is developed, which steadily falls. This depends on the facts (1) that as the free iodine is diminished the electromotive force falls, gradually at first, but more rapidly the less iodine there is present; (2) that as the cadmium iodide solution increases in strength, the electromotive force falls off very rapidly while very small quantities of the salt are present, but more and more slowly as the amount of salt present becomes considerable. In both cases the change may be represented by a continuous curve. The actual values are given in the paper.

Detection and Estimation of Iodine, Bromine and Chlorine. By M. Dechan.—To separate iodine from a mixture of chloride, bromide and iodide, the author distils with a concentrated solution of potassium bichromate (40 grams $K_2Cr_2O_7$ to 100 c.c. water). On repeating the distillation, after adding a small quantity of sulphuric acid, the bromine only passes over, provided that the solution be not too concentrated. The apparatus is therefore so arranged that by means of a stopcock funnel water may be added whenever necessary. The following results are quoted :—

Iodine.		Bromine.		Chlorine.	
Taken.	Found.	Taken.	Found.	Taken.	Found.
0·01443	0·01441	0·0126	0·01254	0·0123	0·0122
0·0288	0·02833	0·0252	0·0250	0·056	—
0·0576	0·05628	0·0504	0 05009	0·194	—

The Analysis of Alloys and Minerals containing the heavy Metals, Selenium, Tellurium, etc. By Thomas Bayley.—The metals precipitable as sulphides are commonly divided into the two groups of those forming sulphides insoluble in alkaline sulphides, and those whose sulphides are soluble. The method of extraction with an alkaline sulphide is often applied in qualitative but less often in quantitative analysis, owing to the difficulty of completely removing the soluble sulphides when once they have been

precipitated in admixture with the other sulphides. Instead of precipitating both classes together, it is better, the author finds, to prevent the precipitation of the thiosalt forming elements altogether, experience having shown that the process conducted on this principle is at once accurate and very easy of execution. The process recommended consists in passing sulphuretted hydrogen into a boiling solution containing the substance together with citric and tartaric acids and caustic soda.

Parliamentary and Law Proceedings.

THE PHARMACEUTICAL SOCIETY OF GREAT BRITAIN *v.* W. E. PRATT.

This case was tried in the Nottingham County Court, held on Wednesday, June 30, before His Honour Judge Bristowe.

It was stated that the defendant was sued by the Council of the Pharmaceutical Society of Great Britain, for a penalty of £5 incurred under section 15 of the Pharmacy Act, 1868, by the taking, using, or exhibiting of the name or title "Druggist" contrary to the Pharmacy Act, 1868; that the defendant carried on a retail business at No. 1, Beck Street, Nottingham, and in that business used labels upon which he was described as "Wholesale Druggist," he in fact not being a *bonâ fide* wholesale druggist or a duly registered chemist and druggist.

Proof was given of the purchase of articles at the defendant's shop on May 11, upon which labels were affixed bearing defendant's name, and the words "Wholesale Druggist."

It was submitted on behalf of the defendant, that as the defendant did some wholesale business, he was entitled to use the title of "Wholesale Druggist."

Defendant was examined, and deposed that he did some wholesale business in drugs, and that he sold scheduled poisons to medical men who called for them. He understood wholesale dealing to mean dealing in any quantity to be sold again.

Cross-examined, the defendant admitted that he was carrying on a retail business, and that he sold drugs by retail.

Mr. Dennis, called by the defendant, deposed that his firm "Dennis and Roberts," in Nottingham, used the style "Wholesale Druggists." The business of his firm was a wholesale one, but they would not object to sell retail.

Cross-examined, the witness admitted that he was upon the Register of Chemists and Druggists.

His Honour gave a verdict for the plaintiffs with costs.

A FATAL DOSE OF AMMONIA.

Dr. Wynn Westcott held an inquest, on Tuesday, at Paddington respecting the death of John William Harris, aged 63, of Titchborne Street, Paddington.

The evidence of the widow showed that the deceased, a cab proprietor, had been a total abstainer for many years, and that three months ago he attended some temperance lectures, and there heard that ammonia was a good thing to take as a stimulant. He had been suffering from pains in the chest, and, thinking ammonia would benefit him, took a dessert spoonful without diluting it. He was taken very ill, upon which Dr. Norman Kerr was called, who found that the skin of his mouth had been entirely destroyed, and was hanging in patches. The deceased, who was in great agony, told Dr. Kerr that he had taken the ammonia, thinking that it would do him good. The deceased gradually grew worse, and died on Sunday last from the effects of the poison.

The Jury returned a verdict of "Accidental Death."

Obituary.

Notice has been received of the death of the following:—

On the 5th of April, Mr. Charles Williams, Chemist and Druggist, Uffculme. Aged 69 years.

On the 15th of June, Mr. George Saunders, Chemist and Druggist, Peckham Rye, London. Aged 59 years.

On the 15th of June, Mr. James William Holmes, Chemist and Druggist, Hull. Aged 31 years.

On the 22nd of June, Mr. Edwin Hopton, Chemist and Druggist, Idle. Aged 46 years. Mr. Hopton had been a Member of the Pharmaceutical Society since 1869.

On the 27th of June, Mr. William Grindley, Pharmaceutical Chemist (of the firm of Grindley & Son), Chester. Aged 46 years. Mr. Grindley had been a Member of the Pharmaceutical Society since 1865, and formerly held the office of Local Secretary.

BOOKS RECEIVED.

THE FIRST APPENDIX TO THE MEDICAL DIGEST, including the Years 1882–5 and early part of 1886. By RICHARD NEALE, M.D. London: Ledger, Smith and Co. 1886.

CHEMISTRY OF THE CARBON COMPOUNDS; OR ORGANIC CHEMISTRY. By Professor VICTOR VON RICHTER. Translated from the Fourth German Edition, by EDGAR F. SMITH. London: H. Kimpton. 1886.

MATERIA MEDICA. A Manual for the Use of Students. By ISAMBARD OWEN, M.D., F.R.C.P., etc. Second Edition. London: J. and A. Churchill. 1886.

YUCCA ANGUSTIFOLIA. A Chemical Study. By HELEN C. DE S. ABBOT. Philadelphia. 1886.

DIE PYRIDINBASEN IN DER CHEMISCHEN LITTERATUR. By ADOLF HESEKIEL. Leipzig: L. Voss. 1886.

ICHTHYOL UND RESORCIN as Repräsentantender Gruppe reduzierender Heilmittel. By Dr. P. G. UNNA. Leipzig: L. Voss. 1886.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE BITTER PRINCIPLE OF HOPS.

Sir,—May I encroach upon your valuable space, to communicate my observations concerning the bitter principle of the hop (*Humulus Lupulus*)? Being interested in the subject, I made a strong tincture of hops with spt. tenuior, but failed to obtain any crystallizable substance from it, although a number of methods were employed. I then made an ethereal extract from the green strobiles, and obtained from this a mass of minute white acicular crystals, soluble in water, ether, and bisulphide of carbon. Three grains of the crystals dissolved in water, and injected hypodermically into the jugular vein of a medium sized cat, caused the death of the animal in seven minutes. The cat appeared in no pain, but showed a peculiar twitching of the muscles. FREDERICK DAVIS.

S. R.—*Jasione montana.*

Nemo.—(1) We cannot say. (2) Ganot's 'Elementary Treatise on Physics.' (3) Yes, apprentices have to present a recommendation from a member or associate in business, who is willing to become responsible for the safe-keeping and return of the books. Forms may be obtained from the librarian.

E. J. King is advised to make his want known to the shipping agents.

W. E.—Carpenter's 'Microscope.' (2) Jenkin's 'Electricity and Magnetism.' (3) Hardwich's 'Photography.'

W. Asten.—We have no information up on the subject beyond what has been already published.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Hebbeler, Aston, Thompson, Neale, Galen, M. P. S

The Pharmaceutical Journal.

SATURDAY, JULY 10, 1886.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

BRITISH PHARMACEUTICAL CONFERENCE.

IT has already been announced in the report of the proceedings of the Executive Committee of the British Pharmaceutical Conference last December, that the date of the Conference meeting at Birmingham this year has been fixed for Tuesday, August 31, and from information received from the General Secretaries we are in a position to be able to announce that in a few days each member will receive an invitation to be present at the forthcoming meeting. For four successive years the Conference has met on the coast, viz., at Southampton, Southport, Hastings and Aberdeen. The great Midland town and its surroundings will therefore afford to members accustomed to attend the Conference meetings a distinct change of interest this year. Birmingham occupies a remarkably central position, and no other town is more easily reached from all parts of the Kingdom. It is therefore anticipated that the meeting this year will be very numerously attended. We understand that the Local Committee has made arrangements that members of the Conference will have the privilege of inspecting some of the works where manufactures are carried on. Further, in connection with the meeting of the British Association an exhibition of the products of local industries and local manufacturing processes carried on within fifteen miles of Birmingham will be held in Bingley Hall. Visitors will therefore have every opportunity of obtaining a very fair idea of what Birmingham really does produce.

Turning to the actual business programme, we find that by permission of management of the Mason Science College the meeting will be held in the chemical lecture theatre of that Institution. Some alterations in the hours have been made. The Executive Committee will not, as heretofore, meet on the Monday evening preceding the general meeting, but at 9 a.m. on Tuesday, the 31st of August. As before, the general business proceedings will occupy both Tuesday and Wednesday, but they will commence at 10 a.m. in place of 10.30 each day, and the interval for luncheon will be from 1 to 2 p.m. instead of from 1 to 2.30. The proceedings on both days will be brought to a conclusion at 4 instead of 5 p.m. On many previous occasions the luncheon interval has been used for the purpose of visiting works, etc., and members have become so interested that they have unduly prolonged their inspection, and the attendance at the afternoon meetings has been materially lessened. At Birmingham this will not occur. With regard to material for discussion we are glad to state that we are informed by the General Secretaries that several papers on subjects of interest to all pharmacists have already been promised.

Although the chief object of the Conference is the advancement of pharmaceutical science, another object is the promotion of friendly re-union and common goodwill among pharmacists. It must be admitted that the proposed arrangements at Birmingham are calculated to promote the latter object in a marked degree. Members will be invited to meet the President and officers of the Conference at a conversazione on the evening of Monday, August 30. This conversazione will supply a long-felt want. Members hitherto have not had much opportunity of becoming known to one another, until the excursion at the termination of the meeting. A concert will be given at the Grand Hotel on one of the evenings, and on Thursday, September 2, it is proposed to make an excursion to Stratford-on-Avon, Leamington, and Kenilworth. The party will lunch at Leamington, and will be conveyed thence by road through Warwick and Kenilworth, opportunity being afforded of visiting Guy's Cliff and Stoneleigh Abbey on the way. Members will therefore on this excursion not only see many places of the greatest possible historic interest, but they will also drive through some of the most picturesque scenery in England.

A new feature in this year's Conference is that tickets at a fixed price will be sent on application to members. One admits to the conversazione and concert, entitles the holder to luncheon each day and to the use of the conveyances provided at the termination of each day's business. The other is for the excursion, and admits the holder to the various places of interest at Stratford, Leamington and Kenilworth. This is at it should be. We have on previous occasions spoken of the collection by local committees of large sums of money and the lavish expenditure sometimes incurred in the entertainment of visitors as being inimical to the best interests of the Conference. The Executive Committee has for some years past endeavoured to check and limit local expenditure, and we are glad to see that Birmingham has the courage to issue tickets for the excursion, etc., at a definite charge. The head-quarters of the Conference will be at the Grand Hotel, Colmore Row, where beds have been secured at the usual tariff. The Secretary to the Local Committee is Mr. CHAS. THOMPSON, Stratford Road, Sparkbrook, Birmingham. In order to facilitate the local arrangements those who intend to be present are requested to communicate with Mr. THOMPSON on or before Monday, August 23. He will be glad to secure accommodation for members at head-quarters, or will give assistance in obtaining private lodgings or in securing beds at other hotels if desired.

The annual meeting of the School of Pharmacy Students' Association, to receive the report of the Executive Committee on the past session, will be held on Thursday, July 15. Professor Attfield will take the chair at 7 p.m.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, July 7, 1886.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT.

MR. THOMAS PRESTON GOSTLING, VICE-PRESIDENT.

Messrs. Allen, Atkins, Baildon, Borland, Butt, Cross, Greenish, Hampson, Hills, Radley, Richardson, Robbins, Savage, Schacht, Southall, Symes and Williams.

The minutes of the previous meeting were read and confirmed.

Appointment of an Examiner.

The President said a meeting of the members and associates resident in Scotland had been held on June 22, when it was unanimously resolved that Mr. David Brown Dott, Edinburgh, be nominated to fill the vacancy on the Board of Examiners in Scotland, caused by the election of Mr. Baildon as a member of the Council. He would therefore move—

"That Mr. David Brown Dott, of Edinburgh, be appointed a member of the Board of Examiners in Scotland, in place of Mr. Baildon, now a member of Council."

He need not add anything except to congratulate the Board of Examiners in Scotland on this accession to its strength. They all knew the exceedingly good work which Mr. Dott had done in chemistry, and felt proud to have him as an officer of the Society.

The Vice-President seconded the motion, which was carried unanimously.

The President read a letter which had been received from Mr. Bosisto, acknowledging the resolution passed last month, and expressing the hope that friendly relations would always subsist between the home Society and the daughter Society in Victoria.

Diplomas.

The following, being duly registered as pharmaceutical chemists, were respectively granted a diploma stamped with the seal of the Society :—

Barrett, Arthur Albert.
Cuff, George Henry.
Johnston, William.
Rogers, Frank Ashley.

Elections.

MEMBERS.

Pharmaceutical Chemists.

The following, having passed the Major examination and tendered their subscriptions for the current year, were elected "Members" of the Society :—

Cuff, George Henry.....Bristol.
Rogers, Frank Ashley .....Nottingham.

ASSOCIATE IN BUSINESS.

Frederic John Gibson, of Wolverhampton, having passed the Minor examination, being in business on his own account, and having tendered his subscription for the current year, was elected an "Associate in Business" of the Society.

ASSOCIATES.

The following, having passed the Minor examination and tendered (or paid as "Apprentices or Students") their subscriptions for the current year, were elected "Associates" of the Society :—

Aspinall, John William .....Ulverston.
Brunyee, Arthur .....Thorne.
Crisford, Frederick James .....St. Leonards.
Dakers, Percy Philip .....London.
Davies, James John .....Newcastle Emlyn.
Fairweather, Ernest Barratt ...Tavistock.
Firth, Marmaduke ....Bradford.
Hay, Arthur..... .....Great Yarmouth.
Johnson, William Wilson .....Aberystwith.
Margetts, William Burgess ...Kettering.
Tomlin, John Percy..... ...Tunbridge Wells.
Toms, John .....Plymouth.
Walker, James .....Rugby.

APPRENTICES OR STUDENTS.

The following, having passed the Preliminary examination, and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Batchelor, William ....Stalybridge.
Bowen, Frederic Tamerlane ...Rye.
Brownlow, John .....Gainsborough.
Cain, Henry .....London.
Colman, Alfred Ernest .....Newport, I.W.
Coleman, Frank Henry .....Chapel Brampton.
Ecroyd, Walter..... ..Keighley.
Forbes, Alexander .....Fraserburgh.
Frost, William Tite.....Northampton.
Hobson, Edmund..... .....Cheadle.
Martin, William .....Exeter.
Wilson, George Waite.....Boston.

Several persons were restored to their former status in the Society upon payment of the subscription for the current year and a fine.

Appointment of Professors.

Dr. Theophilus Redwood was re-appointed Emeritus Professor of Pharmacy for the ensuing year.

Professor Bentley was re-appointed Professor of Botany and Materia Medica for the ensuing year.

Professor Attfield was re-appointed Professor of Practical Chemistry for the ensuing year.

Professor Dunstan was re-appointed Professor of Chemistry for the ensuing year.

Local Secretaries.

The following list, which had been prepared by the Library, Museum, Laboratory and House Committee, was unanimously agreed to as constituting the Local Secretaries for the ensuing year.

List of Local Secretaries, 1886–87.*

Towns eligible.	Names of persons appointed.
Aberdeen	Strachan, Alexander.
Aberystwith	Wynne, Edwin Price.
Abingdon	Smith, William.
Accrington	Stanley, Thomas.
Altrincham	Clarke, James Thomas.
Andover	Bienvenu, John.
Appleby	Longrigg, John.
Arbroath	Burn, David Haitly.
Ashbourne	Reckless, Arthur Henry.
Ashby de la Zouch	Bullen, George Wm.
Ashford	
Ashton-under-Lyne	Fisher, Edwin.
Aylesbury	Turner, John.
Ayr	
Banbury	Ball, George Vincent.
Banff	Alexander, William.
Bangor	Roberts, Meshach.
Barnsley	Badger, Alfred.
Barnstaple	Goss, Samuel.
Barrow-in-Furness	Steel, Thomas.
Basingstoke	Sapp, Arkas.
Bath	Merrikin, John B.
Bedford	Taylor, James Bennett.

* Local Secretaries are appointed in all towns in Great Britain (except London and Edinburgh) which return a Member or Members to Parliament, and in such other towns as contain not less than three Members of the Society or Associates in Business.

Towns eligible.	Names of persons appointed.
Belper	Burkinshaw, W. T.
Berwick	Carr, Walter Paterson.
Beverley	Hobson, Charles.
Biggleswade	Evans, John.
Bilston	Gray, Charles.
Birkenhead	Dutton, Hugh O.
Birmingham	Southall, Alfred.
Bishop Auckland	Thorburn, H. W.
Blackburn	Garland, Alfred P.
Blackpool	Jackson, Joseph.
Bodmin	Williams, Joel Drew.
Bolton	Mason, William B.
Boston	Haller, Frederick Wm.
Bournemouth	Duncan, Alexander.
Bradford (Yorkshire)	Rimmington, Felix M.
Bridgnorth	Deighton, Thomas Milner.
Bridgwater	Basker, John Anthony.
Bridlington	Jackson, Henry John.
Brighton	Gwatkin, James Ross.
Bristol	Stroud, John.
Burnley	Cowgill, Bryan H.
Burslem	Blackshaw, Thomas.
Burton-on-Trent	Wright, George.
Bury	Bowker, Ellis.
Bury St. Edmunds	Summers, Frank.
Buxton	Wright, Robert.
Camborne	Fiddick, Thomas.
Cambridge	Deck, Arthur.
Canterbury	Bing, Edwin.
Cardiff	Munday, John.
Cardigan	Jones, John Edward.
Carlisle	Thompson, Andrew.
Carmarthen	Davies, Richard Morgan.
Carnarvon	Lloyd, William.
Chatham	Crofts, Holmes C.
Chelmsford	Baker, Garrad.
Cheltenham	Barron, William.
Chertsey	Boyce, George.
Chester	Baxter, George.
Chesterfield	Windle, John T.
Chichester	Long, William Elliott.
Chippenham	Coles, John Coles.
Chorley	Hill, William.
Christchurch	Green, John.
Cockermouth	Bowerbank, Joseph.
Colchester	Cordley, William Bains.
Congleton	Goode, Charles.
Coventry	Hinds, James.
Crewe	Harrop, Wm. H.
Croydon	Barritt, George.
Darlington	Robinson, James.
Dartford	Wilson, Richd. Edward.
Deal	Green, John.
Denbigh	Jones, John Harrison.
Derby	Cope, John A.
Devizes	Edwards, Thos. Roberts.
Devonport	Codd, Francis.
Dewsbury	Gloyne, Charles G.
Diss	Gostling, Thomas Preston.
Doncaster	Howorth, James.
Dorking	Clift, Joseph.
Douglas	Brearey, William A.
Dover	Bottle, Alexander.
Droitwich	Sandiland, Robert B.
Dudley	Gare, Charles Hazard.
Dumfries	Allan, William.
Dundee	Hardie, James.
Dunfermline	Seath, Alexander.
Durham	Sarsfield, William.
Eastbourne	Crook, Herbert.
East Grinstead	Tully, John.
Eccles	
Egremont (Cumberland)	Ireland, Edward J.
Elgin	Robertson, William.
Ely	Pate, Henry Thomas.
Epping	Rowland, Thomas.
Evesham	Dingley, Richard Loxley.
Exeter	Broom, William W.
Eye	Bishop, Robert.
Falkirk	Murdoch, David.
Falmouth	Newman, Walter Francis.
Fareham	Batchelor, Charles.
Faversham	Lenfestey, William G.
Flint	Jones, Michael.
Folkestone	Goodliffe, George.
Forfar	Ranken, James A.
Gainsborough	Spouncer, Henry Thomas.
Gateshead	
Glasgow	Kinninmont, Alexander.
Gloucester	Ward, Joseph.
Gosport	Mumby, C. J. E.
Grantham	Whysall, William.
Gravesend	Bulgin, William.
Greenock	McNaught, Archibald.
Grimsby, Great	Cook, Robert, junior.
Guildford	Martin, Edward W.
Haddington	Watt, James.
Halifax	Dyer, William.
Hanley	Eardley, James F.
Harrogate	Davis, R. Hayton.
Hartlepool	Jackson, William G.
Harwich	Bevan, Charles F.
Hastings and St. Leonards	Bell, James Alfred.
Hawick	Craig, John.
Helensburgh	Harvie, George.
Henley-on-Thames	Hunu, Benjamin.
Hereford	Williams, Walter.
Hertford	Durrant, George R.
Hexham	Gibson, John Pattison.
Heywood	Beckett, William.
Hitchin	Ransom, William.
Honiton	Dyer, Edward H.
Horncastle	Kemp, Herbert W.
Houghton-le-Spring	Rowell, R. H.
Huddersfield	King, William.
Hull	Bell, Charles Bains.
Huntingdon	Provost, John Pullen.
Huntly	Chalmers, George.
Hyde	Wild, Joseph.
Hythe	Lemmon, Robert Alce.
Inverness	Galloway, George Ross.
Ipswich	Anness, Samuel Richard.
Jersey	Ereaut, John.
Keighley	
Kendal	Severs, Joseph.
Kettering	Thursfield, John F.
Kidderminster	
Kilmarnock	Borland, John.
King's Lynn	
Kingston on-Thames	Walmsley, Samuel.
Kingswinford	
Kirkcaldy	Storrar, David.
Knutsford	Silvester, Henry T.
Lancaster	Vince, James.
Launceston	White, Thomas.
Leamington	Davis, Henry.
Leeds	Reynolds, Richard.
Leek	Johnson, William.
Leicester	Clark, Walter Beales.
Leigh (Lancs.)	Bennett, John W.
Leighton Buzzard	Readman, William.
Leith	Finlayson, Thomas.
Leominster	Davis, David Frederick.
Lewes	Saxby, Henry.
Lichfield	Perkins, John Jaquest.
Lincoln	Maltby, Joseph.
Liverpool	Symes, Charles.
Llandudno	Brookes, George.
Longton	Prince, A. G.
Loughborough	Foulds, Astley Cooper.

Towns eligible.	Names of persons appointed.
Louth	Hurst, John.
Lowestoft	Sale, Thomas J.
Ludlow	Woodhouse, George.
Luton	Duberley, George S.
Macclesfield	Bates, William Isaac.
Maidenhead	Walton, Ralph.
Maidstone	Stonham, W. B.
Maldon	Wallworth, David.
Malton	Buckle, James.
Malvern	Metcalfe, Edmund Henry.
Manchester, etc.	Wilkinson, William.
Mansfield	Patterson, Douglas John.
March	Davies, Peter Hughes.
Margate	Candler, Joseph Thomas.
Market Harborough	Bragg, William B.
Melton Mowbray	Leadbetter, William A.
Merthyr Tydvil	Smyth, Walter.
Middlesborough	Buck, Thomas.
Montrose	Burrell, George.
Morpeth	Marshall, George T.
Neath	Hibbert, Walter.
Newark	March, William.
Newbury	
Newcastle-on-Tyne	Martin, Nicholas H.
Newcastle-under-Lyme	Cartwright, William.
Newmarket	Barrow, Frank Arthur.
Newport (Mon.)	Phillips, John.
Newport (Salop)	Barlow, John.
Normanton	Farnsworth, William.
Northampton	Bingley, John.
Northwich	Humphreys, Griffith.
Norwich	Sutton, Francis.
Nottingham	Parker, William Henry.
Nuneaton	Iliffe, George.
Oldham	Hargraves, H. Lister.
Oswestry	Evans, John.
Otley	
Over Darwen	Shorrock, Ralph.
Oxford	Prior, George Thomas.
Paisley	Graham, Robert.
Pembroke	Treweeks, Rich. Harwood.
Penrith	Redfern, Tom.
Penzance	Buckett, Alfred Henry.
Perth	Donald, David.
Peterborough	Heanley, Marshall.
Petersfield	Edgeler, William B.
Plymouth	Woods, William.
Pontefract	Bratley, William.
Pontypridd	Cule, Taliesin.
Poole	Pomeroy, Francis T.
Portsmouth, etc.	Childs, James L.
Preston	Sharples, George.
Prestwich	Mercer, Allan.
Radcliffe	Pollitt, Joseph Moore.
Ramsey (Hunts)	Palmer, Frederick Wm.
Ramsgate	Baily, Edward.
Reading	Cardwell, Ernest.
Redditch	Mousley, William.
Reigate	
Richmond (Yorks)	Thompson, John Thomas.
Ripon	Parkin, Joseph Brooks.
Rochdale	Taylor, Edward.
Rochester	Watts, George Wm.
Romford	Lasham, John William.
Ross	Matthews, Thomas.
Rotherham	Horsfield, John M.
Rothesay	Duncan, William.
Rugby	Brown, Frederic P.
Ruthin	Rouw, Theodore J.
Ryde (Isle of Wight)	Pollard, Henry Hindes.
Rye	Waters, William Allen.
St. Albans	Ekins, Arthur E.
St. Andrews	Govan, Alexander.
St. Austell	Dunn, Sampson.
St. Ives (Cornwall)	Young, Tonkin.
Saffron Walden	Gilling, John.
Salisbury	Atkins, William Ralph.
Scarborough	Whitfield, John.
Seacombe	Miller, William Hy.
Selby	Cutting, Thomas John.
Sevenoaks	Pain, Edwin.
Sheffield	Ward, William.
Shields, South	Noble, John.
Shipley	Dunn, Henry.
Shrewsbury	Cross, William Gowen.
Skipton	Richardson, Joseph W.
Southampton	Dawson, Oliver R.
South Molton	Swingburn, Richd. Hy.
Southport	Ashton, William.
Spalding	Shadford, Major.
Stafford	Averill, John.
Stalybridge	Simpson, Allwood.
Stamford	March, Richard.
Stirling	Shairp, William.
Stockport	Kay, Samuel.
Stockton-on-Tees	
Stoke-on-Trent	Adams, Frank.
Stourbridge	Bland, Thomas Frederick.
Stowmarket	Gostling, George James.
Stratford-on-Avon	Hawkes, Richard.
Stroud	Coley, Samuel James.
Sudbury	Harding, James J.
Sunderland	Harrison, John.
Swansea	Grose, Nicholas M.
Tamworth	Allkins, Thomas Boulton.
Taunton	Gregory, George Henry.
Tavistock	Gill, William.
Teignmouth	Cornelius, Joseph.
Tenby	Davies, Moses Prosser.
Thirsk	Foggitt, John B.
Tiverton	Havill, Paul.
Torquay	Smith, Edward.
Totnes	Morse, Charles H. S.
Truro	Percy, Thomas Bickle.
Tunbridge Wells	Howard, Richard.
Tynemouth	Stobbs, Robert.
Uttoxeter	Johnson, John Borwell.
Ventnor	Weston, Charles.
Wakefield	Wice, Jonathan H.
Walsall	Bate, Joseph William.
Warrington	Greenough, Hugh F.
Warwick	Pratt, Henry.
Watford	Chater, Edward Mitchell.
Wednesbury	Gittoes, Samuel James.
Wellington (Salop)	Bates, James.
Wellington (Somerset)	Windeatt, George Jas.
Wells (Somerset)	Manning, R. J.
Westbury	Paine, Charles.
West Bromwich	
Weston-super-Mare	Gibbons, George.
Weymouth	Groves, Thomas Bennett.
Whitby	Stevenson, John.
Whitehaven	Kitchin, Archibald.
Wick	Miller, Kenneth.
Widnes	Jackson, Alfred.
Wigan	Phillips, Jonathan.
Wimbledon	Dowdeswell, Jonathan.
Winchester	Hunt, Richard.
Windsor	Russell, Charles J. L.
Wisbech	Maxey, John Thomas.
Wokingham	Spencer, Thomas.
Wolverhampton	
Woodbridge	Betts, John.
Worcester	Virgo, Charles.
Worthing	Cortis, Arthur Brownhill.
Wycombe	Furmston, Samuel C.
Yarmouth, Great	Poll, William S.
Yeovil	Maggs, Frederick R.
York	Sowray, Joseph.

SUPERINTENDENTS OF WRITTEN EXAMINATIONS.

Upon the motion—

"That Superintendents of Written Examinations be appointed at the same centres as last year, and that the appointment be offered to the Local Secretaries at those centres, with the exception of London, Edinburgh and Guernsey,"

Mr. RICHARDSON suggested the addition of Leicester as an educational centre; it was very convenient in the way of railway accommodation.

The PRESIDENT said the Council was quite aware of the importance of Leicester as a centre, but there were a number of important towns near it, and he believed it was struck out of the list some time ago because experience showed that a smaller number of candidates attended there than at some other centres. Mr. Richardson brought the matter before the Committee not long ago, when the question was carefully considered, and after consulting the map and statistics the Committee felt that it could not on the information at its disposal make any change.

Mr. WILLIAMS suggested that the question might very well be considered by the Committee which was about to consider the mode of appointing Local Secretaries. He had always held that a local centre had nothing to do with the honour of the town where it existed; it was simply a question of convenience in carrying on the examinations. In his opinion, where only two or three candidates were examined, the conditions were not so favourable, even to the candidates themselves, as where there were a larger number.

Mr. RICHARDSON said he should be quite satisfied with the reference to the Committee.

Mr. SYMES asked whether Mr. Richardson had actual knowledge of complaints on the part of young men of difficulty in going to other centres, or was the difficulty only one that he thought likely to arise?

Mr. RICHARDSON said he had heard complaints both from the young men and their employers.

The PRESIDENT said it was not necessary to discuss the subject further, as Mr. Richardson was satisfied with the question being considered by the Committee; but having had some knowledge of the Preliminary examination, before it was handed over to the College of Preceptors, he might say that there was a tendency on the part of young men to go from their own centre to another town to pass the Preliminary examination; they preferred not going up in their own towns, and this was very natural. Those who failed at one centre would generally choose another for a second attempt.

The motion was then put and carried unanimously.

EXAMINERS FOR COUNCIL AND OTHER PRIZES.

Messrs. CORDER and GALE were appointed examiners for the Council Prizes.

Messrs. BLUNT and BOWEN were appointed examiners for the Jacob Bell Memorial Scholarships.

Mr. CORDER was appointed examiner for the Peter Squire Prize.

REPORTS OF COMMITTEES.

FINANCE.

The report of this Committee was read. It included a recommendation that sundry accounts be paid, including the Solicitor's bill, £240.

The PRESIDENT, in moving the adoption of the report, remarked that the whole of the Solicitor's bill, with the exception of two or three guineas, was incurred in respect of prosecutions. For every £5 which the Society received by way of penalty it had to spend about £10 in legal expenses.

The report was unanimously adopted.

BENEVOLENT FUND.

The report of this Committee included a recommendation of the following grants:—

£10 to the widow (aged 66) of a chemist and druggist, member from 1877 to 1884, and a subscriber. Applicant had a grant of £10 in April, 1885. (Middlesex.)

£10 to an associate in business from 1869 to 1886 (aged 50). Applicant has a wife and three children (only one of whom earns anything) and is confined to his bed by chronic illness. (Yorks.)

£5 to the widow (aged 52) of a registered chemist and druggist and subscriber, who had a grant of £10 in April, 1885. (Norfolk.)

£10 to a registered chemist and druggist (aged 66), an unsuccessful candidate at the last election. He had a grant of £10 in July, 1885. (Kent.)

£10 to a registered chemist and druggist (aged 39), helplessly invalided, who had a grant of £5 in November last. (Lancashire.)

Two cases had been deferred for further information and four others the Committee had declined to entertain.

The SECRETARY had reported that he attended the election of the Commercial Travellers' Schools on June 28th, and that the boy Kingerley had been elected.

On the motion of the VICE-PRESIDENT the report and recommendations were unanimously agreed to.

LIBRARY, MUSEUM, LABORATORY AND HOUSE COMMITTEE.

Library.

The report of the Librarian had been received, including the following particulars:—

Attendance.		Total.	Highest	Lowest.	Average.
May	Day . .	462	25	10	18
	Evening .	156	14	3	8

Circulation of books.	Town.	Country.	Total.
May	106	133	239

Carriage paid, £1 13*s.* 9*d.*

The undermentioned donations had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

For the Library in London—

Colonial and Indian Exhibition, London, 1886, Illustrated Handbook of Victoria, Australia.

Mueller (Baron F. von), Select Extra-tropical Plants, new Victorian edition, 1885.

From J. BOSISTO, Esq., M.P., on behalf of the Victorian Royal Commission.

im Thurn (E. F.), Among the Indians of Guiana, 1883.

Timehri, being the Journal of the Royal Agricultural and Commercial Society of British Guiana, 1885. From E. F. IM THURN, Esq.

Squire (P.), Companion to the British Pharmacopœia, 14th ed., 1886. 2 *copies.*

From P. W. SQUIRE, Esq.

Deutsche chemische Gesellschaft, Berichte, 1885.

Chemical Society of London, Journal, 1885.

From WALTER HILLS, Esq.

School of Pharmacy Students' Association of the Pharmaceutical Society, Papers read, Session 1883-84. From the ASSOCIATION.

Third Report on the Chemical Constitution and Physical Properties of American Cereals, by Clifford Richardson, 1886.

From the DEPARTMENT OF AGRICULTURE, U.S.A.

Corradi (A.), L'eau de bois et les cures dépuratives aux xvi^e^ siècle, par A. Dubouchet, 1886.

From Professor J. L. SOUBEIRAN.

Cornish (K. H.), Cholera Treatment and Cure, 1884.

From the AUTHOR.

Dolan (T. M.), Hydrophobia, M. Pasteur and his Methods, 1886. From the AUTHOR.

American Pharmaceutical Association, Proceedings, 1885. From the ASSOCIATION.

For the Library in Edinburgh—

American Pharmaceutical Association, Proceedings, 1885. From the ASSOCIATION.

The Committee recommended the purchase of the following works:—

For the Library in London—

Church (A. H.), Laboratory Guide for Agricultural Students, 5th ed.
Dorvault, L'Officine, 11me éd., 1886.
Waring (E. J.), Manual of Practical Therapeutics, 4th ed., 1886.
Trouessart (C. L.), Microbes, Ferments, and Moulds, 1886.
Dupré and Hake, Manual of Chemistry, 1886, vol. 1, Inorganic.
Richter (V. von), Inorganic Chemistry, 2nd ed., 1886.
— Organic Chemistry, 1886.
Lupton (S.), Chemical Arithmetic.
Squire (P.), Companion to the British Pharmacopœia, 14th ed., 1886. *A third copy.*

For the Library in Edinburgh—

Squire (P.), Companion to the British Pharmacopœia.

Museum.

The Curator's Report had been received, and included the following particulars :—

Attendance during May.	Total.	Highest.	Lowest.	Average.
Morning .	487	51	6	19
Evening .	114	13	1	4

The following donations had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors :—

To the Muscum—

A series of specimens of Mauritius Drugs derived from the following plants:—*Abrus precatorius, Achyranthes aspera, Adiantum caudatum, Andropogon muricatus, Antirrhœa verticillata, Asparagus officinalis, Cacalia flexuosa, Cajanus bicolor, Camptocarpus mauritianus, Cardiospermum Halicacabum, Cassia occidentalis, Cassia Rumphiana, Chenopodium ambrosioides, Cocos nucifera, Commelyna Bengalense, Crotalaria retusa, Euphorbia hirta, Guilandina Bonduc, Harongi madagascariensis, Hedysarum cœspitosum, Heliotropium indicum, Hypericum chinense, Leea sambucina, Leonurus sibiricus, Mimosa pudica, Mussœnda arcuata, Passiflora mauritiana, Pœderia sessiliflora, Polypodium phymatodes, Ravensara aromatica, Rhynchosia scarabœoides, Siegesbeckia orientalis, Smilax anceps, Stachytarpheta jamaicensis, Tetranthera laurifolia, Toddalia lanceolata, Trichodesma indicum, Tristemma virusanum, Zapania nodiflora.*

From Mrs. JOHNS, Brentford.

A series of Essential Oils and Perfumed Substances, including the following:—*Ol. angelica; Ol. anisi; Ol. apii* (*Apium graveolens*); *Ol. asafœtidæ; Ol. asari* (*A. canadensis*); *Ol. bals. Peru; Ol. buchu; Ol. cardamomi; Ol. caryophylli; Ol. carvi; Ol. cedri; Ol. chenopodii* (*C. ambrosioides*); *Ol. cinnamomi; Ol. coriandri; Ol. cubebæ; Ol. cumini; Ol. cynæ* (*Santonica*); *Ol. elemi; Ol. eucalypti* (*E. globulus*); *Ol. fœniculi; Ol. galangæ; Ol. gaultheriæ; Ol. iridis; Ol. iwarancusæ* (*Andropogon*); *Ol. juniperi; Ol. lauri; Ol. linalöe; Ol. lupuli; Ol. lupuli* (from lupulin); *Ol. macis; Ol. majoranæ; Ol matico; Ol. menthæ crispæ; Ol. menthæ piperitæ; Ol. monardæ; Ol. myrciæ; Ol. myrrhæ; Ol. olibani; Ol. origani cretici; Ol. patchouli; Ol. petroselini; Ol. piperis; Ol. rosarum* (*Saxoniæ*); *Ol. sabinæ; Ol. salviæ; Ol. sassafras; Ol. sinapis; Ol. sumbuli; Ol. storacis; Ol. tanaceti; Ol. thujæ; Ol. unonæ* (*Ylang Ylang*); *Ol. valerianæ; Ol. vitis vinifera* (oil of cognac); *Ol. zingiberis.*

Carvol, cymol, eugenol, menthol, safrol, thymol.

Alant camphor; apiol; anisic, cinnamylic, cuminic, myristic and salicylic acids; bergaptene; cumarin; heliotropin; terpin hydrate; and vanillin.

From Messrs. SCHIMMEL and Co., Leipzig.

Three specimens of aloes wood and a large package of African ammoniacum.

From the DIRECTOR, Royal Gardens, Kew.

Two large fruits of Indian bael.

From Messrs. CORBYN, STACEY and Co.

Specimen of *Dodonœa viscosa* and a new variety of *Ægle Marmelos.* From Mr. T. D. PHILLIPS.

To the Herbarium—

Specimen of the leaf of *Andira Araroba*, cultivated at Edinburgh.

From the CURATOR of the Royal Botanic Gardens, Edinburgh.

The following donation to the Society's Museum in Edinburgh had been reported by Mr. J. Rutherford Hill, Assistant Secretary:—

Specimen of Specular Iron Ore from Russia.

From Mr. JOHN BLYTH, Edinburgh.

The Curator had further reported that he had received a letter from the Secretary to the Commissioner for North Borneo at the Colonial and Indian Exhibition, intimating that he will have pleasure in furnishing at the close of the Exhibition such specimens as may be desired for the Museum of the Pharmaceutical Society.

Also that Mr. Albert Walsh, of Port Elizabeth, had obtained a promise from Mr. Andrew Smith, of Lovedale, South Africa, that a portfolio of herbarium specimens of medicinal plants used at the Cape of Good Hope, and at present in the Lovedale exhibit at the Colonial and Indian Exhibition should be presented to the Museum of the Society at the close of the Exhibition.

The Curator had called upon the Executive Commissioner for the Cape of Good Hope at the Colonial and Indian Exhibition and had received from him a promise of such specimens of medicinal plants as were intended for distribution and as might be desired for the Museum of the Society, to be handed over at the close of the Exhibition. The Commissioner had also promised to forward from the Cape further supplies of such as might be deemed worthy of chemical investigation.

The Professors had attended and reported favourably of their respective classes.

The subject of prizes to students of provincial schools had again been considered, and the Committee recommended that the scheme be not further proceeded with at present.

The Committee recommended an addition of £100 per annum to the Curator's salary and £20 a year to the salary of the Librarian.

The Committee had also considered the resolution of the Annual General Meeting with regard to the Journal, and after a long conference with the Editor and Sub-Editor, was of opinion that it is not desirable to increase the size of the Journal, or to make any material alteration in its character.

The Committee had consulted the Solicitor and the Architect as to the draft lease of Nos. 15 and 16, Bloomsbury Square, and the Solicitor had been instructed to obtain certain modifications in the conditions.

At an adjourned meeting a Sub-Committee had been appointed to assist the architect in preparing plans.

A conference had been held with the Professors as to the desirability of instituting a separate course of instruction in pharmacy by lectures and class demonstrations, and the Committee recommended that such a course be established.

The PRESIDENT, in moving that the report and recommendations be received and adopted, said the first subject to which he need call attention was one originally raised by Mr. Martin, of Newcastle, as to the desirability of encouraging a wholesome rivalry among Schools of Pharmacy outside London. The Committee had considered the subject most carefully several times and had obtained statistics from various local secretaries as to existing schools, and the result arrived at was to recommend that the scheme be not further proceeded with at present. By the scheme it was proposed to offer a

prize in botany, materia medica and chemistry for competition between the students of such schools as should be approved by the Council. The opinion was that there should be centres of education under the management and direction of members of the Society like that at Newcastle, and in part that at Nottingham ; but the fact was that at the present moment there was no other school which was managed entirely by pharmaceutical chemists. At many other centres where there had been local schools at one time, such as Bristol, Nottingham and elsewhere, the pharmaceutical students now went to the local college and attended courses of instruction. Occasionally, as at Leeds, there were courses of lectures on pharmacy given by a pharmacist, and sometimes a course on materia medica, but practically there was no organization in charge of the school managed by members of the Society or the chemists of the town. Under these conditions it was felt with regret that at the present time the scheme could hardly be practically carried out. The difficulty of deciding on the kind of school which should be approved by the Council was obviously very great, and the conditions were very different in different places. Nevertheless, he hoped the views of Mr. Martin and others with regard to the organization of local centres of education would be eventually carried out. It would require a great deal of trouble, but it was worth some sacrifice, and he hoped to see at least twelve centres of education in England and Scotland where the general direction of studies should be centred in the Committee of members of the trade. The Society was always willing to help to forward education, and if the Council was not able in this case to carry out the scheme at once it was not from any disinclination, but because the conditions did not exist for doing so satisfactorily. It was thought by some that the offer of these prizes would tend to arouse a little activity in the various centres, but the feeling of the Committee was that that hardly existed at present to a sufficient degree. If these observations had any effect in that direction, he was sure the Council would be glad to have the subject again brought forward. Having referred to the increase of salaries mentioned in the report, the next question considered was the resolution passed at the Annual Meeting that the Council be requested to consider the desirability of increasing the usefulness of the Journal, either by increasing its size or otherwise. The Committee had had the advantage of the attendance of the Editor and Sub-Editor, and had spent several hours in discussing the subject from various points of view, and the conclusion arrived at was summed up in the recommendation. Some members would like the Journal to be more of a newspaper, but on the other hand, others thought, and had written to him to that effect, that it might with advantage be made more purely pharmaceutical. The Committee considered it important that the Journal should remain such as was contemplated by its founder, Jacob Bell, and that the object should be to promote the advance of pharmacy proper ; that it should not be a newspaper, and having regard to the difficulty of combining an efficient journal of pharmacy of high character with anything in the character of a newspaper, the Committee had come to the conclusion that such a change would not be beneficial in any way, and would not give those who wanted what was technically called "trade matter" all they required. As the Journal was the official organ of the Society the Committee had to consider that what could be done with a certain amount of advantage in ordinary proprietary journals could not be undertaken without some loss of dignity and some risk in this case. Under those circumstances he should ask the Council to agree with the Committee in its report. The Editor was always ready to receive any suggestions from members if they would send them. It was sometimes supposed that editors did not like to have their journals criticised, but he could say that the Editor was always ready to receive suggestions, though of course correspondents must not suppose if the suggestions were not carried out that they were not carefully and cautiously considered. The question of publication of a list of trade marks was brought forward, and it was not considered desirable to insert one ; it was thought, however, that the members would find it an advantage to have in the library a complete set of the *Trade Marks Journal* for reference, and it was recommended that such a set should be purchased. Amongst other minor points discussed was the question of getting correspondents abroad to give information of value, and that was to a considerable extent already carried out. It must also be remembered that there was a large number of continental journals of pharmacy published at short intervals which were received regularly and brought pharmaceutical matters closely up to date. It was possible that some of the articles in the Journal which were looked upon as being highly scientific might be diluted somewhat more, and made rather more popular. Such suggestions had been made from time to time, but it seemed rather difficult to deal with them without sacrificing the value of the Journal in other ways. The next subject considered was the conference with the Solicitor and the Society's Architect with reference to the draft lease ; and since the meeting of the Committee he had had the opportunity of seeing the Steward of the Duke of Bedford, and he understood there would be no objection to meeting their views. It was thought desirable that a sort of sketch plan of what the Council thought of doing should be deposited with the Steward at the time the agreement was signed, because one of the conditions was that that gentleman should have complete control over any alterations, and with the view to prevent objections later on it was thought wise that such a plan, showing the essential points of the structure and elevation, should be brought before the Committee at its next meeting, and that was now being prepared. With reference to the question of instituting a separate course of instruction in pharmacy and the other portions of the subject which was postponed to a future meeting, he might say that the Committee came to the conclusion that having regard to the want of training in all ordinary pharmaceutical operations frequently exhibited by students, which appeared to be greater than it was in former times, probably because the old-fashioned system of apprenticeship was dying out, it was thought necessary to afford some opportunities for demonstrating pharmacy, and it was recommended therefore that such a course should be established.

The motion having been seconded,

Mr. BORLAND asked if there were any possibility of instituting a body of Abstractors in connection with the Journal, such as existed in connection with the *Journal of the Chemical Society*. The matter which appeared in "The Month" was very comprehensive, and it seemed to him contained a great deal of instructive and useful information, but still, considering that only one or two individuals were doing all the work of that kind and that it was almost impossible for a very small number of individuals to take a comprehensive view of all that was taking place in pharmaceutical chemistry and the sciences which bore on this branch of knowledge, it struck him that there was a possibility of increased interest being thrown into it if a body of that kind were instituted.

Mr. SYMES said the same thing was done in the *Journal of the Society of Chemical Industry*.

Mr. CROSS said he felt a little disappointed that the resolution carried at the General Meeting had been so fruitless. He was in hopes that something would have been done to obviate the statement which had been made only too frequently, that many people who received the Journal did not think it worth their while to read it. He did not want to repeat that statement more frequently than was necessary, but it was necessary on this occasion, because only yesterday, in the course of the discussion, the fact was brought prominently

forward that one of the advantages of a man becoming a student of the Society was that he should receive the Journal. Now as the Journal at present stood, unfortunately, it was almost beyond the reach of ninety-nine out of every hundred. He had hoped the Committee when it considered this matter would have seen its way to introduce short articles of an educational nature. He had spoken to several young men during the last few weeks and he found that great interest had been taken in the lectures by Professor Redwood, which had recently been published. The young men found in them something to read which appertained to their own business, and this made them look forward to receiving the Journal and to reading it. He spoke with some diffidence as a young member of the Council, but at the same time very sincerely, in saying that if it were possible to induce every young man entering into the business when he had passed the Preliminary to become associated with the Society it would be a great advantage, and he thought it would be one step towards doing so if the Journal were made more interesting to that class.

Mr. ATKINS said no doubt this was an exceedingly difficult problem. The Committee had had a long discussion, and the Editor and Sub-Editor were there, and listened to all the suggestions made, and offered some remarks of their own. The problem seemed to be this, not for one instant to lower the tone of the Journal with regard to the scientific work, but if practicable to render it more popular. He made one very small suggestion in the Committee, that in the question of abstraction from foreign literature, to which Mr. Borland had referred, the Abstractors should not direct their attention entirely to chemistry and scientific work. That was admirably done, but a little more information with regard to other matters would also be interesting. On one or two recent visits to the Continent he had learnt something in this direction. As the President had said, journals of pharmacy came to the office from all parts of the Continent, and if in addition to chemistry they got pharmacy, materia medica, the condition of the trade as for employer and employed, apprentices, and so on, it would be an advantage, and that might be done without lowering the character of the Journal.

Mr. RADLEY also felt somewhat disappointed with the Committee's report. He was well aware of the want of interest in the Journal felt by members in the country. He had no particular suggestion to make, but he thought it would have been far more satisfactory if the Committee had told the Council that every endeavour would be made to meet the wishes which had been so often expressed.

The VICE-PRESIDENT fully sympathized with the desire to increase the interest in the Journal, but the difficulties which presented themselves to the Committee when it considered the possibility of suggesting an improvement were so great that he must uphold the opinion expressed in the report. He would also say that the Editors were most anxious to receive any suggestions in order to make the Journal more attractive to its readers. They felt it their duty to maintain the position of the Journal as it had hitherto been conducted; at the same time they were extremely anxious to introduce any improvement which could be suggested. But when one thing after another was suggested difficulties arose. The Editor also stated that he did not get the support of the members so fully as he ought to or hoped to do. Nearly all those who complained abstained from sending any communications to the Journal to help him to make it popular or attractive, and of course it was very difficult for him to manufacture interesting articles. He also felt, and the Committee agreed with him, that he must not adopt the style of literature which would simply attract the trade interests of members. No doubt members would like to see everything which was given by leading trade journals, and to have information with reference to trade nostrums, suggestions as to how to improve their business, and so on, forgetting that the *Pharmaceutical Journal* was established really for advancing pharmaceutical knowledge and for the promotion of that knowledge for the welfare of the public. The Editors felt they must maintain that position, and could not enter into all the little details which trade journals could very properly go into. He felt that they were placed in a most difficult position. They would be glad of any assistance from members and were ready to receive any suggestions which could be given.

Mr. SYMES said it was very difficult in the report to convey all that was done at a committee meeting. The President had very fairly said what was done, but, as he understood, the statement that they were not to do anything in the direction indicated was not to be considered final. The Committee had to consider the various suggestions made at the Annual Meeting, and the Editors found that there was not sufficient in them to go upon. They would be glad to receive any practical suggestions, as, for instance, that of Mr. Borland that day; but it was no use sending in bald criticisms, and saying the Journal was useless. He was not able to attend the adjourned meeting, but as he saw a Sub-Committee had been appointed to deal with the question of the building, he would like to ask whether that Sub-Committee would in any way consider the desirability of providing a laboratory for pharmaceutical work. He put the question now lest it should be said afterwards that the plans were all completed, and it was too late to alter them.

Mr. WILLIAMS said he could not sympathize with those gentlemen who complained about the Journal and said they never read it; such men could hardly be considered authorities on the question whether it was valuable or not. The true reason probably why many were careless about reading it was that they had it for nothing; if they had to pay for it every week they would read it. They could not insist upon that, and he feared their efforts to make it popular would always result in people being able to point to a row of Journals done up in wrappers and state they never read them.

Mr. BAILDON could not help feeling with others a little disappointment at there being no practical outcome of the consideration of this question. At the same time he would admit most freely that it was a very difficult question. It was like their social position, it was an attempt to exist in two spheres, the commercial and the scientific; that was where the great difficulty lay. He also thought something more might be done in the way of conveying instruction in the pages of the Journal, so as to make it to the interest at any rate of the younger members of the Society to read it. Another little point which arose was the question of paying for contributions. Supposing a young man read a good paper before a provincial society, if it was printed in the Journal, he got nothing for it; but there were other journals which, if he sent the manuscript to them, would give him something for it, and put it in in full. It seemed to him a great pity to let those young men send their contributions to other journals than to their own. If there was one thing which would make a man anxious to see a paper more than another it was when there was something of his own in it.

Mr. ALLEN said the feeling of disappointment which had been expressed by several members was not, he noticed, among those who attended the Committee, and he should like to say that the Vice-President had to some extent answered the objection which Mr. Radley put forward. He would also impress on him that, as had been said, the Editor and Sub-Editor were both present at the Committee and gave particular attention to every suggestion brought forward, and it was the barrenness of the suggestions on the part of the Committee rather than any want of their readiness to acquiesce in them which resulted in the present report. He regarded it mainly as a question of the size of the Journal, but still he expected to see a considerable result from the conference the Committee had had with

the Editors, and should be prepared to see some changes. He was quite certain their minds were open and that they would be searching about during the next few months for some means of producing an improvement in the character of the Journal. One fact was very patent, and that was that many of the things which were pointed out as being desirable subjects to include had already appeared. With regard to the question raised by Mr. Baildon it appeared to him that any member of the Society who read a paper before a provincial institution received a certain amount of honour by finding it printed in the pages of the *Pharmaceutical Journal*, but if he found a market for his paper before he read it he could hardly suppose the *Pharmaceutical Journal* would print it afterwards. He imagined the papers referred to had already been sold before they were read. Moreover, a paper read before a provincial society was the property of that Society.

Mr. SOUTHALL said his experience amongst young men was that when there was a Pharmaceutical Conference, or anything of that sort which yielded to a large extent educational information, young men read the Journal carefully, and papers which had been read before local associations were often read with interest. If the writers sent them to another journal they got paid, but not beforehand; they got something sent afterwards, which came to much the same thing. The other day he had asked a young man why he did not send his papers to the *Pharmaceutical Journal* instead of another publication, and his reply was that the latter always gave a little encouragement, but the former journal never did. He thought money would be very well spent, and as a matter of business it would pay, if they could get more of those who passed their examination to take an interest in the Journal, and they would be more likely to become members of the Society.

Mr. BAILDON said he knew of instances in which papers had been read and the manuscripts sent to another publication without any bargain being made beforehand at all, but merely from the knowledge that it was the custom of that paper to send an honorarium.

Mr. HAMPSON thought this discussion might be very useful ultimately. He felt, when in the presence of the Editor, that he could not write out a prescription which would cure the complaint, because there were so many causes for it, but there was one cause which was strongly present to his mind, that was, the embarrassing fact that the majority of the members did not read the Journal, because they had not a market for the knowledge which they might possibly obtain from it. The bulk of pharmacy in this country was done by medical practitioners, and therefore the zeal of pharmaceutists was taken out of them as soon as ever they passed their examination. However much knowledge they might obtain, the market was not open for it. In fact, it was often closed against them by the absorption of the real pharmacy of the country in wrong quarters—in the surgeries and the dispensaries. He had no doubt many a man came there with the hope and intention of leading a pharmaceutical life as fully scientific as that of any gentleman present, but as soon as they began business they found that the commercial—the lower element as it was called—had mainly to be considered. If a different state of affairs existed, it would be not only the duty, but the interest of all chemists to be acquainted with everything connected with pharmacy. Still he hoped the discussion in the Committee and that day would be fruitful in the mind of the Editor. It was difficult to tell him what to do, but still he thought it possible to give scientific knowledge and yet to dilute it in such a manner that it would even attract the unfortunate pharmacists who could not profit by it commercially.

Mr. SAVAGE said although no definite proposition was put forward by the Editor or Sub-Editor, he thought they went away with the impression that some improvement would follow from the suggestions made. It was said that in many cases the Journal was not opened, and those who did not open it were incompetent to pass an opinion, but unfortunately their impressions were derived from former journals which they had read, and they preferred other publications which gave more general information. There were matters of local information arising in parts of the country which it would be interesting to the members generally to know if they were reported, and if members would take them from the local papers and send them to the Editor it would be very valuable. He did not refer altogether to pharmaceutical matters, but matters connected with law or the sale of poisons, and it was very desirable that members should bear in mind when anything of that kind occurred in their neighbourhood the desirability of sending information respecting it to the Journal.

Mr. RICHARDSON said it appeared from the discussion that the Editor came to the Committee and asked to be instructed what he was to do; but the Committee had simply to say it was not satisfied with the Journal, and wanted him to do more to make the Journal more interesting. He did not mean more interesting in the scientific interest, because he believed it was the most scientific Journal published in the country. The question to his mind was, whether they should be satisfied in the interest of students that it should only be a scientific journal. He had always advocated that it should be partially a newspaper as well as a scientific journal. Reference had been made by the Vice-President to trade interests, and he understood him to say the Journal ought not to pander to the trade, but he thought that was a very wrong aspect of the question. At the General Meeting, which represented the whole trade, there was a resolution passed asking the Council to take into consideration the conduct of the Journal, and it was stated that it did not meet the requirements of those in the country, and it seemed to him it was the bounden duty of the Council to see if it could not mend matters. It was all very well to say pharmacy was a profession; but it was a trade, and people in the provinces wanted to have a journal which would interest them sufficiently without having to spend sixpence on another journal. There was a good deal of truth in what Mr. Williams said, that if they had to pay sixpence a week for the Journal they would open and read it from beginning to end. He was much disappointed to hear some of the country members get up and say in a sort of apologetic tone that nothing more could be done. They had lately increased the salary of the Editor and he ought not come and ask them for instructions what to do. When Dr. Redwood was appointed Emeritus Professor he did not ask what he should do, but he came down and inaugurated a system of lectures which were some of the best things he had ever done. Why could not the Editor do something of the same kind? The Journal might be enlarged and with its present modicum of scientific knowledge there should also be a kind of supplementary effort to give it more the character of a newspaper. One gentleman said that people in the country did not send up reports, but they were never asked to do so. There never was any effort made to get communications from people in the country; there was not the energy there ought to be in the conduct of the Journal. However, he was sure that when the Editor read the report he would think the matter over and would infuse a little more energy and life into it, and that before next year there would be a considerable alteration. He was sorry to hear Mr. Cross say that the Journal was beyond the reach of students, and hoped that was a mistake. There was no doubt it was the best educational journal a student could read, and he knew there were many young men connected with his own firm who read it diligently every week.

Mr. CROSS explained that he only referred to certain portions of the Journal.

Mr. SCHACHT said it seemed to be necessary for each member to say something on this point, and therefore he

would admit at once that, like every other human institution, the Journal was open to improvement, but as one who had not taken part in the discussion in Committee it was only fair to say that as far as his experience of the Journal went, it held its own very well. Not being much of a linguist, he could not give an opinion on some of the Continental journals, but through the courtesy of friends on the other side of the water he received regularly seven journals conducted in the English language, and spent a considerable time in looking over them, and with the exception of one, which was now discontinued, formerly conducted by three gentlemen of the name of Squibb, without any sort of remuneration, he thought the *Pharmaceutical Journal* of Great Britain held its own thoroughly well with all Pharmaceutical Journals written in the English language. The criticisms had been various, but he would remind them that the movement at the Annual Meeting did not come from the provinces; it was led off by London druggists. Mr. Robinson very eloquently set forth what he thought some of its deficiencies; but he particularly wished it to be more interesting, and he was not quite certain that the word "amusing" did not come out. However, at any rate it was to be more interesting and more varied. Some little time after he took up another journal and read an exceedingly amusing and interesting half dozen pages. This was a journal conducted with a great deal of enterprise, whose editor no doubt thought it a proper thing to amuse as well as instruct his readers, and in response to his invitation many communications were sent, and one which ran something in these words—

"Hark the Herald Angels sing,
Beecham's pills are just the thing;
Peace on earth and mercy mild,
Two for a man and one for a child."

That was a specimen of what that editor put in his pages, and he confessed he laughed very much on reading it; but he took it that if that was the sort of thing that was in the mind of Mr. Robinson, he should deprecate such interest being infused into the Journal. If once they were to depart from what appeared to be the legitimate work of the *Pharmaceutical Journal*, which was endorsed by the Society, it would be very difficult to draw the line, and the Editor would be placed in the position in which he could scarcely fail to lose the dignity with which they would like the Journal to be conducted. He thought the Journal was exceedingly good, but that it might be better he would not deny. With reference to one part of the report he was very glad the Committee had come to the conclusion not for the present to develop the idea of offering prizes to students in the provinces. They would hear more of the difficulty of establishing what they were all anxious about, provincial education, later on, but he hoped that when the time came it would be dealt with in a much more direct and satisfactory manner than by giving prizes here and there to the students.

Mr. HILLS said that at the Annual Meeting the members did not express themselves as being dissatisfied with the Journal, and the way it was conducted, but merely that they were willing it should be considered if it could be in any way improved. He did not gather from the meeting, except from those who never opened the Journal, that there was any great dissatisfaction with it, and he could not say he had heard very many practical suggestions for its improvement. Perhaps if the Committee had been differently constituted, a different report might have resulted, but he was glad to hear from Mr. Schacht, who was not present at the Committee, that he was quite satisfied with the report. With regard to the articles suggested of an educational nature, there were surely in these days scientific primers and text-books enough in which the young men could read matters of that character, text-books prepared by the greatest authorities in the special sciences.

The PRESIDENT said he did not propose to reply at length to the criticisms that had been made, though he thought every one could be effectually answered. He had considerable knowledge of the Journal and of journalistic matters, perhaps as much as Mr. Richardson, but he thought it would be better to leave the discussion as it stood. The Editor would read this discussion, and if he could answer any of the points raised in any practical way, so much the better. He was quite sure that the Editor would be glad to see the criticisms of members of Council, and to read any practical suggestions; but what the Editor felt, and what the Council felt, was that there was a want of active, intelligent co-operation on the part of the members at large. It should be the duty of every local secretary and of every member to cut out any item of interest, and send it at once to the Journal, and not be offended if it were not inserted, because it must be subject to the judgment of the Editor. Too often if something sent up and not inserted were, for reasons probably pretty sound, umbrage was taken and no further communication sent. Those were the sort of difficulties which always occurred in conducting a journal of that kind belonging to a Society. Both with regard to the educational part of the Journal, and with regard to subjects of general interest, the difficulty was largely due to the want of knowledge by students themselves, but he was quite sure the Editor would appreciate the remarks which had been made, and any others which might be sent of a practical character. But mere grumbling was of no use. It was easy enough to criticise anything, but it was a very different thing to construct. The report referred more particularly to the suggestion for increasing the size of the Journal, and to that the Committee gave an emphatic negative. The other recommendation was that there should be no material change, and what was meant by that was that its character should not be changed; but the Editor and the Sub-Editor, on the basis of the observations of the Committee, and the remarks at the Annual Meeting and those now made, would probably be able to get some views which would enable them to follow on certain lines and perhaps make the Journal cover a little wider ground. He would not say make it more interesting, because he did not know exactly what that meant. He would give as an illustration a point mentioned by Mr. Robinson at the annual meeting. That gentleman said that a valuable paper had been read before an association in London, and it was stated in the report in the Journal that the paper was listened to with "absorbing interest," and then he said, if so it ought to have been reported. That seemed a very strong point, and therefore he made it his business to ascertain what this paper was, and he found it was not a paper on pharmacy at all, it was on the way in which a chemist's assistant may spend his life abroad; it was of the most general character, and wholly unsuited for publication in the Journal. It touched on many things; morals amongst the number. No doubt it was very interesting to the young men who attended the meeting, but it did not follow that it was of a character to be interesting to the members at large. A journal conducted by a Society must necessarily be somewhat in advance, with regard to a large part of its contents, of the rank and file. That Journal had been given to them with the distinct object of advancing pharmacy in its higher sphere. It was presented as a gift, and a very generous one it was, to the Society by one of the founders, and it was the duty of the Council to carry on the property in the spirit intended by the excellent founder, and as Mr. Schacht said it was exceedingly difficult when you once began to consider how low you might go away from pharmaceutical science to know where to stop. He hoped the Council would always support the Editor in keeping up the Journal to its present high state of efficiency. The Editor, on his part, would be willing to adopt any practical suggestion made by any member. He did not covet mere criticisms, but practical suggestions would always be welcome. In reply to Mr. Symes, the President

said that the plans applied primarily to the conduct of the pharmacy class in the present building, but in the drawings there would be room enough for any proposition in regard to Pharmacy that Mr. Symes could get the Council to approve.

The motion was then put and carried unanimously.

GENERAL PURPOSES.

This report, which was taken in Committee, included the usual letter from the Solicitor, stating the progress made with cases placed in his hands.

Samuel Edwards, High Street, Godalming,

had paid £5 9*s.* into court for penalty and costs prior to the hearing.

A. Waterhouse, High Street, Ramsgate,

had paid £5 10*s.* into court for penalty and costs prior to the hearing.

Several other cases were referred to in which penalties had been recovered, reports of which have already appeared in the Journal.

Six cases of alleged infringement of the Pharmacy Act had been considered by the Committee, in five of which legal proceedings were recommended.

The sale by unregistered persons of "insect killing bottles" containing cyanide of potassium had been brought to the notice of the Committee and the Committee recommended that the Registrar be instructed to call the immediate attention of such persons to the fact that the sale of these insect killing bottles being contrary to the provisions of the Pharmacy Act, 1868, and dangerous to the public, should be discontinued.

The PRESIDENT, in moving the adoption of the report, drew special attention to the recommendation that the Secretary be instructed to call the particular attention of unregistered persons selling insect killing bottles containing cyanide of potassium to the illegality of their proceedings. The subject had been brought under attention by two members of the Society, and it appeared that the sale of these insect killing bottles was now largely increasing, and that children of all ages were in the habit of going to the naturalists and buying these bottles. They contained a mixture of plaster of paris with cyanide of potassium, and the vapour of hydrocyanic acid which was given off was extremely valuable for the purpose of killing insects, as the delicate colour of the insect was preserved. These bottles were sold without any label whatever, or any indication of their dangerous contents. It might be difficult for a child to swallow the contents, but still the Committee felt that having regard to the carelessness of children and others, and the fact that there was no label on the bottle, it was desirable that the sale of poison in this form should be made conformably to law. It was proposed in the first instance to give notice to those who were likely to sell these things, and to follow that up afterwards as might seem expedient.

Mr. HAMPSON said to be consistent notice ought to be given to the unregistered persons who were selling cyanide of potassium alone.

The PRESIDENT said the view of the Committee was that in cases of the sale of cyanide of potassium the sale was a *bonâ fide* wholesale one, whereas here it was not. The wholesale druggists or dealers sold cyanide of potassium to persons who use it in their trade, and that was held to be a wholesale transaction.

Mr. WILLIAMS did not agree with this recommendation, though he should not divide the Council on it. He looked upon it as a very frivolous thing, and thought it would cause their scientific brethren to think they were to a certain extent impeding the progress of knowledge and scientific research. He should doubt whether seven pounds of cyanide of potassium per annum were used for the purpose all through the kingdom, and he did not think a case of poisoning ever had or ever would occur.

Mr. ATKINS said he was entirely in accord with the remark of Mr. Hampson, for he did not think that where there was a sale of one of these bottles on the one hand, and the sale of an ounce or half an ounce of cyanide of potassium to a member of the same family on the other, one transaction could be considered retail and the other wholesale; but he knew this had happened. He did not object to the report, but to be logical the Council ought to go further and prevent the sale of cyanide of potassium in small quantities.

Mr. SYMES said the question of the sale of cyanide of potassium had not come before the Committee. He did not agree with Mr. Williams that because people wanted to use these articles for scientific purposes they were to be allowed to get them anywhere without proper precautions. There were chemists to be found wherever these bottles were required; there were more chemists than naturalists, and it would be just as easy for a youth or a scientific man requiring poison to be able to get it from the legitimate quarter, with a proper label, as from an unqualified person. He could not understand how it was that on every occasion when the Council endeavoured to keep the sale of these poisons in the hands of chemists and druggists, Mr. Williams raised a question of public inconvenience, and appeared to think that poisons should be sold by anyone if they were to be used for any technical purposes. He believed the majority of the Council would agree that it was their duty to see that these poisons were sold by registered persons only.

Mr. ALLEN said his impression was, that the sale of half-an-ounce of cyanide of potassium for the purpose of photography to an amateur was just as illegal as the sale of a poison bottle. The sale of a small quantity of cyanide of potassium to a man who was going to use it for trade purposes was a different matter.

Mr. ATKINS said he accepted the answer of Mr. Symes, that the matter was not immediately before the Committee; he was simply dealing with the logical proposition. The photographic trade had passed largely out of the hands of chemists, which he regretted, into the hands of a certain class of factors who sold apparatus and chemicals. To his knowledge this sort of thing occurred. One member of a family got a cyanide of potasium bottle, and another went to another trader and got half-an-ounce bottle of cyanide of potassium simply without any of the conditions of registration. The matter was not before the Council now, but it would have to come forward if they were to be logical.

The PRESIDENT hoped this discussion would not proceed any further. The proposition was a definite one which did not tie their hands to anything in the future.

Mr. HAMPSON said he still maintained his position. They were simply showing that the Society in the past had failed to do its duty, and in consequence of that the practice had become almost a settled question.

The PRESIDENT said it was open to any member to bring forward a case to be considered.

The motion was then put and carried unanimously.

Deputation from Scotland.

A deputation of Scotch gentlemen, consisting of Mr. Noble, Edinburgh, Mr. David Storrar, Kirkaldy, Mr. Strachan, Aberdeen, and Mr. Watt, Haddington, attended the Council.

The PRESIDENT said these gentlemen had been appointed at a meeting held in Edinburgh, and he thought the most convenient course would be to ask these gentlemen to make any statement they wished to put before the Council, and for the Council to ask any questions on matters which they wished further explained. After that probably the Council would ask them to retire, and either discuss the subject that day or at some future time. He would therefore ask Mr. Watt, who was, he believed, the convener of the deputation, to make any observations which he had to make. He would remind him that the condition of affairs, from the point of view of the Council, was that it was proposed that there should be an Executive Committee of the Pharmaceutical Society of Great Britain in Scotland, consisting of twenty-one members, as mentioned in the Annual Report.

On that he presumed the deputation would wish to offer some observations.

Mr. WATT said it afforded the members of the deputation great pleasure to meet the Council, and they appreciated the consideration which had been shown them. They had come, if possible, to aid the Council in a satisfactory and speedy solution of this question. They were all desirous of showing every possible respect to the Society and admitted fully that the Council was the supreme executive, although some observations had been made as if they did not admit that. They desired in every legitimate way both to aid the Society in its work and to carry out its purposes. In order to present in a concise manner their views a brief statement had been drawn up which the secretary of the deputation would read. There were, however, two positions which they could not ignore—one was their former position and the other their national position. They were not a provincial town, they were a nation, and he hoped the Council would be good enough to remember that in the discussion. Their former position was one which had been of considerable standing, and their position as a nation was not to be compared to a provincial town, however large and distinguished.

Mr. STORRAR then read the following statement :—

1. For over thirty years the members resident in Scotland have been practically recognized as a Branch of the Society, which is shown by the following facts, namely, that the annual reports of the Branch have been referred to in, and in some cases incorporated with, the Society's reports; that by the Act of 1852 special examiners for Scotland were directed to be appointed; that an Honorary Treasurer and Secretary for Scotland have been annually appointed by the Council, and that the nomination of these officials (Examiners, Treasurer and Secretary) has been left hitherto In the hands of the Branch or its Executive.

2. The management of the North British Branch has been entrusted to an Executive elected annually by the Scottish members. In the earlier part of its history this Executive was called a managing committee, and was elected at the annual meetings of the Branch; but subsequently the title of "Committee" was changed to that of "Council," and, for the purpose of exciting a wider interest in the Society's affairs, the election has for some years been conducted by means of voting papers. This change of title and mode of election has been, if not approved, at least not objected to by the Council of the Society, and its own official, the Secretary of the Branch, conducted the election and sent out the voting papers.

3. The office bearers of the Scottish Executive have for many years been known as the President and Vice-President of the North British Branch of the Society; have been recognized as such by kindred professional societies in Scotland, and have worthily maintained the dignity and position of the Society on many public occasions.

4. Neither the office bearers nor the Council of the Branch have ever shown any disloyalty to the Society or claimed independent authority, and we claim for the organization that it has done much to promote the interests and extension of the Society in Scotland, and that although it was not legalized by the Charter or Acts of Parliament, the North British Branch is the outcome of an unwritten agreement amongst the founders of the Society. If it has no better foundation we hold that its claims are founded upon equity and use and wont, and if abolished will seriously affect the welfare of the Society.

5. In spite of all this the privileges hitherto granted to the Scottish members have been withdrawn; the Council and office bearers of the Branch have been superseded, and the affairs of the Society in Scotland are now managed by a small Committee of the Council. The mere fact that some special management is considered necessary goes to prove our contention that the membership in Scotland constitutes a Branch, and can be best administered as such.

6. The Council, while holding a North British Branch and Council to be illegal under the Charter of the Society, have recognized the advantage, if not the necessity, for a special administration of Scottish affairs, by proposing that in future, it should be placed under the charge of a Committee, nominated and elected by members resident in Scotland, and approved by the Council.

This organization (on the face of it quite as illegal as the late Council of the North British Branch) it is proposed to legalize by obtaining the sanction of the Privy Council to a Bye-law giving, in general terms, power to the Council to appoint Committees, composed of members outside their own number, for the management of certain of the Society's affairs.

7. Such a solution of the difficulty the deputation are instructed would not prove satisfactory to the members resident in Scotland, and would greatly weaken the ties which bind them to the Society. While truly loyal to the Society, and anxious to preserve its unity, they cannot help feeling that their national sentiments and old associations have been rudely and unnecessarily interfered with, and that an organization nearly as old as the Society itself has been broken up before any new organization has been formed to take its place.

They quite recognize that the old organization, which unchallenged might have gone on efficiently and prosperously, cannot now be re-instituted without some change. They also agree with the Council that fuller powers might be delegated to the proposed new governing body; but they, at the same time, feel it due to themselves and to the interests of pharmacy in Scotland that some definite recognition of a North British Branch should be made, as was undoubtedly the intention of the founders of the Society.

For these reasons the Scottish members cannot agree to the proposed alteration in the Bye-laws asking general powers, and would not be contented with less than a specific Bye-law, entrusting the management of the Society's affairs in Scotland to an executive nominated and elected by members resident there, but subject to the approval of the Council.

8. While willing to agree to this course of action they are advised, upon competent legal authority, that under the present Charter the Privy Council cannot legally give its consent to a Bye-law authorizing the Pharmaceutical Council to delegate its powers to any Committee composed of persons outside their own number, and to the deputation this objection appears insuperable.

9. Assuming a Bye-law to be unattainable the only course left to put matters on a proper footing is through an amendment of the Pharmacy Act.

To secure this a considerable time must elapse, as it is not to be supposed that the Council will apply to Parliament on this point only, but will include other points as well, so that really the only action which can be taken at the present time is to formulate a provisional agreement on lines to be afterwards legalized.

10. Taking into consideration the whole history of the question; knowing the feeling which exists in their own districts, and acting upon the instructions given them, the members of this deputation are strongly of opinion that no arrangement, whether provisional or permanent, would be satisfactory to the majority of the members resident in Scotland which does not provide—

(i.) That the new governing body shall be called "The Executive of the North British Branch of the Pharmaceutical Society of Great Britain."

(ii.) That the members of Council resident in Scotland shall be *ex officio* members of the new Executive.

(iii.) That the office bearers of the new Executive shall consist of a President and Vice-President, or, if preferred by the Council, of a Senior and Junior Vice-President elected by the Executive out of its own number; and—

(iv.) That the Scottish Executive shall have restored to it the privilege of nominating the Examiners, Hon. Treasurer and Secretary for Scotland, and shall have a general control over Scotch business, subject to the approval of the Council.

London, *July* 7, 1886. JAMES WATT, *Convener.*

MR. WATT said he need not go over the first part of this statement, which was a narrative. The matter really resolved itself into two or three points. The first question referred to was the legal one, but that he would reserve till the last, and the first point he would deal with was the suggestion that the new governing body should be called the Executive of the North British Branch. They did not wish in any sense to interfere with the authority of the Council, but they found the words "North British Branch" over the building, and it would be necessary to destroy the windows, and a good deal of the furniture, and to desecrate the portraits on the wall, if that name were altered. He quite admitted that if they were beginning *de novo*, he should not seek for that title. The Scotch Branch would be more appropriate, but as matters stood he did not see how they could destroy that title. It was a matter of convenience to the Society if they were to have the representation in Scotland that the term North British Branch should be retained. It might be supposed that behind that term there was the idea that it was a separate and distinct Society, but that they utterly repudiated; they admitted to the full all the power the Council could desire. The executive was to report to the Council once a year, and admitted its authority as supreme, and he thought the Council might very well confer all the powers which were asked for in this memorandum without derogating in the slighest degree from its dignity. The next question was that of the titles of President and Vice-President. If they were presuming to call themselves President of the Pharmaceutical Society in Scotland, he could see there would be an objection, but they were doing nothing of the kind; they were simply claiming a local title of some sort of dignity—the title merely of courtesy—and when looked at in that way he could see no objection to it. The Society might have fifty presidents of branches without derogating from its dignity. The question of branches was one for which probably public opinion was not ripe, and he did not wish it to be mixed up with this question, because they stood in a different position, and taking into account their former position it would be admitted there was something in it. Personally he did not care a fig for the title, but wished to see at least the Society represented by gentlemen of position and dignity in Edinburgh. He should be sorry to see the title reduced to that of Mr. Chairman of Committee; in fact, he should cease to be a member of the Society in that case. They were associated in Edinburgh with a great many other societies, with whom they ought to mingle on proper terms, and he did not see why the Council did not deal with them, who were so persistently loyal, in a generous spirit. He was surprised that the Council, composed of men distinguished all over England, should refuse this small honour to Scotland; it appeared to him to be disputing over a mere trifle. They were desirous that this matter should be settled, and, if possible, settled speedily; in fact he saw no reason why it should not be settled at once, and in order to do so they were willing—although he was not quite sure on going back to Scotland he should meet with the approval of his friends for what he was about to say—but in order to meet the Council the deputation was willing to substitute the term Senior Vice-President for that of President. They offered that as a fair compromise and as a solution of the difficulty, although he should have infinitely preferred the Council treating them in a generous manner and sending them home with some dignity attached. He would leave that in the hands of the Council. The other matter was the term Executive of the North-British Branch, and he thought, as they had abandoned the word Council in deference to the Council, the Council might abandon the word Committee; but if any title were given at all it seemed to him the word Committee was not at all suitable. Another thing was that the members of the Council resident in Scotland should be *ex-officio* members of the new Executive. This was proposed for the purpose of recognizing the Council in every possible legitimate form. The third point was that the office-bearers of the new executive should consist of the President, Vice-President, and that to the Scottish Executive should be restored the privilege of nominating the Examiners, the Honorary Treasurer and Honorary Secretary for Scotland and the general control of Scotch business. The reason they suggested this, instead of the members generally nominating the Examiners, was because it was pointed out that if there was a small meeting of the members one gentleman who might be anxious for office might canvass and secure his own return, which might not be for the interest of the Society, and that the Executive would be a more responsible body and would be more likely to consult the general interests in the nomination. The other point was what they had had before, namely, the appointment of the Treasurer and Secretary for Scotland. With regard to the suggested payment of travelling expenses of the Executive in Scotland, it was thought that was a very wise and good offer, because it had been felt that Edinburgh was more largely represented than it should be, and that what would be oppressive on the individual in coming a long distance would not be a great charge on the Society. If there were any agreement on these general points the minor points of detail could easily be adjusted. He would come now to the legal position, which was one he had paid special attention to. He felt for a long time that the proposal of the Council to nominate Committees as a sort of roving commission of that kind would never be listened to. He had gone into it dispassionately, not with a desire to embarrass the Council, but to aid it, and the impression on his mind was that the power sought was one which was inconsistent with the Charter and constitution of the Society, and he came to that conclusion assisted by the advice of eminent counsel. One of his reasons for going into this matter was that if the Council came to the conclusion that the course suggested was the only possible one under the circumstances, it would give it a freer hand. They were not desirous that the Council should go to the Privy Council and be refused, for such a thing had a demoralizing effect on the Society. He had, therefore, carefully considered this point, and the conclusion he came to was that no bye-law which could be proposed would be sanctioned by the Privy Council, because the Council was dealing with parties outside themselves, and it would be evident to common sense, apart from the legal question, that it would be impossible for them to delegate the power to any other body than themselves, unless they had authority in the Charter or Act of Parliament. Now, neither the Charter nor Act of Parliament gave that power. He laid before the eminent lawyer he had referred to the exact position of the Charter and the Act of Parliament, together with what the Council proposed to do, and this was his answer:—"The general principle is, *Delegatus non potest delegare.*" Either the proposed bye-law seeks to sanction the delegation of the special powers conferred by the Charter and Statute or it does not. The dilemma arises that if such an application is sought to be made it is illegal, and no such bye-law or any sanction short of Act of Parliament can legalize it. If no delegation of powers is sought then no bye-law is necessary. That was a common sense view of it apart from the legal view. With these sentiments they had asked nothing which it was not in the power of the Council to grant, and he thought the solution of the difficulty would be found in the course he had suggested. Of course it lay with the Council to say what it would do. In the

circumstances he need not impress on it the necessity for generous treatment of Scotland and the consideration due to Scotch members. He should be extremely sorry if after coming there in a spirit which he hoped would be reciprocated, they should go back nothing being done and be ultimately driven out of the Society, but that was the position the Council must face—either a generous treatment of Scotland or the annihilation of the Society there.

Mr. RICHARDSON asked what was the exact title suggested for the head of the executive in Scotland.

The PRESIDENT said he understood the suggestion to be that there should be two honorary officers in Scotland, who should be called Senior and Junior Vice-President, instead of President and Vice-President. He would ask Mr. Watt if the same powers by which an executive could be appointed by the Council would not apply to the Executive Committee of the Society in Scotland.

Mr. WATT said the same power existed, it was quite true, but it must be understood they wanted to legalize it. This was proposed as a temporary arrangement.

The PRESIDENT: Then this would be unlawful from your point of view.

Mr. WATT said it would if persisted in without legal sanction. It was a temporary arrangement, to be afterwards legalized.

The PRESIDENT said he presumed Mr. Watt would admit that the Council's proposition could be carried out in the same way.

Mr. WATT said that was the misapprehension the Council had laboured under. It imagined, as it said, that it had powers which it had not.

The PRESIDENT said his proposition was, that the position of the Council was precisely the same, whether it appointed an executive under the conditions now mentioned or appointed a committee under the conditions laid down in the report of the Council.

Mr. WATT said he quite admitted that, but the Council had afterwards said it wanted to legalize its action.

The PRESIDENT said, as he understood, the Scotch members wished them to go on doing what they admitted to be unlawful temporarily. Surely the Council might do the same thing in either of the ways considered preferable. The logic of Mr. Watt's argument applied equally to the proposition of the Council.

Mr. WATT said their position was that the Council could not legalize this by a bye-law. They would be very glad if they could, but they saw that the Council was shut up for this course of action, and that, therefore, it could only be a temporary arrangement.

The PRESIDENT said the Council had the same power to go to the Privy Council to appoint a committee for Scotland as to appoint an executive such as was proposed.

Mr. WATT said there was this difference. In the one case the Council would have the assent of the Scotch members. If the Council said it wanted to legalize this Executive, whatever it was called, there was nothing to prevent it trying to do so.

The PRESIDENT said he understood the proposition to be that the Council might temporarily appoint an Executive in Scotland consisting of twenty-one members. His point was that if the Council could lawfully or unlawfully do that, it could also do the other, so that it came substantially to the question which of the two kinds of executives should be appointed, both being doubtfully legal.

Mr. WILLIAMS said the legal opinion must depend very much on the case put before the legal gentleman, and as far as he could gather, that gentleman supposed that this Executive, as it was called, or, as it had hitherto been called, the Council of the North British Branch, would have the power to spend money, or to do things independently of the Council. Now the Council never had yet, and he hoped never would act on that view. All the duty of the Council of the North British Branch had been to advise and recommend, and on that advice the Council had acted.

Mr. WATT said if the Council did not delegate power, it did not want a bye-law.

Mr. WILLIAMS suggested that in that case the North British Branch was perfectly legal.

Mr. SCHACHT said still an alteration might be required of the bye-law which prevented the appointment of a Committee outside the Council. The Council had not according to the written law any power to appoint a Committee even to manage the evening meetings, which was a matter only of advice. Surely there could be no objection to giving the Council the opportunity of appointing Committees for certain purposes. It was not an application for powers necessarily, but the legal gentleman's opinion seemed based on the suggestion that it was intended to delegate powers of the Council.

Mr. WILLIAMS said the Council simply wanted the Committee to look after the property, and to advise the Council what to do.

Mr. HAMPSON said, assuming money had to be spent in Scotland in the interests of the Scotch Society, in what way would the authority of the Council be exercised? Would the Executive spend the money without the sanction of the Council, or first receive that sanction and then expend the money.

Mr. WATT said, as he understood it, the Committee would do nothing contrary to the opinion of the Council or to the orders of the Council. If the Council thought fit to give a written minute of the terms, probably it would obviate the difficulty without a bye-law.

Mr. HAMPSON said the point was very important to test the power which the Committee, or executive, or whatever it might be called, would have in the expenditure of money. Supposing this executive were constituted with or without a bye-law, or by a fresh Act of Parliament, and certain alterations were required to be made in the building of the North British Branch, or certain funds had to be expended, how would that money be expended? Would it first ask the authority of the Council, or spend the money without that authority?

Mr. WATT said he would answer generally that the Branch had never, so far as he was aware, attempted to do anything without the authority of the Council. It would never dream of spending money without that authority.

Mr. SCHACHT asked that the concluding recommendations might be read again.

The PRESIDENT said he thought he could summarize the suggestions put forward. The proposition referred to the expression "North British Branch" as meaning the members and associates in business of the Society resident in Scotland, and it was suggested that the Branch should be generally managed—subject to the control of the Council—by an executive which was not to be called a Council, but an Executive, and they would prefer that the chairman of the Executive should be called president, but were willing, out of consideration to the Council and for other reasons, to waive that, and they would be content to have the two officers called, one the Senior Vice-President and the other the Junior Vice-President. The body would consist of the same number of members as was mentioned in the Council's propositions with regard to the Executive Committee, and members of the Council resident in Scotland would be *ex-officio* members of it. He presumed the President and Vice-President of the Society would also be members. In fact, if they took the proposition of the Council and simply took out the words Executive Committee of the Pharmaceutical Society in Scotland, and inserted the words Executive of the North British Branch, with two vice-presidents as officers, they had the scheme suggested by the deputation.

Mr. WATT said that fairly represented it.

Mr. SYMES said he understood the view of the deputation to be that it would be illegal any way, but that if the Council did it in the way these gentlemen proposed they would not make any bother about it.

Mr. WATT said it was illegal in one sense, but if, as

was now stated, it was not intended there should be any delegation of powers, it was not illegal.

Mr. SYMES said it might be his obtuseness, but he understood Mr. Watt proposed to do something which he held to be illegal, though he said if it were done his way it would not matter much.

Mr. STORRAR said the difference between their position and that taken up by the Council was this,—the Council proposed to appoint an executive committee by applying for a bye-law, which they held to be under the Charter illegal. They proposed on the other hand that the powers be set up by an amendment of the Pharmacy Act to allow of a branch being established in Scotland.

The PRESIDENT: Or anywhere?

Mr. STORRAR said they did not trouble themselves with any other branch.

The PRESIDENT asked if the Council was to understand that the Scottish members were prepared to support any movement which would lead to the establishment of a dozen or more branches in England.

Mr. STORRAR said personally he should not object, but he could not speak for others. They had simply directed their attention to the difficulties in hand. They had had for thirty-five years a branch in Edinburgh legally or illegally, and they held from use and wont this organization had done good service, and in plain language they wished to have it continued, but he was satisfied with the Executive Committee proposed by the Council, only he wished to change it so as to keep up the old association with the Branch. In the second place they were prepared to waive the title of President and to appoint either a Vice-President, or two Vice-Presidents; they proposed two because one might not be present. The main difference was this: they were asked to come here to confer with the Council as to the future government of the Society's affairs in Scotland. As at present advised they considered any action taken in the direction the Council proposed would be illegal, but at the same time they wished that meeting to arrange for a government or a Committee in Scotland and for the Council to take steps to have it legalized as soon as possible. It was no use, however, going forward to ask for powers until they knew what they wanted, and the powers they wanted were on the lines laid down in the memorial. Recognizing that no legal delegation of powers could be made, he wished the Council to take steps to amend the Pharmacy Act so as to make it legal. Might he ask the President what the duties of the proposed Executive Committee in Scotland were to be?

The PRESIDENT said he could certainly give a sketch of its duties, but he thought it was rather for the deputation to say what the executive proposed was to be. He could conceive a Committee, or an executive, or whatever it might be called, being appointed without any delegation at all. It would be perfectly lawful in his judgment for a Committee of twenty-one or more persons to spend money, if that money was authorized by the Council to be spent, because that would not be a delegation of powers, but it would not be lawful for the Executive to propose that £300, £400 or £500 should be spent on a building without coming to the Council for authority. It would be a Committee like other Committees, which would report not so frequently perhaps as other Committees, and the recommendations it would make would have to be confirmed on report from time to time by the Council.

Mr. STORRAR said he held that any Committee which initiated business of any kind, however small, had powers delegated to it, and under the Charter the Council could not give a Committee that power. On the other hand, if it were proposed that this Executive Committee should simply do what it was told by the Council, he did not think there was any use in having a Committee.

Mr. BOTTLE asked under what section of the Charter the Council was debarred from delegating such business to a Committee as inaugurating and recommending work.

Mr. SCHACHT asked if the gentlemen recognized the difference between a Committee and an Executive Committee. He understood their propositlon contained the words Executive Committee, but the Council had never proposed such a term; it proposed simply an alteration in the Bye-laws, giving more scope in appointing committees, but they were not executive committees in the least degree. Not one of the committees appointed by the Council—the Finance Committee, the General Purposes Committee nor the Library and Museum Committee was an Executive Committee; they were all reporting committees which took certain things into consideration and reported the desirability of certain action on the part of the Council. That was exactly what was proposed to be done with reference to Scotch affairs.

Mr. WILLIAMS added that the Council was the only executive body connected with the Society. This legal gentleman, whose opinion was very adverse to the powers of the Council to obtain a modification of the Bye-laws, had evidently been instructed on lines which were not those the Council proposed to adopt. The Council did not seek powers to appoint an Executive Committee to which executive powers should be delegated.

Mr. WATT said he would reply to Mr. Bottle in a Scotch fashion, by asking him what section of the Charter would justify such an appointment. He thought Mr. Schacht confounded two things. The Council was an executive, and therefore could not appoint an executive Committee. If it appointed a Committee to do certain things, it delegated to that Committee the power to do that which it told the Committee to do.

Mr. SCHACHT said his point was the Council did not seek to delegate its powers.

Mr. WATT said in that case no bye-law was necessary.

Mr. SCHACHT said in that case Mr Watt's legal friend was wrong, because the very Bye-law itself stated that the Committee could only be appointed from amongst the members of the Council. He understood Mr. Watt to suggest the word powers in the sense of Executive powers, not advising powers; but advising powers was what was asked. The Council wanted persons cognizant of Scotch affairs to advise the Council, and if it instructed them to superintend the officers and the disbursement of money they could do so, but that would be after special directions given.

Mr. HILLS said the Council appointed Committees of its own body in two ways, to advise and in certain special cases it gave a Committee power to act—but that was only in very special cases, and there were certain members of the Council who thought that even that was an unconstitutional thing to do.

The PRESIDENT said the point was this, that the Bye-law tied the hands of the Council and prevented its appointing any Committee except of its own members. The contention of the Council was that the Charter did not tie its hands, but that the Bye-law did, and therefore it went for a new bye-law to untie its hands, and in doing so he believed it was within the Charter.

Mr. HAMPSON said he presumed their Scotch friends would not object to any solution of the legal difficulty, and it seemed rather an unnecessary bone of contention. Assuming that a higher authority was obtained than that which Mr. Watt had already obtained, advising the Council it had the power to apply for a bye-law to carry out its scheme, he presumed they would not object.

Mr. STRACHAN: Not at all.

Mr. HAMPSON said the legal question could not be decided there because they were not experts.

The PRESIDENT remarked that it formed the basis of the contention, because Mr. Watt said the Council could not do certain things and therefore it had better do something else.

Mr. HAMPSON thought it would be better to keep the legal question apart.

Mr. NOBLE said very little remained for him to say after the full explanation which had been given by Mr. Watt, but at the same time he would press on th

Council that the pharmacists of Scotland had for nearly thirty-five years had such titles, and had now got such a position in Edinburgh and other parts of Scotland that if the Council now reduced them to the position of Chairman and Vice-Chairman of Committee their prestige would be gone, and the Council would find that the Society in Scotland would dwindle away nearly to nothing. The position now held by the Scotch members with regard to other societies was such, that it was felt that if the Council could not give them those titles legally, they could do so as an act of courtesy until they could go to Parliament and make courtesy titles legal.

Mr. STRACHAN said he also had very little to add. He thought that the sooner they got an amended Pharmacy Act the better, but at the same time he did not know whether in the present state of affairs it would not be a little premature, even supposing Parliament were sitting, to attempt to do so. The present Pharmacy Act was very much a thing of the past, owing to the decision of the House of Lords on certain questions, and it was looked upon—in the North at all events—as hardly worth having. In Scotland they felt they were very far from London, and very far from the great centres of education. They could not say so in Aberdeen, because they were pretty well situated, but it was the feeling of the members in the North that if the Council were more liberal towards the various centres, there would certainly be a great augmentation in the members and assistants. He had been asked particularly to mention that point.

The PRESIDENT asked what was meant by being "more liberal."

Mr. STRACHAN said that perhaps it was within the knowledge of the President that at one particular time money was applied for from Aberdeen, and he understood there was still a cheque lying in the office which was never cashed.

Mr. WILLIAMS said the Aberdeen Association would not claim the cheque because of the conditions which were imposed.

Mr. STRACHAN said he could not go into the details of the matter. He thought if there were a more generous expenditure of money throughout the country the membership at large would increase.

The PRESIDENT asked if grants of money for education were referred to.

Mr. STRACHAN said, in the case of Aberdeen, it would be for the library and museum, not really for teaching.

The PRESIDENT said he did not think there had been any application from any other town in Scotland.

Mr. WATT said he wished to emphasize one statement on which he thought there was some misapprehension. The deputation were quite willing if an arrangement were come to to give in, and to aid the Council in any way in which they thought they could, to legalize their position, whether by Act of Parliament or bye-law. Although he had stated the legal difficulty simply to aid the Council, they were quite willing to aid in any way if the arrangement was one they could consent to.

The PRESIDENT asked if the views now submitted represented views expressed at the meeting, or had they been arrived at since.

Mr. WATT said he was chairman of the meeting, but there was some discussion as to the chairmanship. It was a small meeting, and no formal instructions were given, but the proposer of the motion said that he wished to give a free hand to the deputation. The opinions they had expressed were the known opinions of everyone they came across in Scotland, with very few exceptions.

Mr. HAMPSON said the word national had been strongly emphasized, and he might assume, therefore, that the proposal put forward would satisfy the national sentiment; he referred more particularly to the titles of senior and junior vice-president of an executive. Was it to be understood that the gentlemen present agreed with that?

Mr. WATT said that document which had been read represented their united views.

Mr. HAMPSON asked if it represented, as they believed, the bulk of Scotch views.

Mr. WATT said this point was a new idea which had occurred to them from a desire to meet the Council.

Mr. WILLIAMS said he remembered the birth of the North British Branch. It was a branch distinctly, not a local association existing in Scotland. It had to advise and recommend as to those to be appointed to the Board of Examiners, and it had just been necessary to summon a special meeting to give advice in order to fill up a vacancy which had occurred. The Council was incapable of doing that without the advice of the brethren in the North, but it wanted not only their advice, but their zealous co-operation. He thought it would be a wise thing to give the title of President; he was much opposed to the idea of a Vice-President, for that would be admitting something more, admitting that he was Vice of the President of the Society, and as such he might come and take a seat in that Council. It meant more, to his mind, than the mere term President of the branch.

Mr. SCHACHT asked if the Council was discussing this question, or receiving the views of the deputation.

The PRESIDENT said he thought the time was not yet come for discussing the matter in Council. It would be better to get all that was possible from their friends from the North in the first place.

Mr. NOBLE said he thought it was a conference, and they would like to hear Mr. Williams' opinion.

Mr. WILLIAMS said he thought the deputation would probably wish to hear the views of some members of the Council on this question.

The PRESIDENT said it would be a question whether the Council would discuss the subject on that day or adjourn it. It seemed to him that possibly the discussion of the project and the conclusion to be come to about it had better be adjourned.

Mr. HAMPSON said the Council had not, perhaps, fully heard the views of their Scotch friends, and it would be better to hear them at length, and to see a copy of the document in print, and also to have an opportunity of reading their statement in the Journal, and then to carefully consider this important matter at home before arriving at any decision. He did not wish to prejudice the case at all, and the sooner a solution was arrived at the better, but it was a very important matter and he was not prepared to give his opinion straight off. He should prefer to think it over carefully.

Mr. ATKINS said he also wished to hear all the Scotch friends had to say before saying anything. He thought members of the Council might perhaps help them by putting a few questions. The case had been most ably presented, but the most able man might overlook a point. He did not care about the technicality as to whether Mr. Watt was duly appointed Chairman. At any rate he came today, and the gentlemen associated with him, and told them what Scotland thought. He felt with Mr. Hampson that the members of the Council must carefully weigh these matters over and see if there was any solution of this comparatively difficult problem, and he confessed it was still difficult to him. In his opening remarks Mr. Watt referred to national position, and he presumed he meant by that that Scotland had a claim to a higher consideration than Yorkshire or Cornwall, or the south-west or north-west of England—that Scotland, as a nation, had a right to some further consideration. Was that his contention?

Mr. WATT said that was exactly his contention, that Scotland was not a provincial town; that their national position demanded special consideration on account even of the interests of the Society itself.

Mr. RICHARDSON said he came to listen to the friends from Scotland, but was not prepared to give a decision that day. He thought the matter should be left over for at least a month.

Mr. ATKINS said some day or other it might be necessary to form associations in different parts of the country,

and some authority might be delegated to local bodies. Did Scotland claim more than that?

Mr. WATT said he did not wish to raise the question of other branches now. Mr. Atkins had put it rather stronger than he did.

Mr. ATKINS said it was quite possible that at some future time, having regard to the desire for provincial education, the Council might form some bodies on the lines which rightly or wrongly were now contended for by Scotland. The deputation now asked for the title of North British Branch, and for two Vice-Presidents as Senior and Junior—not for President.

Mr. BAILDON said, to prevent misapprehension he would point out that they asked first of all for the term president, but they now conceded that point.

Mr. SYMES said the Council could not discuss and conclude the matter to-day. When Mr. Williams rose he thought his object was to elicit some further information, not to express his own views. But at any rate, they should make all the progress they could, and if members of the Council would mention any points which occurred to them, they would be more likely to elicit the information they wanted from these gentlemen, who could not be expected to come such a distance again. That was why he put the question with regard to the legal position. He had thought from all he could gather, from what had been written and said, that these gentlemen would never raise the question of legality, but would accept the passing of a bye-law which would enable them to appoint Committees for general purposes outside their own body and to appoint a Committee for this special purpose for Scotch business, and he thought with some other slight concession as to details that would meet their views, and they would be getting towards a focus. But instead of that he was a little surprised and rather sorry to find that as far as he could gather there was no concession at all on the part of Scotland. They were all anxious to get this matter settled, but it seemed to him that the general scheme to-day was this: that their Scottish friends wanted all that they had hitherto asked, and the utmost concession he had seen was one which he did not thank them for, namely, to have two Vice-Presidents instead of a President and Vice-President. He would far rather have the President of the Committee. If they preferred the word President to Chairman he could quite understand it, and had great sympathy with that sort of feeling, whether it was desirable or not. In their own local association, the Liverpool Chemists' Association, which was one of the earliest formed in England, there was a president who got invited to some of the municipal *soirées* and other special meetings, and was recognised as holding a certain official position. He believed the point was that these gentlemen thought, not only would they lose an honour, but that they would lose that official position which, in itself, was an advantage to the whole Society, as well as to themselves. He would like to hear from them whether they had not larger powers; whether they had not authority to meet the Council a little further than they had done.

Mr. WATT said briefly it was the *status quo ante* without the President. The deputation had conceded a good deal; formerly, there had been a Council, with a President and a Vice-President of the Council. They had conceded that, and they were also disposed to concede the title of President out of courtesy to the Council. The thing lay in a nutshell, as one of his friends said the other day; two sensible gentlemen would settle the thing in five minutes.

Mr. SYMES said there was something in titles. A man who had obtained the degree of M.D. in the London University was a Doctor of Medicine, but was not a physician, and a man who had obtained a degree at the College of Physicians was a physician, but was not a doctor, but by courtesy he was called "doctor." When this question of courtesy occurred, it struck him that if all the other points could be swept away, they could discuss afterwards this question of President.

Mr. BOTTLE said he quite agreed with Mr. Watt that the matter lay in the nutshell, but he also saw that the nut wanted a good deal of cracking. Who was to appoint the Executive in Scotland? Was it to be appointed by the Scotch members, without any reference or control over such appointment by the Council? Mr. Williams had said the Council was unable to appoint an Examiner without reference to their friends in Scotland, but that was not the fact It was the duty of the Council to appoint an Examiner, and the friends in Scotland had no right or control over it whatever. It was only as a matter of courtesy the Council delegated to their friends in Scotland the privilege of nominating a gentleman they considered desirable to put in that position, and the Council accepted him. So he took it the Council might be disposed to concede that the Scotch members should have the nomination of the Council in Scotland to do certain work, but the controlling power must be in the hands of the Council. The Council could not give away a power and say it would accept and appoint anybody sent up from Scotland. He would ask their Scotch friends if there was really any difficulty in the management of the Scotch affairs in the hands of the small Committee the Council had appointed to carry out, whether it was not as well done by those four gentlemen as it was previously by the twenty-one or twenty-five who had been nominated in Scotland. He could understand there were other reasons why they should have the privilege of appointing a Committee, but so far as the real business was concerned, his conviction was that it was as well done by a small Committee appointed in London, and he should like to hear what objection there was to the *status quo* as it now existed.

Mr. WATT said it was proposed that the members of the Executive should be nominated and elected by the members in Scotland, subject to the approval of the members of the Council. With regard to the management of the affairs by this small Committee that was a wide subject to answer, but he would briefly say that it was in the interests of the Society itself that there should be a representation of Scotch members taking an active part in the business of Scotland.

Mr. SCHACHT asked if it would be satisfactory to the Scotch members that the term "branch" should be applied universally whenever there was a case for central organization in future. If for instance there were appointed a Midland Branch of the Pharmaceutical Society, a West of England Branch, or it were proposed that there should be a Glasgow Branch, would it be possible that that should be done consistently with the assumption that the central organization in Edinburgh should be called the North British Branch, or even the Scotch Branch, as had been preferably selected by Mr. Watt? It seemed to him to raise the question of difference in the future this assumption of the title of branch. At the time that title was first assumed in Scotland it was also assumed by other sections of the Society in other parts of Great Britain. There was a Bristol Branch, a Bath Branch, a Leeds Branch and many others. In that sense it was quite understood the term might be applied, but if there were a North British Branch or a Scotch Branch already existing it would be exceedingly inconvenient that there should be a Glasgow Branch or Aberdeen Branch if such things were desired.

Mr. WATT said he did not wish to go into this branch question, but so far as he knew the opinion of the members they would have no objection to fifty branches and fifty presidents, whether at Aberdeen or elsewhere. But he did not wish that mixed up with this question. They always claimed a national distinction; they represented Scotland, and that had been conceded by the Council.

The PRESIDENT asked if he would object to a branch at Aberdeen with Mr. Strachan as President.

Mr. WATT said, No, nor one for Glasgow with Mr. Frazer as President.

Mr. ROBBINS said there was one satisfying thing at all events; that was, that something new had been brought forward. They had heard for the first time that their Scotch friends would be content with the name of Vice-President instead of President. Mr. Symes thought that still more objectionable, but that was not the question, it was something new and showed that the Scotch gentlemen had conceded something. Within the last two or three days the idea struck him that that would be a capital way of settling this question, but referring to the Charter the Council had to appoint a President and a Vice-President once a year, there was no power to appoint two Vice-Presidents.

Mr. SCHACHT asked whether the Scotch friends had nailed their colours to the mast with reference to this title, or whether, for example, they would consider if it were offered them the adoption of such titles as Principal and Vice-Principal. That was the title often given to the highest personages in many colleges and would not clash with anything at present existing.

Mr. WATT said anything which the Council would propose should have their most careful and courteous consideration, but he must say that this proposal seemed to him ridiculous. There had been another suggestion made, a great deal more ridiculous—viz., that the title should be "moderator." It struck him it should be either president or chairman.

Mr. STORRAR said a great deal of discussion had gone rather wide of the point, especially that they were asking for some more power than the Council was disposed to give; but the real fact was they were perfectly prepared to accept what power the Council was willing to give to the proposed Committee. They were not fighting on a question of power; they were fighting on a question of title. They were determined "North British Branch" should be retained. They also thought the office-bearers should have the title of President and Vice-President, but to meet the Council they were disposed to accept the title of Vice-President. It was said they were not yielding anything, but they had yielded the title of Council, they had yielded the free election of the North British executive, and he might turn round and say what was the Council disposed to give? As far as he had seen, it was not prepared to meet them in any way at all. They had yielded a good deal, and it was the part of the Council now to yield a little for the purpose of conciliating the members in Scotland. Mr. Bottle had asked if the small Committee was not sufficient to do the work. Possibly it was, but why should a small Committee be appointed for Scotland at all if there was not some speciality in the Scotch constitution. There was not a small committee appointed for Liverpool or any other town. They gave up the free election of members of the Council in Scotland, which they formerly possessed, and were, in future, willing to nominate them, subject to the approval of the Council. He believed that was what was asked in this statement, and might very well be conceded. If that were done, it would make matters right in Scotland, and be the means of extending the Society very much; but if it were not granted, if the title North British Branch were to be suppressed entirely, he was very much afraid it would seriously affect the membership in Scotland. With regard to the legality question, they did not make a point of that at all. They simply brought forward the view that, in their case, a bye-law applied for in the shape the Council proposed would not be granted by the Privy Council, but if the Council succeeded in getting a bye-law giving a special committee for Scotland, with specific powers, they were perfectly willing to accept it.

Mr. HILLS asked if they would oppose the granting of a new bye-law.

Mr. STORRAR said certainly in a general form, but not if the Council was prepared to ask for a specific Committee for the management of Scotch affairs.

Mr. NOBLE said it was not right to put Edinburgh on the footing of Bristol, Bath, Leeds, or Manchester—it was a metropolitan city.

Mr. SCHACHT explained that he was only referring to the fact that the title of branch had been applied indiscriminately to these towns as well as to the North British Branch. He meant no disrespect to Scotland or to Edinburgh, but it had occurred to him that difficulties would occur in future if the title North British Branch were retained and other branches in the North were afterwards established; but it was immediately conceded by Mr. Watt that there might be any number of branches.

Mr. NOBLE said there must be a special name for the metropolitan city.

Mr. SCHACHT said that was the difficulty. If there was a North British Branch he did not understand how there could be in addition an Aberdeen Branch. They might, in future, want a President, with organization in the West of England, and in the North of England, and one gentleman from Aberdeen, who spoke at the Annual Meeting, said he hoped there would be branches all over the kingdom. He echoed that wish most earnestly, but it seemed to him that if they were to speak about a Glasgow, or Edinburgh Branch, or an Aberdeen Branch, they would be using expressions which would interfere with the purpose of the words "North British."

Mr. NOBLE suggested the title, "Scotch Metropolitan Branch."

Mr. WILLIAMS asked if the Society paid any of the expenses of the Bristol Branch, or any other branch.

Mr. SCHACHT said, No.

Mr. WILLIAMS said that was the distinction; it paid all the expenses of the North British Branch.

Mr. STORRAR said no doubt Mr. Schacht had pointed out a difficulty, and if they were starting anew he should agree with him; but their claim was, that they had had the North British Branch for more than thirty years, and they would do their best to keep it up.

Mr. WATT said, if the Council did crack the nut by coming to an agreement with the Scotch members, they would aid the Council to legalize the position.

The PRESIDENT said he admired their friends' ingenuity, but it all came to one point, if the Council would adopt their views it was all right. Had they contemplated the possibility of there being a Vice-President of the Society resident in Scotland? It was only by an accident that Mr. Mackay was not Vice-President on more than one occasion; and it had often occurred to the Council that it would be well to have a Vice-President resident in Scotland. If such a case, what position would they be in with two other Vice-Presidents in Scotland.

Mr. WATT said Mr. Borland raised the question at one of the meetings, and he solved the difficulty by going in for Vice-Presidents. The representation on the Council was in the hands of the constituents, and there might be no Scotch members on it.

The PRESIDENT said that was not the point. There might be several Scotch members, and they would not like to prevent a gentleman from Scotland holding the honourable position of Vice-President of the Society. Suppose Mr. Baildon were Vice-President, what would be his position with regard to the North British Branch?

Mr. WATT said the President and the Vice-President would be *ex-officio* members of the Executive of the North British Branch, and if either of them were present at a meeting he would preside.

The PRESIDENT asked if he would be expected to attend the meetings?

Mr. WATT: Not necessarily.

Mr. STORRAR said the President and Vice-President would have notices of the meetings.

The PRESIDENT remarked that if present in Scotland he would attend, unless he were told he was not wanted. Would the Vice-President represent the Branch during his year of office?

Mr. WATT said the President or Vice-President would

of course preside at any meeting at which he was present.

Mr. BORLAND said there seemed to be some misapprehension as to what he suggested, which was that the Executive Committee in Scotland, which he thought had been yielded by the meeting, for there was no opposing voice raised to it, should be presided over by a Vice-President, but he specially used the words that on all occasions on which the President or Vice-President of the Council in London might be present at any meeting in Edinburgh he would, *ex officio*, take the chair.

Mr. STORRAR thought it was understood that Mr. Borland proposed the appointment of a second Vice-President.

Mr. SYMES thought a Vice-President necessarily implied that there was a President.

The PRESIDENT thought the notion was probably taken from the vice-president of a university. It was a common thing for the acting head of a university to be called the vice-chancellor, the chancellor was a person who rarely appeared, and was rather an honorary officer.

Mr. HILLS asked if there were a Scotch Vice-President of the Society, and also a Vice-President of the Executive in Edinburgh, and any public body wished to honour the Pharmaceutical Society by sending an invitation to dinner, which would go.

Mr. WATT said they always endeavoured to give the highest honour to the person who deserved it; the Vice-President of the Society would naturally go.

Mr. NOBLE said the invitation would probably come to the President of the North British Branch.

Mr. WILLIAMS said there seemed to be a good deal of squabbling about the titles, but the fact was there was no provision in the Charter or the Acts of Parliament for the election of a President of the Society. Where a Society elected a President, as in the case of the Chemical Society, or the Royal Society, the members elected, but in the case of the Pharmaceutical Society, the members elected the Council, but had no voice whatever in the election of the President or Vice-President. They were called by courtesy President and Vice-President of the Society, but he was quite clear in his own mind that they were only President and Vice-President of the Council, and he saw no reason why there should not be a President and Vice-President of the North British Branch.

The deputation then withdrew for a short time in order that the Council might consider whether it was desirable to put any further questions.

On being again invited to enter the Council room,

Mr. WATT stated in reply to the President that the opinion of his legal friend was based on the Bye-laws as drafted and proposed by the Council, and referred to a general power to appoint Committees outside the Council. He had only to thank the Council for the kind and courteous reception given to the deputation. He hoped when they met again it would be as friends—not as foes; such was his desire as a very old member of the Society.

AW AND PARLIAMENTARY COMMITTEE.

This Committee had considered the communication from the Privy Council of January 28,* and also the following letter since received by the President in reply to an inquiry which he had addressed to the Department.

"The President of the Pharmaceutical Society,

"17, Bloomsbury Square, W.C.

"Sir,—With reference to your letter of the 13th March last, with regard to the proposed alterations of the Bye-laws of the Pharmaceutical Society, in which you call attention to the last paragraph but one of my letter of the 28th January last, I am directed by the Lord President of the Council to state, that that paragraph was not intended to convey that it would be competent for the Board, by any regulation, to require evidence of (say) a three months' course of instruction in chemistry, or to require a candidate failing to satisfy the Examiners in any subject, to attend a course of lectures on the subject before he presents himself a second time, or to impose any condition precedent whatever on a candidate tendering himself for examination.

"The Lord President is advised that it would *not* be competent for the Board so to require.

"The words of the paragraph in question were intended to express that the examinations should be of such a character as to enable the Examiners to satisfy themselves of the practical skill, knowledge and qualifications of the candidates, and for these purposes they might require practical tests to be submitted to the candidates.

"If it should be your wish to see Sir Lyon Playfair on the subject, I will arrange for a meeting at any time that may suit Sir Lyon's convenience.

"I am, Sir, your obedient servant,

"C. L. PEEL."

In the result the Committee was of opinion that the changes in the training and examination of candidates hoped to be effected by the proposed Bye-laws must be for the present abandoned. It was also of opinion that the other suggested modifications of the Bye-laws might with advantage be proceeded with, and recommended that the Council empower the Committee to frame a new set of Bye-laws and present them to the Council.

The PRESIDENT moved that the report and recommendation be received and adopted. This further letter from Mr. Peel removed any possible ambiguity in one paragraph of the former letter, which referred to the examinations. The powers conferred on the Board of Examiners to make regulations, which seemed possibly to apply to a certain extent to cases which it was proposed to deal with by Bye-laws, could not, according to the Lord-President's advisers, be exercised in that way, and therefore the Committee recommended that the Bye-laws should be recast and sent to the Council for consideration. Of course amongst them would be one referring to the subject recently discussed. Whatever their view with regard to the Scottish question might be it was quite obvious that as the Council had been in the habit of appointing Committees outside its own members for certain purposes it would be convenient to have that framed in a Bye-law. Some useful work might be done in various ways by appointing such Committees more freely, a Spurious Drugs Committee, and so on.

The VICE-PRESIDENT seconded the motion.

Mr. BOTTLE said he gathered that the Scotch members would oppose any Bye-law that included Scotland in a general power to appoint Committees.

Mr. WILLIAMS said it was a question for the Committee to consider—whether it was worth while to go forward with a bye-law which it had reason to know would be opposed.

Mr. SCHACHT could not allow this motion to pass without expressing the pain he felt at having to abandon the project the Council had had so long in hand. It had attempted by two different processes to accomplish what a great many had very much at heart, and upon which the progress of the younger section of the body to a great extent depended, and in both those attempts it had been defeated. A position had been arrived at in which he felt bound to say that a great deal of his labour for the last four years had been rendered nugatory. He had clung to the hope of finding some assistance from the Government, but it was perfectly clear now that the words which appeared ambiguous were intended to embody ideas which were not quite clearly expressed. The Council was, in fact, beaten all along the line. Personally he deplored it very much indeed, for he thought it one of the most unfortunate blows the Society had received for a great number of years in its efforts at progress. It was stopped until Imperial legislation had arrived at that position in which there was some chance of getting a new Pharmacy Bill, and all knew as well as he did that that was almost like postponing the matter *sine die*. He should not altogether give up hope in that direction, though there was certainly

* *Pharmaceutical Journal*, May 8, 1886, p. 938.

not much ground for hope. Nevertheless, he hoped that some day their successors, if not themselves, would carry out the idea. One thing seemed to him desirable in any future effort, that before application was made to any outside body they should exert themselves to their utmost to be unanimous amongst themselves. He could not help thinking even now that the Privy Council would have passed these Bye-laws had it not been for the opposition. He did not pretend to a knowledge he did not possess, but he ventured to think the greatest difficulty had arisen from within their own body. In some directions they had been half-hearted, and they had thus encouraged downright opposition in other directions, and so they were thwarted at last by a technicality. There was nothing left but to try to carry the other portions of the Bye-laws in the best form they could, but he much regretted being obliged to abandon a portion of the scheme which would have been most beneficial to the future training of the young, and would have been quite as much in the interest of the public at large as of their own body.

Mr. WILLIAMS was very sorry Mr. Schacht had made use of the expressions he had in the latter portion of his remarks. Of course he was prepared to hear that he was disappointed; that his great efforts towards improving the education of young pharmacists had been frustrated; but when he said it was caused by want of unanimity amongst themselves it raised a very serious question. Were they to submit exactly to what any member of the Council might choose to say was the right thing, and have no opinion of their own? From the very beginning he had held that some proposals which were made were not in the right direction, and not consistent with the requirements of the case. He was overruled by the majority, but was he therefore not to express his opinion, and to sit still and take no notice of what was going forward? He supposed Mr. Schacht's remarks applied to him, and he could not see that he had acted contrary to the principles on which every member of the Council should act, or that he had not done his duty in opposing to the best of his power what he thought to be improper.

Mr. ATKINS, having been associated with Mr. Schacht to some extent in this matter, said he desired to record his personal sense of indebtedness to him for the long and arduous labour he had undertaken in the matter of education, and he did not want it to be supposed for a moment that that labour was lost. It could not be. They were defeated for a time, and would have to wait perhaps for some time for a better way of doing it—a new Act of Parliament. It was a penalty which all men had to pay who thought out a question a little in advance of others; they did not at once reap the fruit of their labours, but it was only deferred for a time.

Mr. SCHACHT said he had no intention of hurting Mr. Williams' feelings. He spoke generally, and intended his observations to apply generally. He did think he had a right to say once more that a minority should be loyal to the body of which it was a minority. He did not say that Mr. Williams had not been, but certain individuals got the ear of the Executive of the Privy Council in a way to do their utmost to oppose the wishes of the majority of the Council, and it was that which defeated the Council in its efforts to get the Bye-laws confirmed. He had often been defeated, and had submitted with a simple growl; he had never done a single thing outside the Council in opposition to the action deliberately resolved on by the majority.

Mr. WILLIAMS said surely Mr. Schacht did not suggest he had done anything outside the Council?

Mr. SCHACHT said he had not said so. He made a general observation.

Mr. BAILDON did not know whether Mr. Schacht intended to refer to the proceedings which originated in Scotland, but he certainly did not think he had any right to say that these Bye-laws on the subject of education had been rejected by the Privy Council on any other grounds but those stated, namely, that they were in excess of the powers the Society possessed.

The PRESIDENT said it would not be profitable to allow this discussion to proceed any further. Mr. Schacht's observations were no doubt intended to be general, and did not call for any reply. Every member of the Council owed Mr. Schacht great thanks for the labours he had bestowed on this subject, not only during the last seven or eight years, during which it had really been before the Council, but for the many years that it had been before the whole country; he was recognized by every one as being the champion of improved education for pharmacists, and they were all grateful to him. He no doubt felt regret that his efforts had not been rewarded with complete success, because the powers given by Act of Parliament were not wide enough, but possibly it might not be postponed *sine die;* there might be a chance of legislation by-and-bye, and he was not without hope that even with their present powers something might be done in the direction aimed at.

The motion was then put and carried unanimously.

SCOTCH BUSINESS.

This Committee reported that it had passed accounts for book-cases and sundry repairs on the Society's premises in Edinburgh, and recommended that the engagement of a boy assistant by the Assistant Secretary be confirmed.

The Report and recommendation were unanimonsly agreed to on the motion of the President.

An application from the Pharmacy Board of Queensland for the *Pharmaceutical Journal* and a copy of the Register was directed to be complied with.

The President read a letter from the President and Registrar of the Pharmacy Board of Victoria, introducing Mr. Bowen, a member of the Pharmacy Board of Victoria, and President of the Pharmaceutical Society of Australasia. He added that that gentleman had, in fact, arrived before the receipt of the letter, and he had the honour of welcoming him to London.

An application from the Leicester Chemists' Association for a grant in aid of the school was referred to the Library, Museum, Laboratory and House Committee.

REPORT OF EXAMINATIONS.

June, 1886.

ENGLAND AND WALES.

	Candidates.		
	Examined.	Passed.	Failed.
Major (10th)	4	2	2
„ (11th)	5	2	3
	—9	—4	— 5
Minor (10th)	31	14	17
„ (11th)	29	7	22
	—60	—21	—39
	69	25	44

PRELIMINARY EXAMINATION.

Seven Certificates had been received in lieu of the Society's Examination.

2 College of Preceptors.
1 Society of Apothecaries.
4 University of Cambridge.

The PRESIDENT said he had received a copy of a circular, referring to an Inter-Colonial Pharmaceutical Conference, to be held in Melbourne, on October 27, 28, and 29, with the object of bringing about uniformity in education in the Australasian Colonies.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Bush and Co., Earl and Co., Wheldon, Laurus, Associate.

THE COLONIAL AND INDIAN EXHIBITION AT SOUTH KENSINGTON.

North Borneo.

The collections of articles contributed by British North Borneo are to a certain extent similar to those from the Straits Settlements. The chief products of the colony consist of valuable timbers, gutta-percha, india-rubber, Borneo camphor, edible birds' nests, sago, pepper, gambier and tobacco.

One of the timbers, named "billian," is remarkable, besides its durability and great strength, for being proof against the teredo or sea worm, a property that suggests the desirability of a chemical examination of the wood with a view to determine the nature of the constituent which proves obnoxious to these animals. It is perhaps still more valuable on account of being proof against the ravages of the white ant. Another timber called "kungas" is also not attacked by these insects. A third, known as "lakar" wood, is a dark-red marbled and extremely hard wood, which gives off a fragrant odour when burned, and when scraped or rasped is used as an ingredient in incense; it is also employed as an astringent in medicine and for tanning fish nets. According to Professor van Eeden this wood is the produce of *Dalbergia Zollingeriana*, Miq. It is valued in Borneo at 6*s.* per picul, and in Singapore at 4*s.* per picul. The bark of the "russack" tree (*Vatica Russack*), which is added to toddy to make it intoxicating, is one of the few barks exhibited. It is remarkable that a species of the same genus is used in Ceylon for a similar purpose. Under the name of "chindana," probably a corruption of the Hindoo "chandana," a handsome, yellowish, fragrant wood is shown, which might perhaps afford a volatile oil. It does not appear to have been botanically identified. A considerable quantity of mangrove bark forms a conspicuous object of the exhibit and perhaps deserves the prominence given to it, for according to an analysis of the bark made by Mr. W. W. Evans, of Bristol, since the Exhibition has been open, it affords 41·398 per cent. of tannin.

Some very fine specimens of "dammar mata kuching" and of copal are shown, and several kinds of gutta-percha and india-rubber, including "gutta merah," "gutta hilang," or "elong," "gutta menoun," and "gutta lichak" (india-rubber).

Bornean gutta-percha and india-rubber, like those of Perak, are mixed articles. Thus, Mr. Burbidge states* :—

"That from the Larvas district is formed of the mixed sap of at least five species, the juice of *Ficus* and one or two species of *Artocarpus* being not unfrequently used in addition as adulterants. The Bornean "gutta soosoo" or rubber, again, is the mixed sap of three species of *Willoughbeia*, and here also the milk of two or three other plants is added surreptitiously to augment the quality collected."

Mr. Burbidge further remarks that although the demand for caoutchouc from Borneo is a recent one, yet in many districts the supply is practically exhausted. He advises that the *Willoughbeia*, which grows quickly and may be easily and rapidly increased by vegetative as well as seminal modes of propagation, should receive the attention of the Government in India, where the plant might be expected to thrive.

Very little appears to be known concerning the trees which afford the gutta and caoutchouc of North Borneo, and in the 'Kew Report' for 1886 the Director expresses a hope that the North Borneo Company will employ a competent botanist to investigate the subject and to collect good specimens in flower and fruit of every tree yielding a product of commercial value, as it is to the interest of the Company to ascertain definitely the extent of the gutta-percha and india-rubber resources of the island, and how existing supplies may be best developed and husbanded,* since the same wasteful method of collecting gutta-percha that obtains in Perak seems to be followed also in Borneo.

In connection with these remarks it may be well to call attention to a very valuable paper by Mr. Leonard Wray on the great loss of gutta-percha resulting from the wasteful mode of extraction at present employed.† In some experiments made on the bark of a tree of "getah taban simpor" (*Payena Maingayi*) (see p. 5) from which gutta had been extracted, he found that the wet bark which is now allowed to rot in the jungle contains fully 5·7 per cent. of gutta-percha, or 11·4 per cent. when dry, and that by simple pounding or rasping and boiling the bark nearly all this gutta can be extracted. He calculates that, accepting the estimate of the export of gutta from the Straits Settlements and Peninsula as 10,000,000 lbs. weight in 1875 the amount of gutta-percha lost to commerce, in the bark of felled trees, must have amounted in that year to no less than 300,000,000 lbs., putting the price at 2*s.* 6*d.* per lb. to not less than £37,500,000. In other words, for every pound of gutta-percha collected 30 lbs. are wasted. The gutta trees are of such slow growth that the tree planted in one generation cannot be expected to yield good gutta until the next, and according to Mr. Wray one-thirtieth of the number of trees that are at present felled could be saved.‡

The minjak (*i.e.*, oil of) tangkawang, a solid fat with a low melting point and which does not readily become rancid, is shown *in situ* in the bamboos in which it is moulded. There are two kinds of these fats, one of which is nearly white and used for culinary purposes, such as frying fish, making cakes, etc., and the other is of a greenish tint and is used for lubricating machinery and for purposes of illumination. The former is said to be derived from large seeds, probably those of *Hopea macrophylla*, and is known as tangkawang lingis. The green fat is prepared from smaller seeds, probably those of another species of *Hopea* and is distinguished as tangkawang mahjor or minjak kerapoh. A fuller account of these fats was given in a former number of this Journal.§

Two products, which also occur in the Straits Settlements collection, viz., Borneo camphor and edible swallows' nests, can be more appropriately noticed here, since they are represented more fully in the North Borneo Court. Of the birds' nests three varieties are shown. The first and best are quite white and are said to be those which have been collected after they have been finished by the birds, but before the eggs are laid; the second quality

* 'The Gardens of the Sun,' pp. 75—76.

* Kew Report, 1881, p. 44.

† *Journal of the Straits Branch of the Royal Asiatic Society*, 1884, p. 219.

‡ An attempt was made to carry out a project of this kind, some twenty years ago, in British Guiana. A very large outlay was made for the purpose, but the result was total failure, the extract obtained consisting chiefly of astringent material with very little gum.

§ See *Pharm. Journ.*, [3], xiv., pp. 401, 431.

appears to consist of the nests which have been used but in which young birds have not been raised; and the third contains adhering feathers. The two former are known as white and the last as black birds' nests. These appear to be made by different birds, for, as pointed out by Mr. Lowder, the feathers do not merely adhere but are imbedded in the salivary layers of which the nests are formed; portions of dried seaweed or lichens are also incorporated. The birds inhabit caverns near the sea or sometimes inland, as in Upper Perak, and the limestone caverns of Mount Gomanton, in Borneo, and the sandstone ones at Sandakan head.* They are collected, at great risk to life and limb, twice a year, in various parts of the Eastern Archipelago. There appears to be some doubt as to the exact species which build these nests, *Collocalia Linchi*, Horsf., being given in the Straits Settlements Catalogue as the species. Mason, however, states that this bird makes a brown nest of moss glued together, while *Collocalia esculenta* makes its nest of repeated layers of glutinous salivary matter alone. The latter bird is called the "lawet" in Java, while the name "linchi" is applied to the smaller species named *Collocalia Linchi*. Possibly the white nests are the product of *C. esculenta* and the black ones of *C. Linchi*. Two other species, however, appear to produce edible nests and these are known respectively as *C. spodopygia*, Peale,† and *C. fuciphaga*, Horsf.,‡ which occur in the Andaman Islands, the latter also in Tenasserim.

The nests are often brown or discoloured at the parts where they are attached to the rocks, and have to be cleaned for the Penang market. The white nests are used by the wealthy Chinese as an ingredient in soups, 120 grams being used for the litre of soup. The dirty nests are said to be employed to make a particular kind of glue. The first quality is valued at 2500 dollars per picul, the second at 1500 dollars, and the third at 1000 dollars. It is calculated that as much as 242,400 lbs. of these nests are annually exported to China from the Indian Archipelago. In some parts of China as much as £9 has been paid for a catty (about 1¼ lb.) of these nests. At one time it was supposed that the substance of which they are composed was seaweed collected by the birds, and some discussion has taken place in *Nature* on this subject.§ It appears now to be definitely settled that it consists of a salivary secretion similar to that used by the swallows in this country in binding together the clay of which their nests are made. Like another article highly prized by the Chinese, it appears to be considered a tonic and invigorating remedy, and is also used as a restorative by opium smokers; it is prescribed in consumption, and for convalescents after protracted illness. A detailed and interesting account of the commerce in these nests may be found in Simmond's 'Animal Food Resources,' p. 141.

Borneo camphor does not appear to have received the attention it deserves in this country. So astute a people as the Chinese have doubtless some good reason for their preference of this camphor to that which can be procured at one-twelfth of the price in Formosa and Japan. It does not appear to have been noticed that although the odour of the Borneo camphor is not altogether agreeable, the taste is by no means so disagreeable as that of Formosa camphor. Its physiological properties also cannot be said to have been fairly tested. For this purpose well defined crystals only should be used, since it is probable that the smaller crystals are frequently adulterated with crude Formosa camphor, because the large crystals do not appear to be volatile, while the smaller ones frequently furnish a crystalline sublimate at ordinary temperatures.

The high price of the drug is in part due to the fact that a large number of trees have to be examined before the collector can find one containing the camphor in a crystalline state. Many of the trees yield oil, but very few contain camphor. The presence of the latter is ascertained by making a hole in the tree with a native axe at about 14 or 18 feet from the ground, till near the heart, where a deeper incision with a smaller aperture is made; if the oil is present it gushes out and is received in bamboos or other vessels. Some hundreds of trees may be thus examined before camphor is seen. When a tree containing camphor is found it is felled and cut into pieces about 6 feet long, or less, and these are split open, when the camphor is found in the heart wood occupying a space about the size of a man's fore-arm. The produce of a medium sized tree, *i.e.*, about 2½ feet in diameter, is about 11 pounds, and of a very large one, say 6 feet in diameter, about double that quantity. Camphor found in this way is distinguished as "se aaniong," and that met with in holes of trees that have been previously cut is known as "oogar," the scrapings of the wood being known as "belly and foot."* Trees less than two feet in diameter rarely produce camphor, oil being found in the younger trees, but sometimes a pitchy or resinous looking substance is found in the cavities in the trunk.

Probably on account of the uncertainty of finding camphor in the trees the natives and the Malays have very superstitious ideas regarding its collection. While searching for it they abstain from certain kinds of food, eat a little earth, and use an artificial language called the bássá kápor, *i.e.*, camphor language. It is believed that if this language be not used great difficulty will be experienced in finding the trees, and when found the camphor will not yield itself.† There are some men who pretend to a special intuition as to the trees which will yield camphor. These are styled Toongoo Nyr Capoor. Fuller details concerning the commercial qualities of this camphor may be found in a former number of this Journal.‡

Some fine specimens of the camphor wood are shown in this Court. The tree is a very large one, and the wood is extensively employed for making boxes, furniture, etc. It is said to be abundant in the island called Pulo Bai, in Sandakan Bay, and in Padas district.

Another exhibit worthy of a brief notice is a kind of guano or manure, consisting of the excrements of swallows and bats. This is found forming a deep layer in caves, especially in East Borneo in the neighbourhood of Gomanton; it forms an important but, as yet, almost untouched store of this valuable material.

* Burbidge, 'Gardens of the Sun,' p. 237.
† Mason, 'Burmah,' i., p. 358.
‡ *Linn. Trans.*, xiii., p. 142.
§ *Nature*, May 27, p. 86, to June 3, p. 101.

* 'Asiatic Researches,' vol xii., p. 539.
† *Journ. E. I. Archipelago*, 1847, p. 268.
‡ *Pharm. Journ.*, [3], vol. xv,, pp. 795, 796, 894.

Hong Kong.

The Hong Kong Exhibit comprises but few objects of pharmaceutical interest, but these are well worthy of notice. The first object that strikes the eye on entering the Court from the upper end is a small collection of native remedies shown by Messrs. A. S. Watson and Co., but which is not mentioned in the General Catalogue. Several of the articles, such as chaulmugra oil, will be familiar to pharmacists in this country, but a few others, such as cypress seed and cypress oil, oil of cocoa-nut shell, bean oil (*Soja hispida*), oil of *Camellia odorifera*, wood oil (*Aleurites cordata*), and oyster oil and oyster cake, left after removal of the oil, strike one as articles hardly known in Europe.

The properties of the Chinese "wood oil"—which is very different from the oleoresin known in English commerce as wood oil or Gurgun balsam—have been described in a former volume of this Journal,* and to the others there will probably be occasion to refer at a future time. Close to this exhibit may be seen the curious wedge press used in expressing oils from crushed seeds, the principle of which is to exert a gradual lateral pressure by the insertion of a series of wedges between the cake and the end of the press. In the immediate neighbourhood of this press may be seen also a large granite pestle and mortar for pounding rice, which is worked by the simple expedient of a foot lever or treadle. Opium smoking is illustrated by a series of the apparatus employed in preparing the extract, which, and not the crude opium, is used in smoking. The mode of preparation has been well described by Mr. H. McCullum, of Hong Kong (*Pharm. Journ.*, [3], vol. xi., p. 229). The apparatus used by opium smokers is also illustrated by various specimens, including opium pipes, spirit lamp, iron scrapers for clearing out the bowl of the pipe, and needles for inserting the morsel of opium in the orifice of the pipe, etc.† Specimens of these articles already exist in the Museum of this Society as well as at Kew Museum, and their use is fully explained by Mr. T. Sampson, of Canton, in a previous number of this Journal ([3], vol. xv., p. 22).

The next object to attract attention is an excellent model of a Chinese vermilion manufactory at Hong Kong, showing the complete process of preparation of the pigment from the raw material to the cases packed for export. This model was constructed under the superintendence of Mr. H. McCullum and Mr. H. R. Best, of the Colonial and Civil Service, and was presented to the Commissioner by the guild of vermilion merchants. From the descriptive account attached to the model it appears that 1 part of sulphur is rubbed with 5 parts of mercury, an operation which usually occupies about ten minutes. The mixture is then placed in an iron pan over a furnace, is covered with pieces of broken porcelain or white pottery, over which an iron cover is luted on. After this subliming pan has been subjected to heat for sixteen hours the furnace is allowed to cool, the iron cover removed, and the vermilion scraped off the porcelain. It is then powdered and elutriated with a solution of alum and glue, the coarse particles separated by this process being again powdered and elutriated. The object of the glue and alum is not stated, but the glue is probably to prevent the powder from settling too rapidly, the alum to prevent the decomposition of the glue. The details of the process have already been described by Mr. H. McCullum in the columns of this Journal ([3], vol. xii., p. 497). The first quality of vermilion is estimated at 80 dols. per picul, and the second at 750 dols. per picul.

A collection of raw materials used by the Chinese in the manufacture of the celebrated soy and other sauces is shown also by Mr. H. McCullum. Perhaps the most interesting exhibit to pharmaceutical visitors in this Court will be a very complete and truthful model of a Chinese druggist's shop, which is said to be faithful to real life in the most minute details. The roomy shop appears to be arranged in a most orderly manner, and by no means presents a "beggarly array of empty bottles," nor are there visible any of the disgusting animal remedies that are used in Chinese medicine. At the back of the shop and equally open to view at the other side of the model is the dwelling house, the appointments of which seem eminently comfortable, as might perhaps be imagined from the care with which the druggist looks after the money, for in the shop he is represented as weighing the money of a customer to see that it is not short weight. This model is exhibited by Dr. Ho Kai, who has also sent a large collection of over four hundred bottles of Chinese drugs, the names and uses of which are written on the bottles. These consist for the most part of remedies which have already been described by Hanbury, Porter Smith and others, but are evidently highly valued by Dr. Ho Kai, since they have been heavily insured and are to be returned to him.

The only other objects of quasi-pharmaceutic interest are the exhibits of boxes, trunks, etc., made of the camphor wood tree, and a series of the woods of Hong Kong, including a few, such as *Liquidambar sinensis*, *Aquilaria grandiflora*, *Styrax suberifolium*, etc., concerning whose products some information might have proved instructive. Unfortunately, however, no special catalogue had been published at the time of our visit, and Mr. C. Ford, Superintendent of the Palace Garden at Canton, who might probably furnish valuable information concerning them, left this country soon after the Exhibition had opened. The *Aquilaria grandiflora* yields, according to Mr. Ford, a kind of lignum aloes used in China as incense.

* *Pharm. Journ.*, [3], xv., p. 636.

† For figure of these see 'Encyclopædia Britannica,' 9th ed., Art. "Opium."

GALENIC PHARMACY.*

BY EMERITUS PROFESSOR REDWOOD.

(*Concluded from Vol. XVI., p.* 1092.)

About one half of the liquid official preparations intended for internal administration as medicines are made by processes to which I have already referred. The active constituents which they contain either exist in the juices of plants, from which as such they are obtained by expression, and afterwards preserved by the addition of spirit, or they are extracted from dry vegetable substances by means of some liquid menstruum. The liquids thus used are for the most part either water or spirit.

Infusions, decoctions, and some liquid extracts,

* Notes of the sixth lecture on Galenic Pharmacy, delivered in the School of Pharmacy, Bloomsbury Square, on Thursday, July 1.

are either wholly or principally made with water, while tinctures are all made with spirit.

Acetic or other acid is sometimes used with water for the purpose of promoting its solvent property, or of increasing the therapeutic action of the product, and ether, wine, or glycerine is in certain cases either used with or substituted for other menstrua.

I only contemplate directing attention here to such preparations, made by one or other of the methods already described, as present some characters worthy of remark from their novelty or doubtful significance.

Thus for instance, referring to one of the first preparations met with in the Pharmacopœia, acetum cantharidis, the question is sometimes asked, what part is the acetic acid supposed to perform here, and with what object is the strength of the acid containing 33 per cent. of real acetic acid increased by the addition of a small quantity of glacial acid?

The answer to this is that this preparation, which was much used some thirty or forty years ago for producing rapid vesication, and was prescribed for that purpose by medical men of eminence, often failed to produce the required effect, and this was found to be due to the strength of the acid being insufficient as originally ordered in the London Pharmacopœia.

The action of the preparation depends principally upon the acetic acid, and this in the first official process was the strong commercial acid, which is neither strong enough when used alone to produce rapid vesication, nor when digested with cantharides does it dissolve any sensible amount of cantharidin.

The stronger acid produced by the addition of glacial acid is still not a good solvent of cantharidin, but it does take up some vesicating matter from the flies, and on that account, as well as by virtue of its greater strength, it yields a product which generally produces vesication in ten or fifteen minutes.

The acetum cantharidis, however, is open to the objection that the menstruum used is not a good solvent of the vesicating principle of cantharides. It was employed at a time when better preparations had not been introduced, as they have been since in the form of liquor epispasticus and collodium vesicans.

There are other preparations in which acetic acid is used, such as vinegar of squill, acetic extract of colchicum, and now ipecacuanha wine. In the first of these its action is probably chiefly therapeutical, but in the others it no doubt promotes and maintains the solution of the alkaloidal principles of the drugs. For a similar reason hydrochloric acid is now used in the liquid extract of cinchona.

Having thus, as far as time will admit, referred to preparations the active constituents of which are extracted from drugs by means of liquid menstrua of different kinds, we have next to describe some processes and preparations in which matter is dealt with in the condition of vapour.

The vaporous condition is used sometimes for the purpose of promoting the union of substances and sometimes for effecting their separation.

Distillation is a process by which the former effect is often advantageously produced; and evaporation is resorted to for producing the latter effect.

In connection with distillation we have to consider the most suitable and best forms of apparatus, and also the effects produced on the materials operated upon.

The old-fashioned still and worm tub, which formerly constituted so prominent a feature in a pharmaceutical laboratory, have been superseded by less bulky and yet equally effective apparatus.

According to the old system of working, in distilling waters it was necessary to have from ten or twelve up to twenty times as much cold water in the worm tub at starting, as the quantity of product to be distilled, arising from the large amount of latent heat in the vapour of water, namely, in round numbers, 1000° F.

This latent heat becoming again sensible as the vapour condenses, it follows that if we receive it into cold water at 60°, the vapour of one gallon of water in condensing will raise the temperature of nearly seven gallons of water from 60° to the boiling point. But it is obvious that as it approaches the boiling point it would cease to have much condensing power.

For practical purposes we may put it, that—

One lb. of steam at 212°+8 lbs. of water at 60°=9 lbs. of water at 188°, and this is the smallest proportion of condensing water that could be used with good effect, and much less than ought to be used.

This applies, however, to the distillation of waters, and not to that of spirits, still less to that of ether.

The cause of this difference will be readily perceived on observing the respective latent heats of water, alcohol and ether, which are as follows:—

Water	536° C. or 999° F.
Alcohol	208° C. or 406° F.
Ether	90° C. or 194° F.

The worm tub has been replaced by some modification of the Liebig's condenser, of which it may be said that it condenses more effectually, while it occupies much less space, but it requires even a larger supply of water than the older form of apparatus.

With regard to the products of distillation, referring first to the class of waters, it is to be observed that the Pharmacopœia now distinctly states that "in dispensing prescriptions, aqua should be understood to mean distilled water."

Among distilled waters one has been added, namely, aqua anisi.

There has been no change made in the mode of preparing the official waters. With the exception of aqua camphoræ, aqua chloroformi, and aqua, which last, when not used in dispensing, is to be "natural water, the purest that can be obtained," all the others are prepared by distillation, and excepting peppermint and spearmint waters, they are all distilled from the vegetable substances, flowers, fruit, leaves, or bark, containing the volatile oils or other principles, which impart their characters to these waters.

There is no longer any doubt that distilled waters thus made are much better than those produced by diffusing the essential oils through distilled water by the agency of sand, silica or magnesia.

In the case of distilled waters the vaporization is resorted to for the purpose of bringing constituents together in a highly attenuated state which is conducive to their intimate admixture and union.

In other cases, such as the preparation of extracts, parts of the constituents of a mixture being vaporized are driven off, and removed from those they were previously associated with.

The preparation of medicinal extracts, constitutes an important department of practical pharmacy,

and I regret that the time at my disposal will not admit of my discussing it as much in detail as I should have wished.

Several new extracts have been rendered official, among which there are some, such as cascara sagrada, and coca, that have come into rather extensive use.

Among the old processes several have been altered.

Thus extractum aloes barbadensis, and extractum aloes socotrinæ, in the evaporation of which the use of the water-bath has hitherto been allowed, are now directed to be made by evaporating the aqueous solution of aloes to dryness "in a current of warm dry air."

Then extract of calumba is now to be made with proof spirit instead of with cold water, as formerly.

Again, liquid extract of cinchona, as now officially made, is a preparation of definite alkaloidal strength, in the production of which hydrochloric acid and glycerine are used, the former to convert insoluble cinchotannates of the alkaloids into soluble salts, and the latter to counteract the tendency to oxidation, which, if this constituent were omitted, would soon cause the product to form a muddy instead of a clear mixture with distilled water.

In the next place we have liquid extract of ergot, in preparing which the use of ether for the removal of the oil of ergot is now omitted as practically unnecessary. By treating the crushed ergot with cold water a product is obtained which contains the aqueous extractive matter known as Bonjean's ergotine, without any sensible amount of oil.

In extract of nux vomica we have now a standardized preparation of definite strength.

Lastly, liquid extract of sarsaparilla is now prepared by partly exhausting the sarsaparilla with proof spirit, and afterwards partly with water. Formerly it was treated with water only.

With reference to these altered processes, and generally in regard to this class of preparations, we have to consider what are the right and best modes of operating for their production.

It will be found that several methods for effecting evaporation are officially described or indicated.

Thus, in extract of gentian the root is first infused in boiling water, and afterwards boiled for fifteen minutes.

In extract of logwood the chips are first infused for twenty-four hours, and then boiled down to one half.

In extract of hop, the hop is first macerated in rectified spirit for seven days, and after pressing out the tincture, the residue of the hop is boiled with water for an hour.

Now in all these cases the boiling must be effected by the application of a higher temperature than that afforded by the water-bath. The steam-bath may be used for the purpose.

In most cases the evaporation of extracts is to be effected by the water-bath, but in some a lower temperature than that is required.

In two cases especially, those of the extracts of Barbadoes and Socotrine aloes, a much lower temperature is required, namely that of a "current of warm dry air." This involves the consideration of means by which evaporation or desiccation can be effected in the manner indicated. The best method of providing for what is called spontaneous evaporation in a current of warm air constitutes a very important question in practical pharmacy. There are many operations in which a good efficient drying closet, acting on that principle, may be used with much advantage, but it is not easy to define the exact construction of such a closet that would be generally applicable, because it must be adapted to a variety of existing conditions. In such a case the safest course is to study and make application of the principles on which the action of the closet must mainly depend.

The most frequent source of failure or deficiency in the action of a drying closet arises from an inadequate provision for the very large volume of sufficiently dry and previously warmed air necessary for the accomplishment of what is required.

The air on which the action of the closet depends must be not only warm but dry, or at least dry enough to admit of its taking up the vapour of water in accordance with the principles of gaseous diffusion. As the process of drying or evaporation proceeds the warm air will have its temperature reduced in supplying the large amount of latent heat required for the production of aqueous vapour, and there will thus be a progressive increase in the density and gravity of the air passing through the closet, arising partly from that cause, and partly from the diffusion into it of aqueous vapour.

It follows, therefore, that in a well-constructed drying closet, the direction of the current of air by which the effect is produced, ought not to be, as it usually is, from the bottom of the closet towards the top, but in the opposite direction. The warm comparatively dry air should enter at the top, and this parting with heat and picking up aqueous vapour as it travels over the substances to be dried increases in weight and thus naturally falls by its gravity towards the bottom of the closet, where it ought to escape.

A suitable and usual temperature at which to introduce air for this purpose would be about 120° F., and considering that every ounce of water vaporized at this temperature would take from the air so used as much heat as would be capable of raising that quantity of water, as such, through 1100° F. of temperature, it is obvious that the process must be slow although the quantity of air used may be great.

I put before you an apparatus which I have been accustomed to use for illustrating the principle of the process, but in practice my advice is not to attempt results in that direction unless very large volumes of warm and dry air can be made to pass continuously over the evaporating surfaces.

The principal inducement to the adoption of spontaneous evaporation is the avoidance of the application of more than a very gentle heat. There is, however, the objection that the evaporating substance is brought into contact with a large quantity of atmospheric air which may injure the product by its oxidizing action.

The vacuum process to which I have previously alluded presents the advantages of spontaneous evaporation whilst it is free from all its disadvantages. Rapid evaporation can be effected in the vacuum pan at a temperature of 120° F., while atmospheric air is practically excluded.

I put before you a modification of the vacuum apparatus suitable for pharmaceutical use, which I have largely employed for experimental purposes, but even this requires some further modification to adapt it for the preparation of solid extracts.

BORIC ACID AND AFFECTIONS OF THE MOUTH.

The following remarks as to the value of boric acid in various affections of the mouth occur in a communication to the *British Medical Journal* (July 10), from Mr. A. D. Macgregor, of Kirkcaldy:—

In connection with the local application of boric acid in various diseased conditions of the mouth, its solubility in water and glycerine, its unirritating character, its comparatively innocuous nature, and its almost tastelessness, are greatly in its favour. More particularly is this the case in treating such conditions in children, whose oral cavities cause them so much annoyance. Speaking generally, boric acid will be found useful in all conditions of the mouth, fauces, pharynx, and nose, where there is any abrasion of the epithelium; whether it be used as a powder, gargle, mouth-wash, pigment, or confection. More definitely, I may say, it is not contra-indicated in any of the forms of *stomatitis*, though scarcely severe enough for the graver varieties.

In *simple catarrhal stomatitis*, a mouth-wash, containing from 10 to 15 grains to the fluid ounce, speedily cures the condition, and exercises the same beneficial influence in the *ulcerative* form, though there, in addition to the rinsing of the mouth, a local application in the form of the powder or pigment should be made to the individual follicular ulcers. The powder simply consists of finely powdered boric acid, mixed in various proportions with starch; the pigment is a solution of boric acid in glycerine (1 in 4 or 5). In both cases, the addition of chlorate of potassium is advantageous; indeed, I usually combine it, but it is not essential.

For thrush in children, I especially recommend boric acid, either as a mouth-pigment or as a confection. Honey and sugar have both been condemned, as being inadmissible, in combination, for the treatment of thrush; but, so far as children are concerned, I must say I consider a confection (though made with honey), which has been impregnated with boric acid, gains more by its palatableness than it loses by the tendency of the saccharine matter to further the growth of the fungus. The boric acid at once does away with this tendency. Let the pigment be frequently painted with a brush over the patches, never omitting to do it after food has been taken; or, a little of the confection, simply allowed to dissolve in the mouth; and the days of the fungus will soon be ended. I have found boric acid, combined with its salt (borax), markedly beneficial. Borax alone, however, is not nearly so good.

In *pharyngitis*, and *relaxed conditions of the throat*, a gargle, containing boric acid and glycerine, with either tannic acid or alum in addition, ought not to be forgotten.

In severe cases of typhoid fever, the mouth is frequently hot; the lips dry, cracked, and glued to the sordes-covered teeth by inspissated mucus and saliva; the tongue dry, or even glazed and hard, brown or black, crusted with a fœtid fur. Under such circumstances, a pigment, containing boric acid (30 grains), chlorate of potassium (20 grains), lemon-juice (5 fluid drachms), and glycerine (3 fluid drachms), yields very comforting results. When the teeth are well rubbed with this, the sordes quickly and easily become detached; little harm will follow from the acid present. The boric acid attacks the masses of bacilli and bacteria; the chlorate of potassium cools and soothes the mucous membrane; the glycerine and lemon-juice moisten the parts, and aid the salivary secretion.

A tooth-powder should possess certain characteristics; it should be antiseptic, cooling, agreeable to taste and smell, and have no injurious action on the teeth. After use, it should leave the teeth white, and a sensation of freshness and cleanliness in the mouth. As an antiseptic in this connection, nothing can replace boric acid. For years I have used the following powder, and can recommend it. Boric acid, finely powdered, 40 grs.; chlorate of potassium, ℥ss; powdered guaiacum, 20 grs.; prepared chalk, ℥i; powdered carbonate of magnesia, to ℥i; otto of roses, half a drop. The boric acid in solution gets between the teeth and the edges of the gums, and there it discharges its antiseptic functions; the chlorate and guaiacum contribute their quota to the benefit of the gums and mucous membrane generally; the chalk is the insoluble powder to detach the particles of tartar which may be present, and the magnesia the more soluble soft powder which cannot harm the softest enamel.

EXPLOSIVE ICE.*

BY J. W. MALLET,
University of Virginia.

During the very cold weather of the week January 8 to 15, a French "*gazogène*," or portable apparatus for preparing carbonic acid water under pressure, was destroyed in the laboratory of the University of Virginia, by the freezing of the contents of the upper globe, which was almost completely full of distilled water charged with carbonic acid, and was burst by the expansion of the ice formed. The globe, which was surrounded by basket-work of split cane, was of heavy glass, about 8 mm. in thickness, and must have burst with some violence, judging from the distance to which the disc-like top was thrown. Having removed the apparatus to a warm room, in which thawing might take place without the liquid running about on the shelves and floor of the apparatus room, I had my attention attracted in a few minutes by little crackling explosions coming from the ice, which, when brought in, was quite solid and dry—much below the melting point. Standing near and somewhat above the level of the apparatus, which had been placed in one of the laboratory sinks, I was two or three times struck in the face by little bits of ice as large as hazel-nuts, thrown off with some force from the bulk of the frozen mass. One piece, fully as large as a walnut, was thrown off to a distance of 7 or 8 feet upon the floor. Some of the crackling sounds fairly merited the name of explosions. Once or twice the sound was quite as loud as that produced by suddenly treading upon a friction-match.

The ice was in the main white and translucent, but with many small, glassy streaks of complete transparency running through it. It obviously contained a multitude of pretty uniformly distributed, minute bubbles of carbon dioxide gas under heavy pressure—pressure not due merely to the space within which the gas had been originally generated, but greatly increased by the expansion of the water in the act of freezing as the gas separated out from it. It is, perhaps, not impossible that, at the existing temperature, this pressure may have even sufficed to liquefy some of the gas of the bubbles caught in the interior of the ice. The immediate cause of the explosive splitting up of the ice under the tension of the included carbon dioxide seemed to be the weakening of the former by expansion in the comparatively warm atmosphere of the room; there was but little melting during the time, some three-quarters of an hour, during which the crackling sounds and the flying to pieces of the ice lasted. A little explosion could easily be induced by striking a very slight blow with a little blowpipe hammer, or with a chisel or other sharp-pointed tool, on almost any part of the ice which had not before been so treated, and on breaking off some large pieces of the ice and placing them on the table, detached from the rest of the mass, they continued to split and fly to pieces in a very remarkable way.

The whole of the phenomena reproduced exactly the behaviour of the quartz from Branchville in Connecticut, in which occur numerous microscopic cavities containing partly liquefied carbon dioxide; but in the case now described, the explosive splitting up by heating was produced at a much lower point on the thermometric scale.

* From the *American Chemical Journal*, vol. vii., No. 6. Reprinted from the *Chemical News*, June 25.

The Pharmaceutical Journal.

SATURDAY, JULY 17, 1886.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE MEETING OF THE SOCIETY OF CHEMICAL INDUSTRY.

THE Society of Chemical Industry was happily circumstanced when, two years ago, meeting at Newcastle-on-Tyne, during a severe crisis in the alkali trade, it found itself with a President so competent to peer into the future of that industry as the late WALTER WELDON. Not less felicitous was it that this year, meeting at Liverpool, the birthplace of the alkali manufacture in this country and still the neighbour of Widnes and St. Helens, it should fall to a MUSPRATT to tell the Society the story of its rise and development in this country. The later address may be more prosaic than the earlier one; but it is an interesting record of the unceasing application of knowledge, skill and energy by British manufacturers in such a way as to have placed them, and for half a century maintained them, almost beyond rivalry. What was done, and how and when, has been traced step by step by Mr. MUSPRATT, and the narrative will be found in another part of this Journal. The details are far too numerous for recapitulation here; but the outcome may be summed up by pointing to the greatly reduced prices of the products compared with those which obtained fifty years ago, notwithstanding that the price of the raw materials, with the exception of sulphur, is not materially different now from what it was then. Thus, sulphuric acid, which in 1823 cost about three pounds ten shillings a ton to make, can now be made for twenty-five shillings or less. This result is largely attributable to the substitution of pyrites for sulphur in its manufacture, and the economy of nitrate and fuel by means of the GAY-LUSSAC absorbing column and the GLOVER tower. The attempt to establish a high-priced monopoly in Sicilian sulphur roused the manufacturers to devise a means of burning the Irish and Welsh pyrites profitably, and even when the consequent reduction of the price of sulphur brought it again into the field as a competitor, the introduction of Spanish and Portuguese pyrites and the working out of improved methods of recovering and utilizing the iron, copper and precious metals contained in the mineral, maintained for pyrites an advantage. Similarly in the manufacture of soda by the LEBLANC process, the introduction of improved furnaces, the more complete condensation of the hydrochloric acid, the utilization of this acid in the manufacture of bleaching powder and afterwards of chlorate of potash, the processes for the recovery of manganese, all contributed to a diminution of waste of materials, and a greater economy in labour. Meanwhile, coincident with, and consequent upon, the progressive reduction of cost, the production had augmented by leaps and bounds. In 1852, the first year for which a trustworthy estimate exists, the manufacture of alkali in the United Kingdom was computed at 71,193 tons, and that of soda crystals at 61,044 tons; by the year 1878 the figures had increased to 207,992 tons for the former and 170,872 tons for the latter. During the same period the manufacture of bleaching powder increased from 13,100 tons to 105,044 tons. About the end of this period, however, the spectre of the ammonia process began to haunt the LEBLANC manufacturers, and soon afterwards it appeared as if the new comer would extinguish all rivals. The rapid growth of the alkali industry in many parts of the Continent had also the effect of destroying the outlet for British-made alkali to a very serious extent. It was soon recognized, however, that the LEBLANC process could still be worked at a profit up to a point dependent upon the demand for chlorinated products. But finality is no more possible with the alkali maker than with the statesman, and soon the future of both the rivals was menaced by others. Some of these were referred to in 1884 by Mr. WELDON, but they have hitherto failed to justify the predictions respecting them. On Wednesday Mr. MUSPRATT mentioned another process, the property of Messrs. PARNELL and SIMPSON, which claims to unite the LEBLANC and the ammonia processes profitably. It is described as being based on the decomposition of a mixture of common salt and ammonium sulphide in solution by means of carbonic acid gas. Bicarbonate of soda is precipitated, sulphuretted hydrogen evolved and ammonium chloride left in solution. Ammonium sulphide is regenerated by boiling the chloride with Leblanc waste, and is then available for further operations. It is claimed that in this process there is an entire saving of the lime used for the recovery of the ammonia in the ammonia process, whilst the sulphur is recovered from the alkali waste eventually in a form in which it can be used for the manufacture of sulphuric acid. There are, however, difficulties yet to be overcome before the process can be made to respond exactly to this description. Besides this, there is a suggestion that magnesium chloride may one day replace common salt as a source of chlorine, an event that would probably transfer the seat of this industry to Stassfurt.

The inference drawn by Mr. MUSPRATT is that the future lies with the chemical engineer rather than with the theoretical chemist. He points out that most of the processes now used are old in their inception; the novelties lie in the improvement and contrivance of apparatus that have made possible

the effecting of known reactions upon an industrial scale. Notwithstanding this, he says it is very difficult to find a manager who has a knowledge of engineering combined with a knowledge of chemistry. It is in this direction, however, that the work of the Society of Chemical Industry—originally intended to have been named the Society of Chemical Engineers—is tending, as may be seen by a reference to the pages of the Society's journal. With this want supplied, Mr. MUSPRATT believes that British manufacturers will be able to carry on a large portion of the chemical industry with even greater success than in the past. It is gratifying to find that this confidence was endorsed by some of the speakers at the banquet. The importance to this country of retaining a fair share of the alkali industry can hardly be overestimated. At St. Helens alone there are now connected with it eight alkali works, nine glass works, five copper smelting and two copper extracting works, whilst the population has quadrupled since 1829. In Widnes, the rise of which as a manufacturing town only dates from 1848, there are also a number of important works. The competition which so suddenly appeared to jeopardize these interests has been a rude awakening from our insular conceit. But it only needs that we should wisely recognize the means by which our competitors have succeeded in gaining their present advantage to place us in a fair way of regaining—unless the conditions prove more unfavourable than they at present appear to be—the lead in chemical manufactures of which we have been temporarily deprived.

In connection with the report that appeared last week on the subject of the Journal our readers will no doubt understand that it is some satisfaction to us to call attention to the following editorial note in an American journal that reached us a day or two after the Council meeting :—

"Advice is sometimes an excellent article to receive as a present, but not always as valuable for permanent use as the gratuitous giver may consider it to be.

"The Pharmaceutical Society of Great Britain has a journal published and edited under the direction of the Association. At their recent annual meeting a number of prominent members took it upon themselves to inform the editors and council how to run the journal. This advice resulted in the following resolution :

"'That the Council be requested to consider the advisability of extending the usefulness of the journal by increasing its size, or otherwise.'

"'Otherwise' is a very elastic word as employed in this connection, and covers all possible alterations, except increasing the size of the publication.

"The resolution is aptly worded, and well calculated to quiet the clamour of those who can tell how to do a thing better than they can do it themselves. As a friendly word to our brothers across the sea we would say, let your editors alone and allow them to continue to issue every week the interesting matter that the *Pharmaceutical Journal and Transactions* has always contained since they have directed its course."

The occurrence of another death following the eating of "cream ice" recalls attention to a subject that has not yet been satisfactorily investigated. On previous similar occasions, some of which will be found referred to in "The Month" for September, 1884, there has been a disposition to suspect vanilla as the toxic agent, and in the Vienna cases that happened a few years ago some of the persons who suffered had only eaten farinaceous food flavoured with vanilla; but in the present instance it is not clear from the report that this flavouring agent had been used. The *Lancet* mentions that within a fortnight twenty to thirty persons have been treated at St. Thomas's Hospital, all of whom had eaten ices obtained from one particular shop. Most of them were suffering from signs of irritant poisoning, and our contemporary considers it probable that these were due to carbolic acid employed as a preservative of the materials used in making the ices. But it seems remarkable, to say the least, that sufficient carbolic acid should be ingested to cause illness or even death without giving more evidence of its presence than has yet been recognized. The *British Medical Journal* considers it most probable that the materials had undergone some peculiar decomposition, leading to the formation of a poison of the nature of a ptomaine, before they were submitted to the freezing process. A similar theory found favour in the Vienna and Brooklyn cases, and it finds confirmation in an announcement just to hand that such a poisonous substance has been separated by Professor V. C. Vaughan from a sample of noxious ice cream. This compound is said to be due to the action of a "germ" that occurs occasionally in milk, and to be identical with the poisonous compound, named "tyrotoxicon," which the same chemist separated from cheese of a brand that had caused considerable illness in Michigan (see *Pharm. Journ.*, [3], xv., 270).

* * *

In the report of the proceedings of the Council last week the appointment of Dr. Redwood was erroneously described as "Emeritus Professor of Pharmacy" instead of "Emeritus Professor of Chemistry and Pharmacy."

* * *

We have been requested by the Department of the Board of Trade to state that the Free Public Library at the Patent Office, 25, Southampton Buildings, Chancery Lane, W.C., will in future be open to the public daily from 10 a.m. to 10 p.m., instead of, as heretofore, from 10 a.m. to 4 p.m. This Library, in addition to the specifications, indexes, and other publications of the Patent Office, contains a large collection of the leading British and foreign scientific journals, transactions of learned societies, and text-books in the various departments of science and art. We have great pleasure in calling attention to this extension of the working hours of a most valuable institution, which is already greatly prized by many who are in the habit of frequenting it, but which, if it were more widely known, would be capable of rendering still more important service to the public.

* * *

In the *British Medical Journal* for June 26 appeared a paragraph stating that a 3 per cent. solution of morphine hydrochlorate which after being kept eleven months gave rise upon injection to violent and uncontrollable vomiting had been sub-

mitted to a Paris analyst, who found apomorphine present, the inference drawn being that some of the morphine had undergone change. This has called forth a letter from Messrs. Macfarlan and Co., stating that all their experience goes to show that morphine hydrochlorate, whether in the solid form or in solution, may be kept under ordinary conditions for several years without losing its value, and that they have never found apomorphine in old solutions of the salt, even after heating them with excess of acid at a temperature of 200° F. for several days. It may be added that although the paragraph referred to localizes the incident in Paris the details bear a strong resemblance to those of the case reported by Dr. Hager more than twelve months since (see *Pharm. Journ.* [3], xv., 791).

* * *

A case of poisoning by chloroform in which recovery followed the use of the stomach-pump and subcutaneous injection of atropine sulphate is reported in the *Lancet* (July 3, p. 13). A remarkable statement was made by the patient to the effect that he swallowed two ounces of undiluted chloroform and then walked a distance of two hundred yards to his home.

* * *

Another case is recorded in the same journal of recovery after swallowing an ounce and a half of commercial crude hydrochloric acid of ordinary strength.

* * *

The great demand for menthol that has arisen during the last two or three years has caused a great increase in the cultivation of peppermint in Japan. According, however, to a statement in a circular issued by Messrs. Cocking, of Yokohama, nearly the whole of the new plantations have been laid down—through ignorance or carelessness—with a very inferior variety of this plant, known among peppermint growers as the green kind, which yields under unfavourable conditions an oil having a rank turpentiny or camphoraceous smell.

* * *

A report from Mr. Consul Dickson states that a considerable business has lately been done in Damascus and Syria generally in the exportation of liquorice to the United States. About four years since a member of a Philadelphia firm, largely concerned in the commerce of this article, visited Damascus with the object of ascertaining the amount and quality of the liquorice root grown in the country and of making purchases. The result of his inquiries proving satisfactory he arranged for the shipping of large consignments and appointed an agent in Beyrout to act on behalf of the firm. It appears that the root can be obtained in large quantities to the north of Damascus and in the neighbourhood of Latakia and Antioch. The value of the exports last year was about £30,000.

* * *

The sweet nitrogenous compound which under the name "saccharin" has attracted considerable attention, has up to the present only been obtainable with some difficulty. It is stated, however, that there is now a probability that it will soon enter the market as a commercial product. A company has been formed for working the invention, and land has been selected near Magdeburg for the erection of a factory.

* * *

As on the 30th of August next M. Chevreul will attain his one hundredth year a movement has been set on foot to commemorate this anniversary by a medal which shall transmit to posterity the features of the illustrious *savant*. The medal is to be executed by M. Roty, and is to be presented, together with a list of the subscribers, to M. Chevreul on his birthday; a copy of it will also be sent to each subscriber should the funds permit. The committee that has been formed is presided over by M. Charles Brogniart, to whom, at 8, rue Guy-de-la-Brosse, Paris, subscriptions may be sent.

* * *

A curious verdict has been returned in a case at St. Ives, where the death of a man followed the drinking in mistake for water of some liquor "intended to kill worms in woodwork." It was shown that the jar had contained carbolic acid, and the jury arrived at the conclusion that the deceased had been suffocated (*sic.*) through inhaling the fumes of carbolic acid.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly meeting of the Council was held on Wednesday, the 7th inst.

Present—The President (Mr. J. E. Brunker, M.A.), in the chair; Dr. Collins, Dr. Montgomery, Messrs. Allen, Beggs, Doran, Hayes and Simpson.

Donations were announced of *Annalen*, No. 2, k. k. Naturhistorischen Hofmuseums, Vienna, and of the General Index of the Year-Books, 1864 to 1885, from the British Pharmaceutical Conference.

The thanks of the Society were voted for the donations.

A report from the Law and Certificates Committee was discussed and adopted.

The President said a letter had been received, which came too late to be inserted in the programme of business. It was from Mr. Lennan, of 84, Queen Street, who had been duly admitted a pharmaceutical chemist in August, 1885, stating that on the occasion of a fire which occurred on his premises on May 11 last his certificate had been very much injured and defaced, and requesting the Council to forward him a new certificate. It would be impossible to do this, as a new certificate would not be valid without the signatures of the examiners who examined Mr. Lennan, and they were now out of office. The Registrar, however, could give Mr. Lennan a letter stating that he had passed the final examination and was a duly registered pharmaceutical chemist.

The Registrar was directed to furnish such a letter to Mr. Lennan.

The President mentioned that at the Preliminary examination, held on Monday, the 5th inst., twenty candidates presented themselves, of whom twelve passed. Of those rejected two were candidates a second time.

The report of the examiner showed an improvement in dictation.

The Council then adjourned.

Society of Chemical Industry.

FIFTH ANNUAL MEETING.

The Fifth Annual Meeting of the Society of Chemical Industry was held on Wednesday morning at 11 o'clock, in the New Chemical Theatre of University College, Brownlow Street, Liverpool. There was a fair attendance of members. The chair was taken by the President, Mr. E. K. Muspratt, who, after the minutes of the last annual meeting had been read and confirmed, called upon the Secretary to read the

Report of the Council.

The Report stated that the Society of Chemical Industry now contains 2271 members, distributed as follows :—London, 642 ; Liverpool, 184 ; Manchester, 312 ; Newcastle, 120 ; Birmingham, 112; Glasgow, 251 ; Bristol, 73 ; Nottingham, 75 ; Yorkshire, 121 ; United States and Canada, 96 ; other Countries, 140 ; Ireland, 30 ; and parts of England and Wales not included in any of the above, 115. Since the last Annual Meeting 266 members have been elected, and 86 have been lost by death and other causes, making a net gain of 180 members. After referring to the death of the late President, Mr. Walter Weldon, F.R.S., whose services to the Society had been so important, it mentioned that during his year of office he had expressed an intention of leaving to the Society his collection of scientific, technical and chemical works. Death came upon him too suddenly to enable him to effect this disposition in writing ; but his son, Mr. Raphael Weldon, has nevertheless agreed to fulfil his father's known intention. The Society thus becomes possessed of a thousand or more valuable works, which will form the nucleus of a reference library. The other losses by death referred to were Mr. H. S. Evans, Chief Analyst of the Dominion of Canada, and formerly President of the Pharmaceutical Society ; and Mr. Alfred Tribe, Professor of Chemistry at Dulwich College, who was well known for his researches on the zinc copper couple. The Council had received no application for its consent to the formation of new sections during the year ; but the increasing number of members in Yorkshire encourages the belief that at no distant period of time a section will be in operation in that district. Members residing in and near Edinburgh have now resolved to form a joint section with those at Glasgow ; and in future the united body is to be known as the "Glasgow and Scotland" section, due provision being made for the representation of the East of Scotland on the Committee. The original papers read before the sections had shown an increase. Manchester heading the list with 18, Glasgow following with 17, London 16, Birmingham 7, Liverpool and Newcastle 6 each, and Nottingham and Bristol 5 each ; making, with the two read before the last annual meeting, a total of 82 against 71 in the previous year. It was stated that the journal continues to afford evidence of progress. For the guidance of the Publication Committee, Editor, and Abstractors, an amended set of rules has been drawn up. The "List of Patents Published" has been replaced by a list of "Complete Specifications Accepted." The increase of cost has been more than proportional to the increase of matter, owing to the abundance of woodcuts, tables, and diagrams. If this was to be maintained, the Society must receive still more support from the Chemical Industries. The Editorial Committee has been abolished, and in future each section will appoint an Editorial Committee to examine its own papers, and revise discussions before sending them to be printed. It is hoped that these arrangements will conduce to economy in the production of the journal. The Council asked the approval of the members for certain alterations in the Bye-laws ; the most important of all dealing with the subscription. Three alternate propositions had been before the Council—the imposition of an entrance fee, the raising of the subscription to 30*s.*, and the raising of the subscription to 25*s.* It had been resolved to recommend the last of these alternatives. For several years the balance between receipts and expenditure has shown either a deficit or so narrow a surplus as to leave no margin for contingencies. This has been due mainly to the cost of producing the journal, but also in some degree to the subventions granted to sections, the levy of a special local subscription having been found impracticable.

Sir Henry Roscoe, M.P., moved the adoption of the report.

The motion was seconded by Mr. Norman Tate, and carried unanimously.

The report of the Treasurer was then read. It showed that the receipts during the year had amounted to £2660, the principal items consisting of subscriptions, £2156 ; sales of journal, £235 ; advertisements, £91. Besides these about £150 was owing on the journal account and another sum of nearly £100 had been received on account of life subscriptions. On the other side the chief expenditure had been on account of the journal, amounting to upwards of £2000. The balance of receipts over expenditure amounted to £86 6*s.* 7*d.*

Upon proceeding to the appointment of scrutineers to examine the balloting papers for the election of the officers and council for the ensuing year a question was raised as to the authority under which a certain circular had been issued, in which, under the title of the Society, the name of the President appeared, this being followed by information respecting the meeting, train service, etc., and a list of gentlemen nominated by the London Section.

The President having disclaimed any knowledge of the circular, and the President of the London Section (Mr. David Howard) having done the same,—

Mr. Tyrer said he wished to assume the sole responsibility for the circular. As Local Secretary and Treasurer to the London Section he had thought it advisable to send out certain notices respecting the annual meeting to the metropolitan members, especially for the benefit of those who did not open their journals, and in doing so he had followed his invariable practice with sectional notices of placing the name of the President of the whole Society immediately under the heading. But in doing so he did not mean to give any undue significance to the notice.

The explanation being received as satisfactory, the scrutators were appointed. The next business was the delivery by the President of his address, of which the following are the principal passages.

The President's Address.

After welcoming the visiting members of the Society to the city of Liverpool, and briefly referring to the objects of the Society and the work it was capable of doing, the President said :—

I have thought, however, that it will not be uninteresting to the members of the Society, if in this city of Liverpool I endeavour to trace the history and development of the manufacture of alkali, including that of sulphuric acid, hydrochloric acid, and the production of copper, which are essentially connected the one with the other, and have been enormously increased and improved by the introduction of the Leblanc process for making alkali from common salt by my father in 1823, within two miles of this building.

The economical success of the manufacture of artificial soda depends on the cheapness of the raw materials, and the perfection of the chemical and mechanical operation by means of which the final result is obtained.

The neighbourhood of Liverpool, in close proximity to extensive coal fields and salt deposits, and with a port in direct communication with the countries whence are derived the raw materials—sulphur, pyrites, and nitrate of soda—was well fitted to be the cradle of the manufac-

ture, and notwithstanding the rivalry of Newcastle and Glasgow, still retains its pre-eminence. When we consider that, with the exception of sulphur, the prices of the several raw materials are not materially different from what they were fifty years ago, great improvements must have been made in the chemical operations to enable the manufacturer to sell soda ash at present prices, even taking into consideration the aid afforded by the increased consumption of the chlorine products.

The first chemical operation in an alkali works is the production of sulphuric acid. In or about the year 1823 the cost of producing this acid was, as far as I have been able to ascertain, about £3 10*s.* per ton of acid 140° Tw.; at the present time the cost is about 25*s.* or 20*s.* per ton. I shall now review briefly the means by which this economy of production has been obtained.

Attempts have often been made to supersede the costly leaden chambers by more economical structures, without success, but improvements have been made in the mode of construction of the plant, and a cheaper source of sulphur has been found in the cupreous pyrites of Spain and Portugal. The actual process followed is essentially the same as that first applied by Dr. Roebuck, in 1746, converting the sulphur into sulphurous acid at the expense of the oxygen of the air, and by the intervention of a nitrous compound for a further oxidation to sulphuric acid. The most important improvements have been the substitution of pyrites for sulphur, and the economy of nitrate of soda and fuel by means of the Gay-Lussac absorbing column and the Glover tower. Mons. Scheurer-Kestner, in a recent publication, ascribes the first successful use of pyrites to Mons. Perrel, in 1833, but long before this date pyrites, obtained from his mines in Anglesea, was used in Liverpool by Mr. Hill. It was, however, the suicidal policy of the King of Naples in granting a monopoly of the trade in Sicilian sulphur to a French firm, which raised the price of sulphur from £5 or £6 per ton to £12 and £14 per ton, that roused the English manufacturers to seek a substitute, which they found in the Wicklow and Welsh pyrites, and it was in this neighbourhood it was first used on a large scale, for in the years 1839 and 1840 large quantities were burnt by my father at his works at Liverpool and Newton.

As some of the pyrites contained copper, the residue, after burning, was delivered to the Sutton Copper Co., at St. Helen's, so the utilisation of the copper in the pyrites was attempted at its first introduction.

The use of Irish pyrites in place of sulphur was soon generally adopted by alkali makers in the Lancashire district, but sulphur still continued to be used on the Tyne, and so late as in the year 1852 we find 7580 tons of sulphur consumed in that district, when none was used in Lancashire.

Many difficulties were met with in the use of pyrites, and when the price of sulphur fell to £5 per ton, it was a disputed point among alkali makers whether at that price it was not more economical than Irish pyrites at about 25*s.* per ton.

Sulphur could be readily burnt on an iron plate, and although the admission of the necessary quantity of air to support combustion without admitting at the same time an excess presented some difficulties, this was comparatively easily regulated. With Irish pyrites, however, containing only about 32 per cent. of sulphur combined with iron, sufficient air had to be admitted not only to burn the sulphur, but also to oxidize the iron; and as a consequence, the constitution of the gases entering the chamber was very irregular, and much larger chamber space was required than was necessary when using sulphur.

Pyrites smalls presented another difficulty — shelf burners were not invented—and to facilitate their burning in an ordinary kiln, the smalls were mixed with clay and shaped into balls and dried, but the combustion was usually imperfect, and from 5 to 10 per cent. of sulphur was left in the residue. I have already mentioned that some of the ore, and particularly the smalls, contained copper, and large quantities were burnt and afterwards treated for copper in the ordinary smelting furnace, so long as the copper contents were sufficient to render the operation remunerative. It was found, however, that the percentage of copper decreased, and much of the ore contained less than 1 per cent. of copper, which was not profitable to smelt, and the residues were thrown away and accumulated in large heaps, until in the year 1850 Mr. Gossage purchased for a nominal sum large quantities of these residues, and smelted them to a regulus both at Widnes and Newcastle. This regulus was sold to Messrs. Vivian and Sons, of Swansea, who at that time were able to pay a higher price than the copper contents alone would have warranted, on account of the silver therein contained, and which they extracted, I believe by the Augustin or Ziervogel process.

In the year 1859 pyrites from Spain and Portugal was first introduced into this country and burnt by alkali makers on a large scale. This pyrites, containing about 2½ to 3 per cent. of copper, was very suitable as a flux for smelting when mixed with other ore, and large quantities of the burnt ore were delivered to the copper works at St. Helen's and Widnes, but the price obtained was not sufficient to materially reduce the price of the sulphur to the alkali manufacturer, as the quantity required as a flux with ores was limited, and the smelting of the residue by itself was unprofitable. The assay of copper ores by the Cornish assayers also militated very much against the general use of these ores, for the production of sulphuric acid, and non-cupreous ores of very fine quality testing about 40 to 45 per cent. were also introduced from Norway and Belgium, and these for a time competed successfully with the cupreous ores. The imports of foreign pyrites into the Mersey rose from 26,641 tons in 1859 to 133,864 in 1869, 152,138 tons in 1871, 280,326 tons in 1880, and in 1885 amounted to 253,146 tons. [Here and elsewhere the address was illustrated by copious tables, setting out the facts in great detail.]

In the year 1871 about 100,000 tons of the non-cupreous ore also was imported and consumed, but this gradually fell off as the extraction of copper increased. The great aim of the alkali manufacturer was to obtain the sulphur at the lowest possible price; but as I have before explained, the intricacies of the copper assay left him very much in the hands of the copper smelter, and the increased consumption of the ore gradually raised the price directly or indirectly until a combination of alkali makers acquired the Tharsis mines, together with Mr. Henderson's patent rights for the extraction of copper by calcination of the ore with common salt, and subsequent lixiviation of the calcined mass and precipitation of the copper by iron. The calcination was conducted in a close furnace, the HCl evolved, and the copper volatilized being condensed in the usual manner, and used for the lixiviation of the roasted ores. The process itself does not differ materially from Mr. Longmaid's, to which I shall refer later, but to Mr. Henderson is due the credit of discovering the suitability of this method for the treatment of the burnt Spanish ores in the market.

The process when first applied to the burnt Irish ores was not very remunerative, but with the burnt ore from Spanish and Portuguese ores the oxide of iron or purple ore left after lixiviation found a ready sale, and practically paid for the cost of extraction, leaving the difference between the quantity of copper yielded by the wet and dry assay as profit on the operation. By the introduction of this wet extraction process, the sulphuric acid manufacturer was freed from depending on the copper smelter, and the price of sulphur was reduced owing to the competition of the various pyrites companies.

This lasted till 1879, when the three large companies combined to fix the price of pyrites, and since that time until the combination was broken up by the Tharsis

Company in 1885, with a view to enable the alkali manufacturers to compete with the ammonia soda process, the price of sulphur has always been a source of great anxiety. The effect of these improvements in copper extraction has been to bind more closely together the manufacture of alkali with the production of copper, sometimes by the same firm, or, in the case of the Tharsis Co., by the shares in the copper company being largely held by alkali makers. I shall, later on, trace the progress and improvement in the copper extraction, and now return to the use of pyrites in the production of sulphuric acid. The chemical process in the sulphuric acid chambers was by no means as regular as could be desired, even when burning sulphur; but with pyrites, for the reasons alrady given, the irregularity was still greater, and as a consequence the production of sulphuric acid showed a result considerably below what was theoretically possible, and the quantity of pyrites and nitre used to produce a ton of sulphuric acid differed in various works from 10 to 20 per cent. In his 'Letters on Chemistry,' which appeared in 1851, if not in his earlier letters, Liebig says, speaking of the process of making sulphuric acid :—"As regards the process and the apparatus, this manufacture has reached its acme, scarcely is either susceptible of improvement," but to those practically acquainted with the manufacture and with the immense improvement since that date, this statement must appear extravagant. Liebig was, no doubt, misled by reports of very careful working with sulphur and enormous chamber pace.

The introduction of Gay-Lussac's system for the absorption of the nitrous fumes escaping from the chambers was the first great improvement in the conduct of the chemical operation. In this system the exit gases of the chambers pass up a tower filled with coke, down which percolates a stream of concentrated sulphuric acid, by means of which the nitrous gases are absorbed. By diluting this nitrous vitriol and heating with steam, the nitrous gas is returned to the chambers. This system was first adopted at the St. Gobain Works in France, in the year 1842, with a saving of fifty per cent. of the nitrate of soda used ; but notwithstanding this saving, after it had been introduced into several works in this neighbourhood, it was subsequently abandoned, partly on account of the great wear and tear on the apparatus employed, and partly because when working with Irish pyrites the exit gases were so diluted by air as to render the absorption comparatively difficult. The use of the richer Spanish ores since 1859, which rendered the composition of the gases leaving the chambers more regular, and Mr. Glover's improvements in the concentration and denitration of the sulphuric acid, brought about the general adoption of the Gay-Lussac absorbing column. It is clear that Gay-Lussac's invention was incomplete, and at an early date (about the year 1843) experiments were made at our works in Liverpool to concentrate the sulphuric acid by means of the sulphurous gas from the pyrites kilns ; but the tower through which the gas passed, and which was filled with coke, took fire owing to the carelessness on the part of the workmen, and the attempt was abandoned. To Mr. Glover is due the merit of having successfully constructed an apparatus, by means of which the nitrous vitriol is denitrated and the sulphuric acid sufficiently concentrated for use in absorbing the nitrous gas in the Gay-Lussac column. With this invention the apparatus for producing sulphuric acid in leaden chambers is complete, but the present perfection of working has only been attained by the application of trained chemists to the study of the process, and the introduction of apparatus for the accurate but rapid estimation of the constituents of the gases entering and leaving the chambers. Much of this work has been done in Germany, and by the investigations of Winkler, Weber, Schwarzenberg and others, we have a much clearer idea of the reactions which take place in the chambers and absorbing columns than formerly. Dr. Hurter's paper on the dynamic theory of the manufacture of sulphuric acid, read before the Liverpool Section of this Society in 1882, seems finally to have placed the operation on a thoroughly scientific footing. Orsat's apparatus for gas analysis, and the nitrometer, enable the manufacturer to control the working of his chambers in a very different way to that in use in the best works thirty years ago, where the colour of escaping gas on coming in contact with the air, or the use of the nose, served as an indication of how the reaction was proceeding. For the past ten years no important improvement in the manufacture has taken place, nor can we expect any, since with good apparatus the loss of sulphur escaping is reduced below one per cent., with a consumption of nitre of less than two per cent. on the sulphur burnt. In order to treat the large quantities of burnt pyrites furnished by the alkali manufacturers, large extracting works were erected in this neighbourhood and on the Tyne, and the quantity of copper extracted greatly exceeded the aggregate production from the copper mines of the United Kingdom.

It had long been known that the copper precipitate produced from the Spanish and Portuguese ores contained both silver and gold, but as the amount of silver present in the burnt ore was exceedingly small (and even the whole of this small quantity is not obtained in solution), a simple and expeditious method was necessary, if its extraction could be made remunerative. In the year 1870, Mr. Claudet introduced his beautiful process at the works of the Widnes Metal Co., and since then about $2\frac{1}{2}$ millions of ounces of silver and 11,965 ounces of gold have been extracted from the burnt pyrites.

This process is based on the precipitation of the silver from the copper liquors by means of a soluble iodide ; the precipitate consists of silver iodide together with lead sulphate and chloride and sub-salts of copper. These last are removed by washing with diluted HCl, and the precipitate is then decomposed by metallic zinc, which completely reduces the silver iodide, and the resulting zinc iodide is used over again to precipitate further quantities of silver. Where the pyrites residues are thus treated, it will be seen that all the constituents of the pyrites are practically made available ; the sulphur for the production of sulphuric acid, and the iron, copper, silver and gold in the extracting works. Unfortunately all the salt used in the calcination process, amounting to over 20,000 tons per annum, is at present lost, and is run away as sodium sulphate in the waste liquors. This drainage from the extracting works, coming in contact with the chloride of calcium, the waste liquor from the Weldon process in alkali works, deposits large quantities of gypsum obstructing the drainage, which gave rise to a long and expensive lawsuit in the Widnes district. To avoid this nuisance, the liquors were for a time evaporated and calcined, and the sulphate of soda, together with a small quantity of ferric oxide, were obtained in a marketable form, but the high price of fuel rendered all these processes unremunerative.

The second operation in the manufacture of soda by the Leblanc process is the decomposition of common salt by means of sulphuric acid, and the consequent production of sulphate of sodium and hydrochloric acid. As the chemical reaction is a very simple one, and had been carried out for the production of hydrocholoric acid long before the introduction of the Leblanc process, the improvements that have been made have necessarily taken the form of improved apparatus. Where the primary object was the production of hydrochloric acid, the apparatus employed was either glass retorts or iron pots ; but when the sulphate of sodium became the main object of the operation, furnaces were employed, either with or without a lead lining.

The operation is now conducted in two stages. The first, decomposition with the formation of bisulphate of sodium, takes places at a low temperature in an iron or lead pan, yielding strong hydrochloric acid, which can

be easily condensed, and when the hydrochloric acid was of little value, the decomposition was completed, forming neutral sulphate of sodium, in an open reverberatory furnace, the liberated hydrocholoric acid passing off together with the products of combustion. Where more hydrocholoric acid was required, either for sale or for use, than was yielded by the pan, a close or muffle furnace was substituted for the second stage, or the roasting of the sulphate.

By the use of these improved sulphate furnaces, together with condensers or towers filled with coke, through which the gas passes, meeting a stream of water (a plan for which Mr. Gossage obtained a patent so early as 1836), the sulphate can be manufactured of excellent quality, and without causing injury to the neighbourhood. The substitution of machinery for hand labour, first attempted by Mr. W.W. Pattinson in 1848, has been carried to perfection by Messrs. Jones and Walsh, Mr. Mactear, and the Bede Co. Owing to the difficulty of obtaining strong hydrochloric acid, in the case of Messrs. Jones and Walsh and Mactear's furnaces, most manufacturers fine it convenient to use improved muffle furnaces worked by hand.

Mr. Gossage introduced his plan of condensing the hydrochloric acid in 1836, but a long time elapsed before it was generally adopted. The construction of plant for chemical purposes was then very imperfect and costly, and only those manufacturers who were possessed of sufficient capital were able to apply the improved system, notwithstanding the complaints of nuisance and the frequent litigation that ensued. The present generation can hardly form an idea of the intensity of feeling and prejudice aroused against chemical and alkali works during the first forty years of their existence—*i.e.*, up to the passing of the Alkali Act in 1863.

Hardly an assizes passed without an action for nuisance or damage, and, as this litigation continued without absolute ruin to the manufacturer, the public believed the profits to be fabulous, and many people without chemical knowledge commenced to decompose salt, sometimes selling the salt-cake to soapmakers to be converted by them into black ash, or, as the demand for alkali continued to increase, converting the salt-cake themselves into soda ash. The effect was that long after Mr. Gossage had solved the difficulty of condensing the large quantities of hydrochloric acid evolved, many works continued to manufacture without condensation, and those who expended money on condensing apparatus were only induced to use it in proportion as they found an outlet for the liquid hydrochloric acid. In the year 1863 the Alkali Act was passed, and good condensation was made compulsory. In Lancashire, and more particularly in Liverpool and St. Helens, there was a considerable local demand for hydrochloric acid; but, as this acid was required in a comparatively concentrated form, a different mode of making the salt-cake was adopted to that which was found suitable on the Tyne, where the greater portion of the acid, after condensation, was run to waste. It was in Lancashire, therefore, that the pot was first separated from the furnace, and the close roaster introduced by Mr. J. C. Gamble.

With an increasing demand for alkali, much more acid was produced than could be easily disposed of, and the alkali manufacturer was gradually led to manufacture bleaching powder for the purpose of utilizing his hydrochloric acid. When bleaching powder or dry chloride of lime was first made by Mr. C. Tennant, of St. Rollox, the chlorine was produced from a mixture of salt, manganese and sulphuric acid; but when, by the manufacture of sulphate of sodium, a large quantity of liquid acid was obtained of little value, it was used to produce the chlorine by the direct action of the hydrochloric acid on peroxide of manganese. Much difficulty was encountered in constructing suitable apparatus for such a pungent and corrosive gas as chlorine, and many improvements were gradually introduced into the manufacture in the form of improved apparatus.

At an early date attention was called to the possibility of recovering the manganese which ran to waste in the still liquor; but Mr. Dunlop was the first to effect this regeneration in a practical manner, by a very ingenious process, which he introduced in Messrs. Tennant's works at Glasgow. In this process the waste manganese liquors were neutralized by lime, and the neutralized liquor converted into carbonate of manganese by treatment with carbonate of calcium under pressure of $2\frac{1}{2}$ atmospheres. The resulting carbonate of manganese was then converted into the peroxide by heating in a current of air. The plant required was very costly in proportion to the quantity regenerated, and this, together with the cost of the fuel employed, prevented the extension of the process to other works.

With this exception none of the various processes suggested to recover the manganese were successful, and the preparation of chlorine continued without any great change, till Mr. Weldon carried to perfection his well-known method of recovery, in Mr. Gamble's Works at St. Helen's. This process was early adopted in the Widnes and St. Helen's district, and, as the demand for bleaching powder increased, spread rapidly. The economic effect of the process was very great, since the alkali manufacturer was enabled to produce chlorine and its products at a marvellously small cost, so long as the price of the soda left a small profit.

With a decrease in the price of bleaching powder came a rapid increase of consumption, since the paper manufacturers, freed from the Excise Duty on paper in 1861, turned their attention to other fibres, requiring large quantities of bleach, such as straw, esparto, wood, etc., as a substitute for rags, which were daily becoming scarcer. There was, simultaneously, a large increase of the exports of bleaching powder from this country to the Continent, as it was manufactured so much cheaper by the new process before it had been generally adopted in France and Germany. The increase in the trade was greater in Lancashire than elsewhere, and for the next ten years there was a marvellous increase in the population of Widnes and St. Helens, owing to the erection of new works.

Another use for hydrochloric acid was found in the production of potassium chlorate, first manufactured on a comparatively large scale by Mr. Balmain and Mr. S. A. Parnell, at St. Helens, in 1847, and by Mr. Gamble in 1848.

The process employed was the saturation of milk of lime by an excess of chlorine, which produces a pinkish solution of chlorate of calcium and chloride of calcium, in the proportion of about 1 : 5·5, and the subsequent decomposition of the chlorate of calcium by heating with chloride of potassium. The chlorate of potassium is then separated from the calcium chloride by crystallization. This process was first proposed by Liebig, but it is not certain whether he was aware of the necessity of perfectly saturating the lime with chlorine before applying heat. This fact seems to have been known to Mr. Parnell, who proved by experiment that when even a small quantity of lime was present, oxygen is disengaged largely on heating, with a proportionate loss of chlorate in the liquors.

The demand for chlorate of potash being comparatively restricted, the manufacture could not be largely increased without an undue fall in the price, and for many years the quantity made was exceedingly small. The price at first was 2*s.* 4*d.* per lb., but with an increased production the price fell quickly, and in 1852 was 10*d.* per lb. at which it left little or no profit, until by the introduction of the Weldon manganese recovery process the cost of production was materially lessened. Of late years, with a largely-increased consumption for match making, the manufacture has increased considerably, particularly in Widnes and St. Helens, but as the

consumption in the colour manufacture fell off, a large stock accumulated, and it was almost unsaleable even at 5*d.* per lb.

I must not leave this portion of the subject without alluding to the beautiful process for the production of chlorine invented by Mr. Deacon, another Widnes manufacturer, but for reasons which it would take me too long to explain fully, it has not been generally adopted.

Before proceeding to the third operation in the Leblanc alkali process, I must call attention to some interesting attempts that have been made in this district to supersede sulphuric acid chambers, and the manufacture of sulphuric acid, as a preliminary to the conversion of common salt into sulphate of sodium.

The first in point of time is that of Mr. Longmaid, which consisted in roasting iron pyrites, containing small quantities of copper, with salt, in a reverberatory furnace. The result was the production of sulphate of sodium and ferric oxide, with the evolution of hydrochloric acid, chlorine and some chloride of iron and copper. From the calcined mass the sulphate of sodium was extracted by lixiviation, and the residue worked for copper and silver. The chlorine evolved was used to make bleaching powder, but the difficulties which had to be overcome in utilizing the chlorine on account of its dilution, and the loss of sulphur in the calcination, rendered the process less remunerative than might have been expected. It was worked at the Patent Alkali Company's Works at St. Helens, from 1846 to about 1856, when it was abandoned. The process, however, in another form—viz., treating the burnt instead of the unburnt ore—has, as I have already shown, been more successful, and the sulphate of sodium, which now runs to waste, may be utilized, if the expense of evaporating the liquors is not too great.

Another process, perfected by Mr. Hargreaves, and first carried out by him at Widnes, has been adopted by some manufacturers, and would have been more generally used if it had not been for the simultaneous improvement of the sulphuric acid manufacture by the introduction of the nitrate-saving apparatus, and the low price of nitrate of soda.

The process consists in the direct action of sulphurous acid and steam upon common salt, at a temperature of 800° to 900° F., yielding a very pure sulphate of sodium and hydrochloric acid, which is condensed in the usual manner. The process is in operation at three works in Windes, decomposing about 25,000 tons of salt annually.

The next step in the conversion of sulphate of sodium into carbonate is the making of black ash by fluxing the sulphate of sodium with carbonate of calcium and coal. This is the true Leblanc process, and so far as the chemical operation is concerned remains essentially the same as that practised by Leblanc himself. The theory of the operation is, however, not absolutely decided, even at the present day, and its obscurity led to numerous analyses of and investigations into the nature of black ash, and of the waste after lixiviation, that fill volumes of chemical literature. It is not necessary for me to refer more in detain to these investigations of Gossage, Meyer, Brown, Kynaston, Scheurer-Kestner, Kolb and Mactear, which are well-known to all interested in the alkali manufacture, as the practical result has been confined to some slight alterations in the quantities of the materials used in the mixing, before the introduction of the charge to the furnace. The almost universal adoption of mechanical furnaces has brought about a general uniformity in the production, which with hand furnaces varied considerably in different works. When my father first commenced making black ash on the large scale, in 1823, the principal improvement he effected was in the quality of the black ash produced, since the small quantity then made in England and France contained only about 10 or 12 per cent. of alkali. From the first he produced black-ash testing by the then alkalimetric test 24 per cent. of alkali, and in this form it is delivered to the soap-makers, of whom there were in Liverpool itself seven or eight, to be used in place of kelp. It was found, however, when this black ash was exported, it lost strength from exposure to the air, and to meet this difficulty the carbonate of soda was extracted by lixiviation, and the liquors calcined in a reverberatory furnace, producing the so-called white ash or soda-ash. It is not necessary for me, nor would time allow, to refer at length to the numerous small improvements gradually introduced into the manufacture since its commencement, but many were first introduced in this neighbourhood, such as the utilization of the waste heat for evaporation, the systematic lixiviation of the black ash, the use of boat and fishing pans, the separation of the salts of monocarbonate of sodium from the caustic alkali or red liquor, and finally the manufacture of caustic soda itself.

These, and many other improvements, are due to Lancashire manufacturers, among whom I may mention Gossage, Gamble, Deacon, etc. In addition to these the greatest improvements of all, revolvers or mechanical furnaces, were also first introduced into this neighbourhood in 1853 by G. Elliott and W. Russell, at the Patent Alkali Company's Works at St. Helens. This first revolver did not work satisfactorily, and it took a long time and numerous experiments on the part of Messrs. Stevenson and Williamson, at Jarrow, to overcome the difficulties encountered in the lixiviation of the metals, which were not porous enough ; but now all these have been overcome, and the metals produced by the revolver are superior in every way to the best worked by hand. The extent of this improvement may be gauged if we consider that in a modern revolver of large dimensions as much salt cake can be decomposed in a given time as in ten hand furnaces requiring forty men, and the decomposition itself is from 10 to 15 per cent. more efficient.

At an early period a difference in the mode of working on the Tyne and in Lancashire developed itself. On the Tyne, the greater portion of the alkali produced took the form of carbonated ash and crystals of soda, but in Lancashire, where so much of the ash was used for bleaching and soap making, a caustic ash was produced, and as the sulphide and ferrocyanide of sodium it contained was found to be injurious for many purposes, much ingenuity and skill were employed to eliminate these from the liquors. In 1853 Mr. Gossage obtained a patent for purifying the black ash liquors by the oxidation of the sulphide of sodium, by passing them through a tower filled with coke, meeting a current of air, or if a carbonated ash was required by passing carbonic acid through the tower. This patent also included a process for the production of caustic soda, and at a later period (1857) he suggested removing the sulphide by means of hydrated ferric oxide, zinc, manganese, or other suitable metal. These suggestions all culminated in the separation of the carbonate of soda from the caustic soda in the liquors by the use of so-called fishing pans, where the salts, as they are deposited on evaporation, are withdrawn by perforated ladles, and the salts carried to a drainer.

The concentrated liquor is further evaporated with addition of nitrate of sodium, and is then run into settlers, where it deposits a further quantity of salt, and the red liquor is further concentrated in a cast-iron pot, and when strong enough to solidify is packed as cream or red liquor caustic soda. The nitrate of sodium reacts both on the sulphide and cyanide of sodium, but it was observed first, I believe, by Dr. Pauli, that by a further concentration when the heat approached redness, the destruction of the cyanide is complete, and graphite is found proceeding from the carbon of the cyanide. When this, together with the aluminium silicate, is allowed to settle out, the caustic soda becomes colourless, and, when packed, perfectly white. The first red liquor caustic soda made on a large scale was made by Mr. Gamble at St. Helens, under Mr. Gossage's patent, but much difficulty was experienced in the manufacture, and it was confined to a few firms in the Widnes and St. Helens district

As a market was found at good prices for this caustic soda, it occurred to some manufacturers to causticize the liquors with lime before evaporation, and Messrs. Roberts, Dale and Co., of Manchester, and Messrs. Hutchinson and Co., of Widnes, erected a large plant for the manufacture of this so-called artificial caustic soda, to distinguish it from the red liquor caustic then in the market. Most of this good coloured or white caustic soda was made in this manner, but the cost was considerably greater than that of the red liquor caustic, and until the consumption increased very considerably it did not pay the manufacturer to incur this expense. In the exhibition of 1862, there were exhibited samples of this article by several manufacturers, and in 1866, as is seen by the statistics of that year, a large quantity (11,213 tons) was manufactured in Lancashire, and 3720 tons on the Tyne. With the extending consumption of caustic soda for use in the refining of petroleum, the manufacture of soap and paper making, and in the manufacture of aniline colours, this industry has taken an enormous development, and in 1885, 140,795 tons were manufactured in Lancashire, and 4159 tons on the Tyne.

After the black ash has been lixiviated, and the soda converted into either soda ash or crystals or caustic soda for sale, there remains the alkali waste, containing nearly all the sulphur consumed in the manufacture, and this waste, when not removed out to sea, as on the Tyne, accumulates in large heaps round the works, and unless properly treated, infects the air with the unpleasant odour of sulphuretted hydrogen. Since the passing of the Alkali Act of 1863, it may safely be asserted that nearly all the complaints of nuisance from alkali works are due, not to hydrochloric acid, but to the sulphuretted hydrogen given off by the drainage from the waste heaps. It has not been for the want of either enterprise or science on the part of the manufacturers that this source of nuisance continues to exist. Means are well known which will render the waste comparatively innocuous, and it is satisfactory to know that the method now recommended by the Alkali Inspector for the prevention of the nuisance from waste heaps, emanated from the manufacturers themselves. It is, however, to be regretted that hitherto no process for recovering all the sulphur in the waste has been successful from a pecuniary point of view. A small quantity is extracted by Mr. Mond's process; but Mr. Gossage's original scheme for decomposing the sulphide of calcium by carbonic acid, and Messrs. Schaffner and Helbig's plan for decomposing the waste by magnesium chloride, promised sufficiently well to induce my father, in 1839, and Messrs. Chance Bros., in 1882, to spend large sums of money in attempting to work them practically.

The fall in the price of sulphur, and the increasing value of hydrochloric acid, owing to the ammonia soda process, have entirely changed the commercial conditions, so that unless Messrs. Parnell and Simpson's process for uniting the Leblanc with the ammonia soda process (to which I shall allude later on) succeeds, I see little prospect of the recovery of the sulphur in future.

I have now traced very rapidly the rise and progress of the Leblanc alkali industry in this district, from 1823 to 1878, a period slightly exceeding half a century, and it is desirable at this stage to review the position of the trade, and to mark the change which the process has wrought in the prices of alkali and bleaching powder, the two forms in which the chlorine and sodium of the salt is made available for industrial purposes. I have selected the year 1878 for comparison, as from that date forward the competing ammonia soda process began to influence the price of alkali, and the whole position of the trade changed. I have also added the prices of this year, showing the influence exercised by the competition of the ammonia soda.

The prices of the raw material have not varied nearly so much as those of the manufactured products, as will be seen from the annexed tables:—

Comparative Prices of Manufactured Articles at various dates.

	Liverpool, 1827—1830.	1839-1840.	Liverpool, 1878.	Liverpool, 1886, after ammonia process.
Black Ash	£7 to £10 for 20 p.c.	(1835) £4 10*s.*	—	—
Soda Ash	£16 10*s.*	£15 per ton.	1⅜*d.* to 1 9/16*d.* per cwt., or £5 10*s.* to £6 per ton.	1*d.* to 1⅛*d.* p.c. per cwt., or £4 to £4 10*s.* per ton.
Salt Cake	£7 10*s.*	£6 10*s.* ,,	£2 (unpacked).	25*s.* per ton.
Nitre Cake	£12 5*s.* from Nitrate of Potash.	—	—	17*s.* ,,
Soda Crystals	£18 10*s.*	£11 ,,	£3 12*s.* 6*d.*	£2 15*s.* ,,
Caustic Soda, 70 per cent.	—	—	£12 10*s.*	£8 5*s.* ,,
,, ,, 60 per cent.	—	—	£10 5*s.*	£7 5*s.* ,,
Bleaching Powder	—	£19 per ton.	£5.	£5 17*s.* 6*d.* per ton.
Concentrated Vitriol*	2*d.* per lb.	1½*d.* per lb.	½*d.* per lb., or	£4 per ton.
Muriatic Acid*	2*d.* ,,	1*d.* ,,	5*s.* to 10*s.* per ton.	5*s.* to 10*s.* per ton.
Nitrous Acid*	6½*d.* ,,	—	—	5*d.*
Brown Vitriol	¾*d.* to 1*d.* per lb.	—	£3 per ton.	£2 per ton.

Comparative Prices of Raw Materials.

	Liverpool, 1827—1830.	1839—1840.	Widnes, 1878.	Widnes, 1886.
Sulphur	£5 10*s.*	£11 10*s.* (monopoly).	£6 15*s.*	£5.
Salt	6*s.* to 8*s.*	9*s.*	8*s.* 9*d.*	8*s.*
Limestone	—	4*s.* 6*d.*	5*s.* 6*d.*	4*s.* 6*d.*
Lime	13*s.* 4*d.*	7*s.* 6*d.*	14*s.*	11*s.* 6d.
Nitrate of Soda	—	£16 10*s.*	£14.	£9 10*s.*
Nitrate of Potash.	£30.	—	—	—
Slack	(1831) 6*s.* and 6*s.* 9*d.*	At Liverpool, 1839, 5*s.*; 2*s.* 6*d.* per ton *at Newton*, in 1840.	5*s.*	4*s.* 6*d.*

* Where the acids are sold per lb. the discounts vary according to circumstances.

The cost of the sulphur used has been reduced by the substitution of pyrites, but to-day the price of sulphur itself is the same as in 1830, viz., £5 per ton. For the prices of manufactured goods and of the raw materials at the earlier period, I have taken the prices according to my father's books during the years 1827–1830, when the consumption of black ash had superseded that of kelp, in Liverpool. On referring to the table it will be seen that black ash was sold in 1827 at 10*s.* for 20 per cent., or 6*d.* per degree. In 1828 the price had been reduced to 7*s.* for 20 per cent. In 1830 the first large scales of white ash were made at about £16 10*s.* per ton, but this ash seems to have been only about 35 per cent., and may have been made partly from the mother-liquor of crystals. In 1835 the same price seems to have been paid, but the strength now was 48 to 50 per cent., and from that date forward the strength 48 per cent. was taken as the standard, and the ash sold according to degree at prices varying from 3*d.* to 4*d.*, and this price has been gradually reduced, with fluctuations according to the demand, to 1*d.* per degree. Before the introduction of revolvers and the more modern improvements a price of 1¾*d.* per cent., or £7 per ton, barely covered the cost of production.

In 1852 we have the first estimate of the production of alkali for the United Kingdom, prepared by Mr. Allhusen; and in 1861, according to Messrs. Schunk, Smith and Roscoe, the production in Lancashire was as mentioned below :—

	1852. Manufactured in the United Kingdom.	1852. In Lancashire.	1861. In Lancashire.
Alkali	71,193 tons.	26,343 tons.	93,600 tons.
Soda Crystals . . .	61,044 ,,	3,500 ,,	8,840 ,,
Bicarbonate of Soda	5,726 ,,	1,200 ,,	11,700 ,,
Bleaching Powder .	13,100 ,,	1,250 ,,	8,060 ,,

But all these estimates were very imperfect, and it is not until 1866 that we have a trustworthy record of the trade, which is shown in the following table :—

	Lancashire Branch.	Tyne Branch.	Total.
Soda Crystals . .	24,978	86,000	110,978
Soda Ash and Refined Alkali .	87,314	74,000	161,314
Caustic Soda . .	11,213	3,720	14,933
Bicarbonate of Soda	6,457	11,000	17,457
Sulphate of Soda .	32,137	2,400	34,537
Bleaching Powder	20,006	27,000	47,006
Bleach Liquor .	5,871	—	5,871
Oil of Vitriol (for sale)	18,592	9,000	27,592
Muriatic Acid (for sale)	13,819	700	14,519
Salt decomposed .	194,000	157,000	351,000

In 1877 the Alkali Association commenced their annual statistics, and in the report of 1878 the most notable feature is the large increase in the production of caustic soda and bleaching powder, more especially in Lancashire as compared with the Tyne. In 1861 the manufacture of caustic soda in Lancashire was estimated at 4680 tons, in 1878 the total for the United Kingdom was over 96,000, of which 94,000 tons were made in Lancashire, and this is important in connection the competition from alkali produced by the ammonia process.

Statistics of Alkali Trade, 1878, *as issued by the Alkali Manufacturers' Association.*

	West District, Lancashire, Scotland, etc.	East District. Tyne.	Total Tons.
Salt decomposed . . .	384,958*	183,584	568542*
Alkali equal to 48 p. c. .	120,939	87,053	207,992
Soda Crystals	47,697	123,175	170,872
Caustic equal to 60 p. c.	82,585†	2,027	84,612
Bleaching Powder . .	77,100	27,944	105,044
Bicarbonate of Soda . .	4,703	7,053	11,756
	717,982	430,836	1148818

Although I have been able to give the prices of the raw materials before 1860, it is impossible at the present day to estimate the cost of producing alkali before that date with any approach to accuracy; and as the wages paid and wear and tear and general charges vary in different works, it is useless making comparisons, even at the present time. In 1860, for the purpose of fixing the duties under the French treaty, Mr. Allhusen and I endeavoured to arrive at the cost of production in the two countries, and found a great difference between the cost on the Tyne and in Lancashire; but in order to show the effect of the improvement in the manufacture, and the use of Spanish instead of Irish pyrites has had on the cost of soda-ash, the following comparison of the cost of the raw materials to produce a ton of 48 per cent. ash in Lancashire in 1861 and to-day, after a lapse of twenty-five years, is interesting. For 1861 I have taken Mr. Gossage's figures :—

	1861.		1886.	
1¼ tons Pyrites (Irish)	£1 15 0	13¼cwt. Spanish Pyrites, 14*s.* (Sulphur value)	£0 9 9	
1 cwt. Nitrate of Soda	0 12 0	231b. at 10*s.*	0 2 0	
1¼ tons Salt	0 10 0	25cwt. at 8*s.*	0 10 0	
1½ ,, Limestone ..	0 10 0	26 ,, at 5*s.*	0 6 6	
3½ ,, Fuel	1 1 0	2¾ tons at 4*s.* 6*d.*	0 12 6	
	£4 8 0		£2 0 3	

It is thus seen that, principally by the improvements in the sulphuric acid process, the cost of the raw materials has been reduced over 50 per cent. To this saving must be added the saving in labour by the use of machinery, and the reduction of wear and tear by improved apparatus; but, notwithstanding these improvements, as the cost of production by the ammonia process is very considerably less, the Leblanc alkali maker cannot continue to work at a profit, unless he is able to utilize the chlorine of the salt to a greater extent and more economically than the ammonia-soda maker. As the consumption of alkali in soda-ash is limited, if ammonia-soda works continue to increase, part of the alkali produced by them must be converted into other forms, such as bicarbonate, crystals, and caustic soda; but as the Leblanc alkali maker can causticize his liquors cheaper than the ammonia-soda maker, the tendency will be for the Leblanc maker to manufacture caustic soda in the place of soda-ash.

The problem before the Leblanc maker is a very difficult one, for he not only has to face the competition of the ammonia-soda maker in the price he obtains for his alkali, but if he increases the quantity of bleaching powder made and the consumption remains the same, the price of this product must also fall. A satisfactory position of the trade can only then be

* Of this 16,230 tons were decomposed by the ammonia process, producing a corresponding amount of alkali.

† In addition to this there were made in the Liverpool district about 12,000 tons caustic soda more than returned to the Association.

approached when the bleaching powder and other chlorine products together are the equivalent of the quantity of salt decomposed, and such a price is obtained for the chlorine as will compensate the Leblanc maker for his loss on the alkali produced. I have already pointed out how the manufacturer of alkali was forced to condense the hydrochloric acid produced, and indicated the various modes in which he made use of that acid. By far the larger quantity of the hydrochloric acid produced is used for the manufacture of bleaching powder.

The production of bleaching powder has been stationary for the last five years, since it has been regulated by the manufacturers, and as the stocks are about the same, it is clear the consumption has been stationary also. When we further consider that one ton of bleach can at present be made by the consumption of two-and-a-half tons of salt, and that by improved processes the quantity of salt required will be still further reduced, we must look forward to a still further curtailment of the decomposition of salt by sulphuric acid. It is true, there are other uses for hydrochloric acid than the manufacture of bleaching power, but these do not seem to increase, nor are they likely to do so. As the price of hydrochloric acid is necessarily higher than it was, it may be superseded in some directions by sulphuric acid, which is much lower than formerly. It has been estimated that during the year 1884 hydrochloric acid was utilized for other purposes than the making of bleaching powder to the equivalent of 170,000 tons of salt, leaving 408,874 for the manufacture of bleach ; but as the quantity of bleach produced, owing to the restriction, was only 128,651 tons, it is evident the acid from 87,247 tons of salt was not utilized.

If the consumption of chlorine products bore the same proportion to the consumption of soda products as the chlorine does to the sodium in the salt, the future of the alkali trade would be less gloomy. The peculiar position of the soda industry since the development of the ammonia process is well known to the members of this Society, from the paper read by Mr. W. Weldon before the London Section in 1883, and the address he delivered as President at Newcastle. In the latter he threatened both the Leblanc and the Solvay process with extinction by a third process, which was being worked out by Messrs. Pechiney et Cie., at Salindres. I have not been able to ascertain what progress has been made by Messrs. Pechiney since 1884, nor has any further information been given to the world as to the commercial success of Mr. Mond's and Mr. Solvay's various methods for utilizing the chlorine in combination with the manufacture of alkali by the ammonia process.

The beautiful process of Messrs. Carey, Gaskell and Hunter for obtaining alkali by the decomposition of sulphate of sodium by bicarbonate of ammonia, or substituting salt-cake for salt in the ammonia process, with the consequent utilization of the chlorine, is still in the experimental stage, but since the Newcastle meeting a new process for uniting the Leblanc and ammonia-soda manufactures has been patented by Messrs. Parnell and Simpson, and is about to be worked on a large scale by the Lancashire Alkali and Sulphur Company, Limited.

This process is based on the decomposition of a mixture of solutions of common salt and ammonium sulphide by means of carbonic acid gas, the result of which is that sodium bicarbonate is precipitated as in the ordinary ammonia process, and sulphuretted hydrogen gas evolved, ammonium chloride being left in solution. To recover the ammonium in the form of sulphide, the chloride solution is boiled with Leblanc alkali-waste, when a certain proportion of sulphuretted hydrogen gas is first evolved, and later ammonium sulphide and ammonia, which is condensed in brine for fresh treatment with carbonic acid gas. Since Leblanc alkali-waste is of no value, the advantages of this process over the ordinary ammonia process are—first, an entire saving of the lime used for the recovery of the ammonia in the latter process ; and, secondly, the recovery of the sulphur in the alkali-waste in a form that at all events can be employed for the manufacture of sulphuric acid. It will at once be seen that there are drawbacks to the employment of the dilute carbonic acid obtained from the limekilns in this process, partly on account of the portion of oxygen that the limekiln gas nearly always contains, which would cause an oxidation of a proportion of the ammonium sulphide, and partly from the difficulty of dealing with the dilute sulphuretted hydrogen that would be evolved after the treatment of the brine and ammonium sulphide. The patentees have several alternative plans of meeting this difficulty, but the one which they have decided to work, and for which they are now erecting plant, is the employment of pure carbonic acid gas obtained by heating and decomposing ammonium bicarbonate. The latter is produced in an ordinary Solvay tower by treating in saturated solution of ammonium carbonate with limekiln gas ; the crystals of ammonium bicarbonate are drawn off into a suitable vessel and heated to a temperature of about 160° F., when nearly one equivalent of carbonic acid gas is driven off.

This gas, after cooling, contains only a fraction of a per cent. of ammonia, which is recovered in a wash tower in the usual way. The remaining solution of ammonium carbonate is then cooled, and returned to the towers for fresh treatment with limekiln gas, and thus the ammonia is kept constantly circulated. The carbonic acid thus produced is collected in a gas-holder for use in the ammonium sulphide tower, while the sulphurctted hydrogen evolved from the latter is collected in another gas-holder ; this, in both cases, being necessary in order to have the process under proper control. It may at first appear that this preliminary preparation of pure carbonic acid gas will involve twice as much work in the towers as is the case in the ordinary ammonia process, and that consequently a greater loss of ammonia may be anticipated. The total amount of gas escaping, however, is only increased by the amount of sulphuretted hydrogen produced, or, say, about 25 per cent. of the total volume passed into the towers, so there is no serious ground for apprehension on this score. The ash produced by this process seems to be in no way inferior to that obtained by the ordinary ammonia process.

The process is very interesting both from a scientific and practical point of view, as it combines the Leblanc and ammonia processes, and proposes to recover the sulphur in the alkali waste in a mercantile form, and so extinguish the nuisance from the waste heaps to which I have already alluded. But it has one defect, and that is it will produce a larger quantity of alkali, and this is serious, as there is apparently more produced at present than the market will bear. It is true the alkali made by the Leblanc method will take the form of caustic soda, and that by the decomposition of bicarbonate of ammonia the form of soda ash, but for every 70 tons of caustic soda we shall have an additional 100 tons of alkali.

It is clear therefore that if the process is successful, both the present ammonia soda works and the Leblanc alkali works must still further reduce their output.

I have in the foregoing given a short account of the alkali industry in this neighbourhood, with its allied industries of copper and chlorine products. It has, of course, attracted round it other industries such as the manufacture of glass and soap, but these are now principally in St. Helens, Warrington, and Widnes, whereas in Liverpool, where there were seven or eight soap works in 1827, there are now only two small ones.

At St. Helens, in 1829, the first alkali works was erected, and there were then only five small glass works; now there are eight alkali works, nine large glass works, four of them manufacturing plate glass. Of copper-

smelting works there was only one in 1829 ; to-day there are five and two copper-extracting works, and the population has increased from 14,251 to 61,472 at the last census.

In Widnes the progress has been still greater, as its rise as a manufacturing town dates from about 1848, and it now contains fifteen alkali works, most of them of large size, four copper works, and the large soap works of Messrs. W. Gossage and Sons.

All this is now placed in jeopardy by the advance of chemical industry. Professor Dumas, in addressing the Société d'Encouragement pour l'Industrie, in 1860, at a time when by the Treaty of Commerce with England the French manufacturers were about to be brought into competition with their English rivals, made use of these remarkable words, which contain a great truth :—

"Europe has always accepted our supremacy in the chemical arts. Let us preserve it with care. It is by means of it, and of its unforeseen conquests, that the balance of trade is often overthrown."

France since then has seen her supremacy in this particular direction rudely shaken by Germany, which has made enormous strides in all chemical manufactures.

We in England at that time thought ourselves quite safe from all foreign competition, but we are now also beginning to recognize that by the conquests of science the balance of trade may be altered. The Leblanc may have to succumb to ammonia soda, and under these new conditions foreign countries are becoming less dependent upon us for alkali. If chloride of magnesium is used to replace salt as the raw material for chlorine, this great chemical industry will, of necessity, have its seat in Stassfurt, and not in Lancashire. Mr. Levinstein, in a paper read before the Manchester Section, which has only just come into my hands, quotes from a speech by Professor Bayer (the discoverer of artificial indigo), in which the learned professor points out how Germany has succeeded by means of her intellectual achievements in wresting from France and England, countries superior in natural resources, a source of national wealth in the colour industry, and he seems to think that the English alkali manufacturers have contributed to this by asking too high a price for their products.

He seems to be of opinion that we in England are at the present moment unable to compete with the Germans in our own country, because for special reasons the prices of sulphuric acid and soda ash are dearer in England than in Germany. I have not had time to verify his statements so far as the price of alkali in Germany is concerned, but the fact that the German manufacturers sent a small parcel of caustic soda to England, and that ammonia soda of German make is offered in London at £5 10s. per ton, proves nothing. I have no doubt the Leblanc makers themselves would sell 58 per cent. soda ash in London at £5 10s. per ton, if they could not dispose of their alkali to better advantage in the shape of caustic soda, and it is well known that Messrs. Brunner, Mond and Co. are prepared to meet any competition of the German alkali manufacturers either in this country or abroad.

But Mr. Levinstein's second and more serious complaint refers to sulphuric acid. I think he rather exaggerates the advantages we possess in the price of the raw materials, pyrites and nitrate of soda, since freights to Antwerp are as low as to our own ports, and the internal carriage throughout Germany, whether by canal or railway, is very reasonable. Although German labour in this department is lower than in England, I think any of our large alkali manufacturers are able to make sulphuric acid as cheaply as his German rival, and if it pays the German manufacturer to deliver acid of 66 Beaumé at £3 per ton, it can only be because the cost of delivering from the Griesheim works to Frankfort is less than from the English works to the place where the acid is consumed. The question of transportation is a very serious one. and English manufacturers are undoubtedly heavily handicapped by the difficulties put in their way by the railway companies.

If the quantities of sulphuric and hydrochloric acids consumed in one German colour works are correctly given by Mr. Levinstein, the English alkali manufacturer will pray that several of these works may be erected in England and so relieve the Leblanc makers of their acids.

As to the remedy, I quite agree with Mr. Levinstein, it is not the theoretical chemist, but the chemical engineer that fails us.

The records of the progress of the alkali manufacture show that most of the processes now used are old, and that it is in the apparatus employed that the greatest improvements have been made ; but while a few of our manufacturers have shown that they fully recognise this, it is very difficult to find a manager who has a knowledge of engineering combined with a knowledge of chemistry. Such men must be educated, and it is only now, after the Germans and French have shown the way for forty years, that we are beginning to follow in the path.

This laboratory, in which we are met, is but a sign of the movement that is in progress, and our Chair of Engineering in Liverpool has only been founded one year, but I look forward to the not distant day when by means of improved secondary education, and the work of institutions like Owens College, and University College, Liverpool, our manufacturers will be able to find men ready to carry on, with even greater success than in the past, a large portion of the great chemical industry of the world.

At the conclusion, Sir Henry Roscoe moved that the hearty thanks of the Society be given to the President for his valuable address. He said it was a subject for congratulation that one bearing the name of Muspratt should have presided on that occasion, as that name was intimately connected with the birth, rise, and progress of one of the greatest of the chemical industries in England. He also took the opportunity of expressing the sincere sympathy of the Society with the family in respect to the death of Mr. James Muspratt, who was the originator of that great industry.

The motion was seconded by Mr. David Howard and carried by acclamation.

Mr. Stanford then moved that the Society should meet next year in Glasgow, and assured the members that they would receive there a warm welcome.

Mr. Tyrer seconded the motion, which was adopted unanimously.

Votes of thanks were then passed to Mr. E. K. Muspratt for his services as President during the past year, to Mr. R. Weldon for the presentation of the books that had belonged to his father, and to the Council and Senate of the University College for the use of the lecture theatre.

The alterations in the bye-laws recommended by the Council, including the raising of the subscription from £1 1*s.* to £1 5*s.*, were then moved *en bloc*, and adopted without discussion.

It only remained to wait for the report of the scrutineers, by whom it was announced that Mr. David Howard had been elected as President for the ensuing year.

In the afternoon a number of the members visited the Exhibition now open in Liverpool; others inspected the sugar works of Messrs. Crosfield, Barrow and Co., or the new laboratories at University College.

The Annual Dinner.

The Annual Dinner took place on Wednesday evening at the Adelphi Hotel. The chair was taken by Mr E. K. Muspratt. The attendance was hardly so large as on some previous similar occasions.

The usual loyal toast having been honoured,

Sir Henry Roscoe, M.P., F.R.S., proposed "The City

and Trade of Liverpool," coupling with it the name of Sir James Picton. Incidentally he mentioned that it has been decided to hold an exhibition in Manchester, in which the illustration of the chemical industries will constitute a chief feature.

In replying, Sir James Picton referred to the connection of the Roscoes with Liverpool, and said that the family showed no signs of falling off in the third generation. He defined the science of chemistry as the application of certain forces of nature to the modification of natural substances for the benefit of mankind. As an outsider he thought that, much as chemists had done, they were still open to reproach in regard to the state of affairs in the neighbourhood of some of their works; for, although he had been informed that in some cases Widnes and St. Helens were regarded as sanatoria, and patients were occasionally taken there to inhale the atmosphere, people did not take their families there as they took them to Buxton. Cologne, too, with its three hundred stinks, was the home of the manufacture of the queen of perfumes. The story of chemical discovery was far from being yet told, and the man who could reduce the metal aluminium from the abundant clay at a low cost would deserve a good reward.

In proposing the toast of the "Guests," which was responded to by Dr. Hill, mayor of Bootle, Dr. Campbell Brown said that on one occasion he had been asked to prepare some Widnes gas for administration to a person who was ill.

The President next gave the toast of the evening, "The Society of Chemical Industry." He said the fact that it now numbered 2000 members showed that it filled a void in the world of societies which had sprung up during the present century. As Sir Lyon Playfair said in his address to the British Association, the competition of nations now was a competition of knowledge and of science, and it was only by the possession of these, in an equal if not superior degree, that we could expect to hold our own with the other industrial nations of the world. By the application of science, and particularly of the science of chemistry, we had seen in those parts of Russia only lately conquered from the Turks a wonderful extension of trade and commerce. The port of Batoum, where there was an enormous trade in petroleum, was an instance of how the application of science was gradually altering the balance of trade; and there were many other instances of it. The application of petroleum instead of coals as a motive power in vessels would certainly effect a remarkable change in the commerce of the world. In coupling with the toast the name of Mr. David Howard, the President-Elect, he alluded to the fact that Mr. Howard was a member of a firm established so far back as the year 1789, or about thirty years after the birth of modern chemistry in the discovery of oxygen.

Mr. Howard, in responding to the toast, said he thought the Germans were our most dangerous rivals in chemical science; but he did not think we need fear them if we devoted patient unceasing work and indomitable courage to the development of chemical science and chemical industry combined. The rivalry must, however, be a friendly one, for how could they be at enmity with a people from whom they had learned so much. He himself had received his chemical training from Professor Hofmann in the glorious old cockpit of the College of Chemistry. Undoubtedly, the study of pure science was much more attractive than the development of applied science. Pure science was the Pegasus that soared aloft, but we were bound to put him to the plough, and though he might not like it, we should find that he would be an invaluable animal for the most homely and useful work. Pure science could tell us what was the composition of the stars, but it could also tell us what to do with our sewage. So if only we were content to take the teachings of pure science, and put to them all that hard work which used to characterise Englishmen—and he did not think it would be found that the race had degenerated—he thought we should find that there was a future of great prosperity for our commercial industry, even greater than it had enjoyed in the past.

The other toasts were "The Health of the President," proposed by Mr. Tyrer, and "The Officers of the Society," proposed by Mr. Stanford.

The Excursions and Conversazione.

On Thursday morning a number of the members embarked at the Princes' Landing Stage on a special saloon steamer for a trip on the river Mersey. Visits were made to some American steamers and the ship-building yard of Messrs. Laird Brothers, and opportunities were given to inspect the docks and warehouses and the new grain stores and elevator. Lunch was provided on board and the arrangements gave great satisfaction.

On Thursday evening there was a Reception by the President and a Conversazione at the Walker Art Gallery, the whole of the rooms being thrown open. Some excellent instrumental music and singing were provided, and the company numbered about 400.

On Friday there were to be alternative excursions to Widnes and Runcorn and to St. Helens, to inspect some of the works carrying on the industries characteristic of the neighbourhood.

Provincial Transactions.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

At the annual business meeting held in April the Committee were requested to consider the desirability of having botanical excursions of the Association during the summer months, and the first of these took place on the morning of Thursday, July 8.

Most of those who formed the company had to be back to business at the usual hour, and consequently only a limited time could be devoted to the object in view. Fully an hour was spent in a pleasant and most profitable examination of the flora in and around Craig Crook Quarry, a comparatively rich botanical station within a few miles of the city. Each member of the company secured a considerable number of interesting specimens, and the beautiful weather and picturesque scenery combined to make the Association's first lesson in practical field botany one which will not be readily forgotten by any who were fortunate enough to be present.

A visit was paid first to a pool of stagnant water, and here a number of aquatic plants were secured, among others being *Veronica Beccabunga*, *Iris Pseudacorus*, *Mentha aquatica*, *Equisetum palustre*, *Stratiotes aloides*, *Potamogeton natans*, *Lemna minor*, *Lemna trisulca*, *Sparganium simplex*, *Alisma Plantago*, *Alisma ranunculoides*, etc. A visit was then made to the quarry. On a small piece of mossy ground fine specimens of *Lychnis Flos-cuculi* and *Orchis mascula* were gathered. In the quarry itself *Digitalis purpurea*, *Scrophularia nodosa*, *Myosotis palustris*, *Fragaria vesca*, *Lychnis diurna*, *Mercurialis perennis*, *Arctium Lappa*, *Silene Cucubalus*, *Lotus corniculatus*, and *Hieracium alpinum* were gathered. An interesting abnormal development in *Matricaria inodora* was found. The bracts forming the involucre appeared to be transformed into true leaves, and a circle of unexpanded capitula surrounded the capitulum. A similar monstrosity is sometimes found in the ordinary daisy and

is commonly designated "hen and chickens." *Matricaria inodora* seems to be somewhat prone to deviate from the normal structure. At the Association's annual conversazione a most remarkable instance of fasciated inflorescence in this plant was exhibited, and such instances appear to be comparatively common.

The excursion was evidently thoroughly enjoyed by all. The circumstance which seemed to have most generally impressed itself on the members who took the trouble to attend was the astonishing amount of good practical botanical work which could be accomplished even during a time so restricted as that at the disposal of the vast majority of chemists' assistants and apprentices. The attendance was not large, but it is confidently expected that the next excursion will be much more largely taken advantage of. The idea was first suggested by Mr. Thomas Stephenson, whose practical knowledge of the flora of Edinburgh and the surrounding district is freely placed at the service of the Association.

It is proposed to form a herbarium of local plants for the use of members of the Association, so that those who are so situated as to be unable to join in field work may derive benefit from the labours of their more fortunate fellow members.

Obituary.

Notice has been received of the death of the following :—

On the 16th of June, Mr. Daniel Pattinson, Chemist and Druggist, Whitehaven. Aged 36 years.

On the 26th of June, Mr. Peter Slater McIntyre, Pharmaceutical Chemist, Tweedmouth. Aged 66 years. Mr. McIntyre had been a Member of the Pharmaceutical Society since 1863.

On the 29th of June, Mr. David Jones, Pharmaceutical Chemist, Clynderwen. Aged 53 years. Mr. Jones had been a Member of the Pharmaceutical Society since 1853.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

"North British Branch."

Sir,—If I cannot with Mr. Gladstone claim to be a Scotchman, or to be of Scotch descent, it may be that my dozen years of residence so near the canny country has made me half a Scot, and will excuse me for taking up the cudgels in support of half their claim. I do not see the objections which have been advanced to the title "North British Branch," and for this reason: the Society (not the local pharmacists) possesses premises in Edinburgh where a portion of its most important legal work is transacted, viz., the conduct of the examinations. This surely makes the premises and the executive in Edinburgh a "Branch" in a sense far different from that which is ever likely to be established in merely provincial towns, however large. But the same reason which would make me adhere to the title "North British Branch" would make me strike out the titles president and vice-president as tending to confusion. There is a President of the Pharmaceutical Society of Great Britain, and it appears to me most undesirable (even if it were not irregular) that anyone else in connection with the Society should be called by the same title. If the Council in Edinburgh were merely the executive of a purely local association there could not, I fancy, be an objection to its chairman being styled the President of the "Edinburgh" or "Scotch Pharmaceutical Association" or any other name they liked, which implied it was local only; but the fact that they have a branch establishment of the parent Society in their midst, in which important functions of the Society are performed, whilst it confers on them greater honour and distinction than upon others, debars them at once from the assumption of titles which rightly belong to other important executive officers of the Society. I hope our neighbours, and I trust I may write our friends, across the border will see the matter in this light, and concede that they cannot, without a loss of that dignity with which Scotchmen are justly credited, persist in the use of titles which can be rightly borne only by others.

Newcastle-upon-Tyne. N. H. Martin.

Ichthyol.

Sir,—In the Journal of July 3 there is a short article on "Ichthyol."

At the commencement of this year I was asked to make some experiment with this substance in order to ascertain the best mode of application and also to try and disguise the odour. To attain this latter object I tried several of the essential oils; the one that appeared to answer best was oleum lavandulæ, six drops of this being sufficient to disguise the odour of a drachm of ichthyol.

I found, as mentioned in the Journal, that it is miscible with water, glycerine and vaseline in all proportions; oil of turpentine also mixes with it fairly well at first, but after standing some time the mixture separates into two strata, the lower one having an oily appearance and the colour of ichthyol; these mix again on agitation.

Taking a drachm of ichthyol, about fifty minims of spirit will mix with it, but if more than that quantity of spirit is used, it coagulates.

The following form was used to make a plaster: Ichthyol four parts, lead and resin, plaster of each, two parts; but the preparation mostly used here was an ointment containing equal parts of vaseline and ichthyol.

Edward A. Andrews.

North West London Hospital.

Prosecutions of Offenders.

Sir,—The case of the Pharmaceutical Society *v.* W. E. Pratt, Nottingham, is one which should elicit satisfaction from every member and associate of that illustrious Society, for it proves not only that we may expect, but that we have protection against all who would infringe our rights by appropriating the name of Chemist or Druggist without having satisfied our Society's Examiners either as to qualification or any competence whatever to deal in drugs.

No wonder chemists feel aggrieved when, after years of hard and persistent study, they succeed in passing the now stringent examinations, only to see a fac-simile of their own shop, with these words over the door of an unqualified man, viz., "Druggist, Patent Medicine Vendor," etc., and a notification to the effect that prescriptions are prepared, pharmaceutical preparations retailed, and in fact, that everything comprised in a chemist's business (short of the most deadly poisons) may be obtained with the greatest facility, and not unfrequently with the suggestion that they are cheaper than when obtained from a *bonâ fide* chemist and druggist.

Actions similar to that taken by the Pharmaceutical Society at Nottingham prove that it has our best interests at heart, will protect our legal rights, and is therefore worthy of our united support.

Stockbrook Street, Derby. An Associate.

J. A. Wheldon.—Diplolaxis tenuifolia.

Student.—Send a specimen in fruit.

T. F. Walker.—(1) *Epilobium obscurum.* (2) *Veronica Chamædrys.* (3) *Galium cruciatum.* (4) *Spiræa Ulmaria.* (5) *Geum urbanum.* (6) *Cerastium triviale.* (7) *Lapsana communis.* (8) *Galium verum.* (9) *Geranium Robertianum.*

Laurus (who should have sent his name and address).—Bay rum is made by distilling rum from the fresh leaves and berries of *Myrcia acris* (bayberry tree). See a paper by Mr. Riise in *Pharm. Journal*, July 8, 1882, p. 39.

Communications, Letters, etc., have been received from Messrs. Robinson, Langton, Barfoot, Zimmerman, Marsden, Preuss, Davis.

THE OPTICAL METHOD OF ANALYSIS FOR QUININE SULPHATE.

BY DAVID HOOPER, F.C.S.

The estimation of quinine by means of the polariscope has been discussed both favourably and adversely by some prominent chemists familiar with bark analysis. Although it has been regarded as an expeditious and accurate method by some who uphold its use, it seems to be unsatisfactory in indicating large quantities of an alleged impurity (cinchonidine) in commercial samples of sulphate of quinine which have had the reputation of being almost absolutely pure. The publication of these unexpected disclosures was made in the *Nieuw Tidschrift voor de Pharmacie in Nederland*, as stated in this Journal for March 13, 1886, and it was remarked at the time that it might be expected to lead to further inquiry into the value of the method of analysis by which the results were arrived at.

It is with the intention of elucidating some points in this subject, that I am anxious to contribute my experience as to the working of the optical method; having had numerous opportunities extending over a period of two years. Dr. A. C. Oudemans was the first to experiment in this direction; by determining the specific rotatory power of the cinchona alkaloids and their salts, he was able to arrive at formulæ by which the amount of them could be determined in mixtures of them. Dr. O. Hesse has proposed an assay of quinine based on the use of the anhydrous sulphate, and its rotatory power. Dr. W. F. Koppeschaar has brought a mass of evidence together to advocate the plan of polarizing the double tartrates of quinine and cinchonidine. Mr. R. H. Davies has found the optical process very useful in determining the effect of recrystallization upon certain samples of sulphate of quinine. While Dr. de Vrij has, from the very first, used the polariscope in his quinological researches, and given it so much publicity in his interesting "studies," that he has thoroughly identified himself with the process. All these gentlemen have given their testimony more or less in its favour, and they show that some reliance may be placed on the analysis of quinine sulphate by polarizing.

As to the salt employed in optical experiments, I am greatly in favour of the tartrate rather than the sulphate. The efflorescent character of sulphate of quinine and the varying amount of water of crystallization are fatal objections to its use. From 5 to 18 per cent. of water has been found in ordinary samples. Left in an open vessel the salt is constantly changing weight according to the conditions of the atmosphere. I have found that on taking samples from the same bottle on two different occasions in the monsoon, the water had increased from 13 to 15 per cent. Dr. Hesse in his assay uses the absolutely dry salt; to obtain this is an operation which must be undertaken with great precautions, as moisture is absorbed so readily. From this cause, it is possible to introduce into the experiment at this early stage an error which no amount of accuracy in the after proceedings could rectify. If the weight is not certain at the commencement, then the mean of any number of readings of the polariscope will be worthless. The tartrates, on the other hand, are more constant in the proportion of combined water. They lose their hygroscopic moisture at 30° to 40° C., and do not increase or diminish in weight in climatic changes. I have frequently proved this by placing weighed amounts under cover for twelve to twenty hours, when it was found that the alteration, if any, was insignificant.

I will now draw attention to the intrinsic value of the optical method in estimating sulphate of quinine, and will notice a simple experiment by which it may be made to prove its own accuracy. I will grant that a careful analysis made by polarizing the tartrates from a certain sample of the sulphate and subsequent calculations give results which stand in need of confirmation. Another sample may be taken, and keeping the optical method in view, let it be divided into two parts by the agency of water. Dr. Paul's modification of Kerner's test is well adapted for this purpose. The sample is heated with a quantity of water insufficient to dissolve it; it is then left to cool and filtered. By this fractional crystallization two parts are obtained: the original sulphate, if containing any cinchonidine, will leave on the filter a purer salt, while the mother liquor will be a saturated solution of quinine sulphate. The recrystallized quinine is dried, weighed and converted into tartrate. The mother liquor is slightly concentrated, and also treated with alkaline tartrate. These two tartrates when dried are polarized, and it will be observed that the former salt invariably gives a higher rotation than the latter, affording evidence of the actual state of affairs brought about by recrystallizing. On adding together the amounts of quinine sulphate and cinchonidine sulphate determined in each fraction, they will be found to correspond with the quantities of these two salts found by polarizing the tartrates obtained from the original sample.

I have employed the above method in testing three sample of sulphate of quinine which differed considerably in their composition and purity.

The first sample had been manufactured experimentally in this country, and the presence in it of cinchonidine was so marked, that it was detected with ease by the ether method of the Pharmacopœia of 1867. It yielded 93·22 per cent. of tartrates, which gave the molecular rotation $[\alpha]_D = -180°·0$; by calculating the double tartrate into the respective sulphates, it was found that 67·79 parts of sulphate of quinine, and 40·77 parts of sulphate of cinchonidine made 108·56 parts total; therefore the sample under examination was composed as follows:—

Sulphate of quinine	62·45
„ „ cinchonidine	37·55
	100·00

Four grams of the original sample were fractionated by means of boiling water. The recrystallized salt when converted into tartrates gave the rotation $[\alpha]_D = -191°·66$ and this worked out by Oudemans formula showed that it consisted of—

	grams.	per cent.
Sulphate of quinine	2·32	72·73
„ „ cinchonidine . .	·87	27·27

The tartrates from the mother liquor rotated $[\alpha]_D = -150°·0$, which is equivalent to the following proportions:—

	grams.	per cent.
Sulphate of quinine	·17	20·98
„ „ cinchonidine . .	·64	79·02

These figures resulting from the examination of four grams of the sample, it is only necessary to add together the respective sulphates and division will reveal the following percentage composition:—

Sulphate of quinine	62·25
„ „ cinchonidine	37·75
	100·00

The second sample was a well-prepared article of good appearance, from the manufactory of a well-known continental firm. It yielded 92·03 per cent. of tartrates which had the specific rotatory power $[\alpha]_D = -205°·88$ and calculation indicated the following composition :—

Sulphate of quinine	88·52
„ „ cinchonidine	11·48
	100·00

On conducting the second part of the experiment by fractional crystallization, 86 per cent. of dried sulphate of quinine was recovered by filtration. The rotation of the tartrate precipitate was $[\alpha]_D = -208°.22$, which shows by the usual calculations—

	grams.	per cent.
Sulphate of quinine	3·14	91·22
„ „ cinchonidine	·30	8·78

The tartrates from the filtrate when dried gave the angle of rotation $[\alpha]_D = -194°·0$, showing by calculation—

	grams.	per cent.
Sulphate of quinine	·41	73·21
„ „ cinchonidine	·15	26·79

The separate sulphates added together, and knowing that they are obtained from 4 grams, it will be seen that the sample examined was composed of—

Sulphate of quinine	88·75
„ „ cinchonidine	11·25

The third sample was of English manufacture. It was a good commercial article as it answered the test of the present Pharmacopœia for containing less than 5 per cent. sulphate of cinchonidine. It yielded 94·59 per cent. of tartrates polarizing $[\alpha]_D = -213°·33$; and calculating as before —

Sulphate of quinine	97·11
„ „ cinchonidine	2·89

The amount of sulphates recovered after recrystallization was larger than the previous samples ; this, I take it, is a confirmatory indication of its purity. When the crop of crystals had been dried and converted into tartrates it was found that the rotatory power so approximated that of Oudemans' constant for pure sulphate of quinine, that when calculated it showed only 0·25 per cent. cinchonidine sulphate, the remainder of this salt was therefore contained in the filtered solution. I did not take the tartrates from this solution. They were in such small quantity as would not afford a reliable estimation, and no more of the original sample was at hand. These experiments tend to illustrate the fact that has been noticed by recent writers, that very few recrystallizations are sufficient to obtain an absolutely pure sulphate of quinine.

The above-mentioned experiments have been made upon commercial salts, but a great deal could be said with equal satisfaction regarding the examination of the tartrates derived from mixed alkaloids in bark analysis. In this manner I have found that there is a relation between the amounts of the lævorotatory alkaloids in distinct species of *Cinchona*. For instance, there is twice the quantity of quinine than cinchonidine in natural bark of *C. officinalis*, while in the natural bark of *C. succirubra*, this order is reversed, and double the amount of cinchonidine exists to every one part of quinine.

Of course a great deal more could be said on this subject, but I only wished to draw attention to the physical method of analysis. I have shown that the examination of the fractions corresponds and substantiates the examination of the whole, and when the results turn out in entire accord with one another, it shows that the method of working is proved with the exactitude of demonstration of a proposition in Euclid.

It must be remembered that these operations have been conducted at a tropical hill station. where temperature, altitude, latitude and other climatic influences are diverse from those of the countries where previous communications have originated. There are numerous processes often applicable to a single object, such as the estimation of quinine, and in a place where some of these processes are not practicable it is as well to keep to a method which gives satisfaction to those who are in the habit of using it.

Ootacamund, India.

SPECIFIC GRAVITY OF CRYSTALLINE STRYCHNINE.

BY THOS. P. BLUNT, M.A., F.C.S.

A case of criminal poisoning by strychnine occurred recently, in which the crystals were coarsely powdered and put into porter. At the inquiry before the magistrates, a question was asked of the writer whether the poison would sink quickly in a malt liquor, or would be likely to remain suspended for some time. This of course could only be settled by a knowledge of its specific gravity, and upon this point no information could be found in such text-books as were at hand. The gravity was therefore taken in the following manner :—A solution of subacetate of lead was prepared, of such strength that a crystal of strychnine was suspended indifferently in any part of the fluid ; the specific gravity of the liquid was found to be 1·13, which was therefore that of the crystal. The experiment was somewhat roughly and hastily made, with a sole view to the forthcoming trial, but the result is sufficiently accurate for practical purposes, and it seems worth while to place it on record.

SALICYLIC AND BORIC ACIDS, AND THE DEVELOPMENT OF GERMS OF FUNGI IN SOLUTIONS OF ALKALOIDS.*

BY R. G. ECCLES, M.D.

While uncombined salicylic acid checks the development of all forms of micro-organisms in quite small proportions, its salts possess but little antiseptic power. For this reason a saturated solution might be efficient with alkaloidal salts and fail utterly with the alkaloids themselves. Even if a sulphate or muriate becomes a salicylate of the alkaloid the released radicals, as acids, become themselves good germ inhibitors and continue to protect the solution from infection. Sulphuric and muriatic acids stand quite high on the list of germicides. As it is rare to have pure active principles ordered, and as some of the most important are almost insoluble in water, there can be but little need of treating them antiseptically. Their salts alone require careful consideration in this connection, and they, without doubt, can be fully and indefinitely protected by a saturated solution of salicylic acid. One part in 2500 kept unchanged during three months of the warmest weather we had last summer, solutions of the muriates of cocaine, morphine and pilocarpine, and the sulphates of eserine and morphine. It took 1 in 2000 to protect strychnia acetate, strychnia sulphate and atropia sulphate. Being soluble in 600 parts of cold water, a saturated solution is about three times

* Read at the meeting of the New York State Pharmaceutical Association. From *The Druggists' Circular*, July.

stronger than required except in special cases. Neither proportion, however, will kill germs. Last September some specimens were mounted as microscope slides in solutions of 1 part in 100. For three weeks the sporidia that had not been discharged from the joints kept moving around and tumbling about in a quite lively fashion. The fact, therefore, that their development and propagation is inhibited does not prove that they are absent or dead. Here a solution of twenty times the strength needed to keep them down failed to destroy their lives. Should a solution protected by salicylic acid become neutral the chances are that their growth would begin again. As to its efficiency in checking the development of the thallophytes there can be no room for doubt, but when we come to consider the expediency of using it indiscriminately for this purpose a question of grave importance is placed before us.

In collyria its irritant qualities are so marked that it would be well nigh intolerable in a large number of diseases of the eye. Wherever tried it has been rejected. Administered internally its depressing effects upon the cardiac muscles would certainly be contra-indicated with eserine, digitaline, or any other agent used to give power to a lagging heart. If hyoscyamine was administered to dry up secretions the physician certainly would not want his solution to contain salicylic acid to increase their flow. If pilocarpine is administered to save the overworked kidneys of a patient with Bright's disease it could not be considered wise to give with it a substance which common experience has taught every medical man makes matters worse invariably. In Ringer's 'Therapeutics,' p. 587, can be found the following pointed words:—"Dr. Weber has seen the acid [salicylic] cause acute nephritis, with bloody albuminous urine containing casts, this effect following three moderate doses and lasting sixty hours after the last dose. Other observers refer to similar effects with the acid, in some cases the urine being almost suppressed."

This would likewise preclude its use in connection with eserine and morphine salts, both of which are likely to be prescribed in nephritis. In all wasting diseases of a chronic character like that of tuberculosis or diabetes the whole range of alkaloids may be called into play to answer the changing phases of the malady. It is in such cases that preparations of malt, pepsine, pancreatine, or other organic ferments are likely to be given with or without cod liver oil. Under such treatment to give salicylic acid even in very minute doses would be a serious blunder. Suppose duboisia, picrotoxin or other alkaloid or glucoside containing in its solution this acid is administered to check night sweats and a ferment is given at the same time, the latter is rendered totally worthless. One part of salicylic acid reduces 5000 parts of diastase to perfect inactivity. With pancreatine it acts still worse. One part inhibits 9000 parts of this ferment (Brunton's 'Pharmacology,' p. 86). How much cod liver oil, fat or starchy food would the patient be likely to assimilate under such treatment? Yet here morphine and atropine may be given for pain, strychnine and quinine as tonics, and aconitine and digitaline for hyperpyrexia. If these are put in a saturated solution of the acid the patient is likely to fare badly. In diabetes homœopathists might on *à priori* grounds claim for it curative qualities since it increases the excretion of glucose in healthy people, but experience seems to show that it injures instead of benefiting such patients.

All antiseptics are contra-indicated to some extent, so that to choose between them is but to select one from a number of evils. To discover the one having the balance of good features in its favour should be the first consideration before us. All investigators are agreed that where it is practical, sterilization by heat surpasses every other method. Such solutions of alkaloids or their salts as will not decompose by a boiling heat can be protected indefinitely by corking them when at a temperature of 212° F. Those that remain uninjured up to 140° F. can be made to keep for years unchanged if heated to that point and maintained there for one or two hours, or else treated to that temperature four or five successive times within twelve hours, and being in the interval shielded from further infection. All others must have some chemical antiseptic introduced or be kept constantly below 60° F. In fact this last plan would probably supersede all others if every pharmacy had a properly shelved ice closet. Butchers have had to adopt such a device to save their meats. Pharmacists may yet find that it will pay to imitate them in a small way and protect their mucilage of acacia, syrup of acacia, syrup of althæa, syrups of the hypophosphites, solutions of alkaloids, aromatic waters, ammonia, sweet spirit of nitre, solutions of organic acids, dilute phosphoric acid, etc. When medical men and the general public become as good judges of spoiled remedies as they are of spoiled meat, the same plan as that of the butcher must be adopted. Our present methods will be intolerable and barbarous in their eyes. Almost every family has a supply of ice in summer, so that after being dispensed it would be easy to have the medicine kept fresh by advising them to put the bottle in a cold place. "All this means extra work and care to the already overburdened pharmacist" someone says. Exactly. The more special knowledge and special care required of you, the further you are removed from mere tradesmen and the better your reasons for demanding higher prices to compensate. As alkaloids come more into use the greater will be the necessity of caring properly for their solutions. That the time is not far distant when many of them will supersede the tinctures and extracts they represent is quite probable. Such seems to be the tendency of therapeutics. It is not at all certain that this tendency is not retarded by our inability to properly protect them. How many adverse criticisms of cocaine, pilocarpine, eserine, digitalin, etc., are due to the doctor having used solutions containing bacteria, and other thallophytes? No one is prepared to answer this question positively, but many little facts well known to those who have made the subject a study seem to point this way.

If a choice must be made between chemical antiseptics there is no reason why we should confine ourselves exclusively to either salicylic or boric acid. As the query which suggested this paper only refers to these it would seem to imply that no others are available. Fashion sways here as in dress. No lady likes to appear in a bonnet not in full fashion for fear of seeming eccentric. These two acids are now "all the rage," and whoever advocates anything else is considered cranky. Benzoic acid, hydronaphthol, mercuric chloride, and many non-irritating substances have been successfully used in surgical practice and are available in pharmacy as well. As between salicylic and boric acids the latter is now considered the best in collyria. It is much more soothing, notwithstanding the fact that it requires nearly forty times the amount to do the same work. All who have tried the two upon the conjunctiva never hesitate in giving the preference to boric acid. Dr. Squibb now prefers it to everything else, and thinks that a better article for the purpose is unnecessary. Certainly its almost negative medical properties would seem to commend it here. It is soothing to inflamed tissues and is not likely to be physiologically contra-indicated in many cases. The writer's choice, however, after a trial of many kinds, is benzoic acid. Applied to the eyes in solution of more than double the strength necessary to protect it does not produce the least irritation. One grain has about the same antiseptic power as a drachm of boric acid. In fruit juices the flavour is not in the least impaired by it, and in alkaloidal solutions no nauseous taste is superimposed on that of the active ingredient. Like all others, it is sometimes contra-indicated, but less frequently than salicylic acid and no oftener than boric. It is excreted as hippuric acid, a normal constituent of urine, thus indicating that it adds force to the body. Salicylic acid steals force away by being excreted as salicyluric acid, a combination of itself and glycol.

ADULTERATION OF OLIVE OIL.

A recent number of the trade report of E. Dieterich, of Helfenberg, gives an account of a comprehensive series of experiments made with the object of obtaining satisfactory tests for the presence of different adulterants of olive oil, which is used largely in his establishment in the manufacture of plasters. In the first place some of the methods that have been published in the journals were thoroughly tried with the following results:—

Equal volumes of oil and nitric acid of sp. gr. 1·400 shaken together are said to assume, if cotton-seed oil be present, a more or less brown colour. This was confirmed, the test allowing the detection of an addition of ten per cent.

The presence of sesame oil has been stated to be recognizable by shaking together equal volumes of oil and hydrochloric acid, sp. gr. 1·190, in the latter of which some fragments of cane sugar have been dissolved, the sophistication being indicated by a reddening of the acid layer. It was found that the coloration of the acid also takes place with pure olive oil after about three-quarters of an hour; on the other hand, upon the addition of sesame oil, a rose-coloured zone is formed very quickly, even during the separation of the two layers. If this be not very distinct, a control experiment with pure oil placed by the side of it for better comparison gives only a very conditional indication.

The statements as to the melting and solidification points of the fat acids of the different oils vary very much; according to Bach, those of cotton-seed oil are 38° and 35° C., and according to Hübl 30·5° and 27·5° C. In order to form a judgment upon this point, the fat acids of olive oil and of the other oils used as adulterants were experimented with, as well as those of mixtures containing 25 per cent. of the foreign oils. The precaution was adopted, before taking the melting and solidifying points, to allow the fat acids to solidify during at least twenty-four hours at 15° C.; the melting point was taken when the fat acids had melted quite clear and the solidifying point when the mass began to show turbidity. In all cases care was taken to raise the temperature as slowly as possible. The following were the results obtained:—

A.—Pure Oils.

	Melting Point.	Solidifying Points.
Ol. Oliv. prov. No. 00 Ol. Oliv. prov. No. 0 Ol. Oliv. comm. flav.	26·5° to 28·5° Average of 19 samples	23·5° to 24·6°
Ol. Arachis	33·5°	31°
Ol. Arachis (so-called Crown Oil, water white)	31.5°	29°
Ol. Arachis (so-called Crown Oil, yellow)	32°	29·5°
Ol. Gossypii	38·5°	36°
Ol. Helianthi	23°	18°
Ol. Sesami	31·5°	28·5°
Ol. Lini. Ol. Raparum Ol. Ricini	still fluid at 13°	

B.—Mixtures of Olive Oil

With	Melting Point.	Solidifying Point.
25 per cent. of Ol. Arachis.	29°	26°
25 per cent. of Ol. Gossypii	30°	27·3°
25 per cent. of Ol. Helianthi	25°	20·5
25 per cent. of Ol. Sesami	28°	25°
25 per cent. of Ol. Lini	24·5°	19·5°
25 per cent. of Ol. Raparum	23°	19°

It appears, therefore, that additions of 25 per cent. cannot be detected with great certainty, whilst lower percentages cannot be recognized. The determinations would, consequently, have value at most only as additional evidence in doubtful cases; but they would even then be superfluous, since with a high percentage of adulteration there is scarcely any doubt.

Attempts to base a method of examination upon the elaidin formed through the treatment of the oil with nitric acid and copper filings failed entirely, both because the differences between the elaidin obtained from pure oil and from mixtures were too small, and because the elaidin prepared from one and the same oil had not always the same character. The saponifying power of the oil before and after the formation of elaidin was also taken as a starting point, but equally without result.

Considerable attention was paid also to the iodine addition method, published by Hübl. This is based upon the assumption that almost all fats contain acids of the acetic, acrylic and tetrolic acid series, and that the quantity of these acids in any particular fat is a definite one, and is different in different fats. These three groups of fat acids show a very characteristic distinction in their behaviour towards the halogens, the first series under ordinary conditions remaining indifferent, whilst the second series readily take up two, and the third four atoms of halogen. The quantity of added halogen will therefore vary with the composition of the fat, and constant figures will be obtained which will be dependent upon the kind and relative quantities of the unsaturated acids, and consequently standing in intimate relation with the constitution of the respective fats. The problem, therefore, is to effect the addition of the halogen under conditions that will exclude substitution, and then to estimate with certainty the amount of added halogen.

Iodine is more suitable for the purpose than chlorine or bromine. But since iodine acts at ordinary temperatures too sluggishly on fats, whilst at higher temperatures the results are unequal, an alcoholic solution of iodine in presence of mercuric chloride is used, and as only few oils are soluble in alcohol chloroform is taken as a solvent. The mixture of iodine and mercuric chloride solution, called by the author "iodine solution," reacts at ordinary temperatures upon the unsaturated fat acids, forming chlorine and iodine addition products, whilst the saturated acids present remain unattacked. The amount of iodine thus taken up is then ascertained and calculated into percentage, the result being the "iodine number."

In order to test this method the "iodine number" of unmixed fats was first obtained, and then of mixtures containing various percentages of sophistication. These experiments confirmed essentially Hübl's statement, and with twenty-three samples of olive oil, especially, numbers were obtained which agreed with those given by him. In the following table the numbers obtained by Dieterich and by Hübl are given side by side for comparison:—

A.—Pure Oil.

	Iodine Number.	
	Dieterich.	Hübl.
Ol. Oliv. prov. No. 00 Ol. Oliv. prov. No. 0 Ol. Oliv. comm. flav.	81·6-84·4 23 samples	81·6–84·5
Ol. Arachis	91	101–105
Ol. Gossypii	108·5	105–108
Ol. Helianthi	132·25	—
Ol. Lini	154	154–160
Ol. Raparum	99·8–100·5	97–105
Ol. Sesami	110	105–108

The only essential difference in the two series of figures is in respect to oleum arachis, which notwithstanding repetition of the experiment gave to Dieterich only 91, and came nearest to olive oil. This is the more un-

fortunate, since it is arachis oil that is at the present time most used as an adulterant.

B.—Iodine Numbers of Mixtures of Olive Oil.

With.	25 p. c.	15 p. c.	10 p. c.	5 p. c.
Ol. Arachis	85·53	85·10	84·10	82·9
Ol. Gossypii . . .	89·50	87·10	86·10	83·4
Ol. Helianthi . . .	96·24	90·30	87·0	84·6
Ol. Lini	102·20	93·80	88·70	85·9
Ol. Raparum . . .	87·20	85·30	82·70	82·2
Ol. Sesami	90·55	87·90	85·90	83·4

As adulterations with 5 to 10 per cent. are seldom met with, whilst admixtures of 20 per cent. and upwards much more frequently occur, Hübl's iodine addition method gives tolerably certain indications, except in the case of arachis oil. At any rate, Herr Dieterich believes it to be the most trustworthy method that at present exists.

Some experiments were also made as to the solubility of iodine in different fat oils, with the following results :—

Ol. Amygdalarum took up 57 per cent. of iodine.
Ol. Arachis „ 45 „ „
Ol. Gossypii „ 38 „ „
Ol. Helianthi „ 23 „ „
Ol. Lini „ 19 „ „
Ol. Olivarum „ 44 „ „
Ol. Raparum „ 41 „ „
Ol. Ricini „ 51 „ „
Ol. Sesami „ 39 „ „

The iodine was rubbed up with the oil in successive percentage quantities, each addition being allowed to stand, with frequent stirring, until dissolved before another one was made. Finally the iodine was shaken out from the saturated oil with spirit and estimated volumetrically. Herr Dieterich thinks that a recommendation which has been made as to the addition of castor oil to tincture of iodine, based upon the solvent power as shown above, is worthy of attention. It would prevent the too rapid volatilization of the iodine when painted upon the skin, and would possibly modify its action.

EXAMINATION OF THE SO-CALLED SPRUCE-GUM.*

BY ADOLPH F. MENGES.

The so-called spruce-gum of commerce is the balsamic exudation of *Abies nigra*, Poir, the black or double spruce, which, according to Gray, occurs in swamps and cold mountain woods from New England to Wisconsin and northward, and southward along the mountains. The source of this commercial article was traced by Professor E. L. Patch a few years since,† and was then definitely referred to the above tree, although it was also stated that a much smaller quantity is produced by *Abies alba*, Michx, the so-called white spruce, but none from *Abies Canadensis*, Michx, or the hemlock spruce, which affords the U.S. officinal Canada pitch or hemlock pitch.

In order to be assured of the true botanical origin of the substance used in my investigation, some twigs and cones of the tree affording the so-called gum were obtained from Vermont and submitted to Professor William Trelease, by whom they were readily identified as the above-mentioned *Abies nigra*.

The method of collecting spruce-gum has already been quite accurately described:‡ but the following information relating thereto would seem to possess some interest, and for which I am indebted to Mr. J. G. Rich, of Bethel, Maine, who has been engaged in the collection of this substance for a number of years. Mr. Rich writes substantially as follows :—Spruce-gum is not obtained by puncturing the trees,—at least not to any great extent; the causes for the flow of sap being natural ones, such as a rotten knot or a seam up and down the tree caused by extreme heat or cold. Therefore the gum does not occur on any particular part of the tree, but is found from the bottom to the top on such as are injured or decayed. Simply bruising the tree will not cause a flow of sap—the cavity must extend through the bark and sap-wood. This causes a good flow which is at first transparent and viscid, but upon exposure becomes opaque and hardened, gradually assuming various shapes, and becoming of a darker colour from year to year. It has been found that those trees situated on low or level lands yield little or no gum. The trees yielding the largest amount are located on the mountains, more especially the tops and sunny sides, and those woods which have been thinned out by logging or otherwise. The gum is collected in winter time by men on snow-shoes, when there are several feet of snow on the ground, as they are thus capable of travelling much faster. They are provided with a little contrivance made by taking a small tin cup, to which is fastened a chisel in such a way that the gum may be cut off and allowed to fall into the cup; the latter is so arranged with a holder that a long pole may be inserted, thus enabling them to reach the pieces on the upper parts of the tree. They collect as much as can conveniently be carried, taking it to their houses, where it is cleaned by the women and children. Each piece has to be scraped separately, after which operation it is sorted and brought into the market.

The gum* at my disposal was obtained from a dealer in Vermont, who states that it is collected in Maine, New Hampshire, Vermont and Canada, the largest amount and that of the best quality coming from the latter point. It occurs in irregular pieces of various shapes and sizes, is of a reddish-brown colour, brittle, and breaks with a rough fracture; it has a faint odour, and, when chewed, a terebinthinous and slightly bitter taste. It is readily soluble in alcohol, and the solution has an acid reaction. Among the fragments of gum, pieces were observed which gave two distinct colour reactions with strong sulphuric acid, the one giving a pinkish-purple, the other a deep green coloration. Selected pieces of the gum when freshly broken exhibit a white surface, which, upon exposure to the air, soon acquires a pink hue, thus reminding of the similar change observable in asafœtida.

Portions of the gum were submitted to distillation with and without water. By the latter method a larger amount of volatile oil was obtained, although, owing to the frothing of the heated mass, the entire amount of volatile oil present could not be separated, but the percentage appeared to be relatively small.

The volatile oil was dried by contact with calcium chloride, and then re-distilled. It forms a limpid, colourless liquid, having a characteristic, terebinthinous and rather agreeable odour, and the specific gravity 0·85. Its boiling point is 160° C. (the mercury being entirely in the vapour). With iodine it fulminates, and in contact with a mixture of nitric and sulphuric acids it takes fire, thus evidently consisting simply of a terpene $C_{10}H_{16}$ as was also indicated by its boiling point. With hydrochloric acid it did not form, however, a crystalline compound, nor could crystals of terpin be obtained therefrom by the usual process. The amount of oil obtained did not suffice for an examination of its optical properties.†

* From 'Contributions from the Department of Pharmacy of the University of Wisconsin,' No. 2.

† *New Remedies*, January, 1882, p. 23.

‡ *American Druggist*, October, 1885; also *Pharm. Journal*, 1885, p. 370.

* The word *gum* is used here in its popular sense, although obviously incorrect from a scientific standpoint.—F. B. P.

† It is believed that this is the first examination which has been made of the volatile oil obtained from the so-called spruce-gum, and the references to this subject in our literature are very limited. Mr. F. Stearns (*Amer. Journ. Pharm.*, January, 1859, p. 29) states that " the commercial

The aqueous distillate from the gum, from which the volatile oil had been separated, had an acid reaction and a somewhat acetous odour, but gave no reaction with ferric chloride. It was digested with barium carbonate, and the solution filtered and evaporated, when a white, scale-like residue was obtained. The salt was quite freely soluble in water, and afforded white precipitates wlth silver nitrate and with basic lead acetate. When mixed with sulphuric acid it gave off the odour of butyric acid, and when this mixture was heated with a little alcohol it developed the very characteristic odour of butyric ether. An estimation of the barium was made, but the salt had absorbed a little carbonic acid, and the percentage of barium found was therefore a little less than that of barium butyrate, with which it otherwise appeared to agree.

A portion of the resin was completely exhausted with hot water to ascertain the presence of a bitter principle. The solution so obtained had an acid reaction, and when evaporated to dryness left an amorphous, blackish-brown residue, having a bitter, somewhat acrid and astringent taste. When dissolved in water it afforded a turbid greenish solution, which became clear when heated, but gave no precipitate with tannin.

The resin remaining after the distillation of the volatile oil from the so-called gum formed a transparent, amorphous and brittle mass, which was soluble in alcohol, methyl alcohol, ether and chloroform, sparingly in benzol, and insoluble in petroleum ether. When the finely powdered resin was brought into a boiling solution of potassium or sodium hydrate it readily dissolved, forming a soap-like compound, which separated on cooling, but which was of a much darker colour than the corresponding soap prepared from common rosin or colophony. With potassium or sodium carbonates it seemed incapable of dissolving or forming such soap-like compounds.

Several experiments were made with the view of separating a crystallizable acid or other crystallizable principle from the spruce resin, but without success, as may be shown by the following results :—

1. A portion of resin of spruce was digested with alcohol of the specific gravity 0·89, in which it was found to be completely soluble, whereas colophony digested with alcohol of this strength readily affords crystals of abietic acid; with alcohol of specific gravity 0·92 a similar result was obtained.

2. The resin was boiled with a solution of caustic soda for the purpose of combining the acid, and the clear solution subsequently precipitated by hydrochloric acid; but the precipitate was entirely devoid of crystalline structure and had simply a resinous appearance.

3. Ten grams of resin were dissolved in alcohol, and the solution precipitated by an alcoholic solution of lead acetate. The resulting precipitate was collected on a filter, washed with alcohol, and afterwards suspended in alcohol and decomposed by hydrogen sulphide. The filtrate from the lead sulphide was allowed to evaporate spontaneously, when a reddish-brown, amorphous residue was obtained, corresponding to 14 per cent. of the original resin. It was readily soluble in alcohol, ether and chloroform, but did not crystallize from these solutions. It fused completely at about 100° C.

The filtrate from the lead acetate precipitate was then treated also with hydrogen sulphide in order to remove the excess of lead salt, and filtered. The latter filtrate, upon evaporation, afforded a non-crystallizable residue of a bright reddish-brown colour, corresponding to 86 per cent. of the original resin. Its fusing point was about the same as that of the preceding portion. Both of these constituents of the resin, when moistened with a drop of concentrated sulphuric acid, produce a bright purple colour, reminding somewhat of the strychnine reaction with sulphuric acid and potassium bichromate, but differing essentially from this by the colour being permanent.

By the oxidation of colophony with dilute nitric acid Schröder obtained isophthalic, trimellithic and terebinic acids. By the oxidation of 50 grams of spruce resin with nitric acid I obtained only picric acid. From the latter the potassium and sodium salts were prepared and obtained in handsome crystals, which explode like gunpowder when heated on platinum-foil.

From the results of this investigation it will be seen that the so-called spruce gum differs in many respects from the other balsamic exudations of the Coniferæ which have as yet been chemically examined.

oils of spruce and hemlock are one and the same thing, and are distilled from the boughs of *Abies canadensis*." The only other notice relating to oil of spruce that I have been able to find occurs as an abstract in *Amer. Journ. Pharm.*, April, 1844, which has been kindly afforded me by Professor J. M. Maisch. The latter investigation was made by Gottschalk, under Wöhler's supervision, and refers to the oil obtained from the young twigs of *Pinus Abies*, Lin., or the Norway spruce fir. That oil was found to consist of a terpene, boiling at 160° C., and afforded likewise no solid compound with hydrochloric acid.—F. B. Power.

COLLECTING THE ORANGE FLOWER CROP IN FRANCE.*

BY J. CREUSE.

The usual time for beginning the collection of the crop on the Mediterranean shore is from April 25 to May 1, and the gathering lasts about one month or five weeks. The quantity gathered, rather small at first, gradually increases, and after May 10 reaches its full proportion.

The orange tree, indigenous in India, is thought to have reached Arabia towards the end of the ninth century, but made its appearance in southern France only during the sixteenth; at least, such is the period at which it began to be mentioned. At any rate, the orange groves of the vicinity of Hyères were in 1556 reported to have the appearance of large forests, and the trees were equally cultivated at St. Chamas, Fréjus, Cannes, Vallauris, Aix, and in Marseilles itself.

At present Vallauris, whose name apparently comes from *Vallum aurantii*, or its Provençal equivalent, is the headquarters of the orange flower industry, and has lately acquired considerable importance. The climate of the place, being a very temperate one, is quite favourable to the cultivation of the orange trees. As no less than fifteen distilleries for making orange flower water and neroli are located in Vallauris, the town may justly claim to be the centre of this sort of manufacture.

The picking of the flowers employs no less than two thousand persons. As the crop usually averages one million kilograms, that is, one thousand tons, its importance, notwithstanding the variations of prices, is easily understood as a source of revenue for the localities where the orange tree is grown for its flowers alone. The variety cultivated is the *bigaradier*, or bitter orange, producing very fragrant blossoms but bitter fruits. From 1880 to 1882 orange flowers sold from thirty to sixty francs a hundred kilos. In 1883, frost having destroyed most of the crop, the price rose to three hundred and sixty francs; but last year it remained between seventy-five and one hundred francs. The coming crop promises to be fair. Some groves have suffered from frosts, but the evil is not general, and there are good prospects of a fine quality of flowers.

The yield of neroli greatly varies according to the season when the flowers are collected. Those gathered at the beginning barely produce half a gram to the kilo of blooms (one-half of one per thousand), while near the end of May they afford one gram or more. Hence the average yearly yield of essential oil is seventy-five thousand kilos, or about one hundred and sixty-five thousand

* From the *Druggists' Circular*, July.

pounds. To this may be added from twelve to fifteen hundred tons of orange flower water which is produced at the same time as the essential oil.

ACTION OF OILS ON METALS.

In a paper read before the Glasgow and West of Scotland Section of the Society of Chemical Industry,* Mr. I. J. Redwood gives the results of a series of experiments made principally with a view to determine what fixed oils are best adapted for mixing with mineral oils for lubricating purposes. The metals employed, after being thoroughly cleansed, washed with ether and dried, were weighed and placed in corked tubes together with 15 c.c. of the oil, the tubes were kept for twelve months at an average temperature of about 80° F. in summer, and at 50° to 55° F. in winter. As a consequence the tallow oil was solid for some time during the winter. At the end of the twelve months the oils were poured off, and the metals were washed with ether, dried and weighed. The original paper contains a table and diagram showing the extent to which the metal in each case was affected, as indicated by loss of weight. The results are summarized as follows :—

Iron is least affected by seal oil, and mostby tallow oil.

Brass is not affected by rape oil, least by seal oil, and most by olive oil.

Tin is not affected by rape oil, least by olive oil, and most by cotton-seed oil.

Lead is least affected by olive oil, and most by whale oil ; but whale, lard, and sperm oils all act to very nearly the same extent on lead.

Zinc seems, by the four actual weighings that were of any value, to be not acted on by mineral lubricating oil, least by lard oil, and most by sperm oil.

Copper is not affected by mineral lubricating oil, least by sperm oil, and most by tallow oil.

Mineral Lubricating Oil has no action on zinc and copper, acts least on brass, and most on lead.

Olive Oil acts least on tin and most on copper.

Rape Oil has no action on brass and tin, acts least on iron, and most on copper.

Tallow Oil acts least on tin and most on copper.

Lard Oil acts least on zinc and most on copper.

Cotton-seed Oil acts least on lead and most on tin.

Sperm Oil acts least on brass and most on zinc.

Whale Oil has no action on tin, acts least on brass, and most on lead.

Seal Oil acts least on brass and most on copper.

Mineral lubricating oil has, on the whole, the least action on the metals experimented with, and sperm oil the most.

For lubricating the journals of heavy machinery, either rape or sperm oil is the best oil to use in admixture with mineral oil, as they have the least effect on brass and iron, which two metals generally constitute the bearing surfaces of an engine. Tallow oil should be used as little as possible, as it has considerable action on iron.

TINCTURE OF KINO.†

BY R. ROTHER.

The transformation that sometimes takes place in tincture of kino is not strictly the production of a visible sediment but a gradual thickening of the liquid until wholly firm. Various expedients have been suggested to remedy this difficulty. The present official process employs glycerin, which, however, is as unsatisfactory as all other agents previously tried. The alleged occasional success with sundry corrigents can only be accounted for by the fact that there are numerous varieties of kino, and that one or the other sort may not be susceptible to this change. On one occasion the writer advised the exclusion of air as an infallible protection. Results since then obtained have only tended to confirm the efficiency of this method. Some samples of tincture, prepared on February 6, 1880, preserved in filled two-ounce vials, are at present in prime condition. It was previously observed that after some time the corks become loosened through the contraction induced by the alcohol vapour as well as by changing temperature. In all such bottles the effect of air on the tincture became very manifest. In such that admitted much air gelatinization became complete. If, however, the precaution is taken to look after the corks and keep them fastened no deterioration results. When a vial was partially emptied the remainder invariably jellied in due time. The addition of glycerin before or after gelatinizing had no visible effect, either in preventing the alteration or regenerating the spoiled tincture.

As some loss and inconvenience nevertheless result from this treatment, the writer concluded to test catechu in this connection, as tincture of catechu never gelatinizes. An ample proportion of catechu was employed, which, in all probability, is far in excess of actual need. The success of this process is complete, as no change occurs in tincture of kino so prepared, after keeping it for upwards of eight months exposed to the air with impunity. That the catechu is really protective, and not merely so by appearance, for reason of using an unchangeable kino, is shown by the fact that the same kino, used alone, gives an impermanent tincture. Another remarkable circumstance is that a tincture of kino, already quite syrupy from oxidation, when treated with one-third its volume of the catechu-kino tincture, ceases to thicken and remains intact on unlimited exposure thereafter. It is evident that the catechu is the preserving agent, as a tincture made by using an aqueous extraction of the catechu is equally effective. The writer recommends the following process for preparing a permanent tincture of kino : —

Kino	1½ troy ounces.
Catechu	½ a troy ounce.
Alcohol	4 fluid ounces.
Water sufficient to make one pint.	

Powder the kino and catechu, mix them, add ten fluid ounces of water, heat for ten or fifteen minutes with constant stirring, and let the mixture cool. Now add water to the measure of twelve fluid ounces and then add the alcohol. Pour the mixture into a bottle containing sixty grains of filter paper, shake the whole well at intervals and strain the tincture through fabric after twenty-four hours.

QUININE OLEATE.*

BY R. ROTHER.

The method of administering quinine by inunction is coming into practice. For this purpose it is usually exhibited in the form of an ointment prepared by mixing some salt of quinine, usually the sulphate, with a fatty medium. Since the oleate presents superior advantages in this manner of application such an article has of late appeared in the market.

The commercial oleate occurs in the condition of an unctuous mass resembling petrolatum in appearance. When rubbed upon the skin it speedily vanishes, and leads to the supposition of a phenomenal absorption. Although this salt is rapidly assimilated, and in this

* *Journal of Society of Chemical Industry* for June 29, p. 364.

† Abstract from a paper in the *American Journal of Pharmacy* for July.

* From the *Druggists' Circular*, July.

respect superior to most all if not all other quinine salts, yet in this particular its seeming entry into the system is but preliminary and superficial. The apparent absorption is merely due to its remarkable property of accommodating itself to the irregularities of the epidermis. Its presence in this condition is most readily ascertained by the taste, which physiological test might serve as a rough indicator of the actual absorption. It is highly presumable that this salt will assume an important place in medication, and hence it must become desirable to have an early knowledge of its various properties in relation to pharmacy.

Quinine oleate is an article for the preparation of which the pharmacist has a valid excuse. But at the very threshold of the operation of compounding it the secular pharmacist has the fact forcibly brought home to him how great his dependence is on the industrial producer of chemicals.

Oleic acid in an available shape is one of the two prime essentials of the home-made process. It is doubtless generally known that the manufacture of this substance is not now undertaken by any one on the small scale excepting it be for the curiosity and pastime.

Quinine is the other necessary requisite in the process. Although quinine as pure base is now an official article with a view to its application in various official formulæ, it is questionable whether pharmacists prepare it in that form.

It is further open to question whether the condition officially necessitated has not rather deterred than encouraged the use of formulæ specially designed for diminutive operations.

According to the U.S. Pharmacopœia the base is in the state of a trihydrite, which for certain purposes must be preliminarily dehydrited.

It does seem that in such instances the Pharmacopœia would have followed the prevailing tendency rather than come in direct confict with it, thus not only jeopardizing its own authority, but also creating an unnecessary confusion about an otherwise very plain matter. Quinine as pure alkaloid can readily be obtained in the market. For some time the writer had used this under the belief that it was the official trihydrite. On trial it was, however, found that the commercial article is indeed the pure alkaloid in the anhydrous condition. When subjected to a very moderate heat the trihydrite fuses and parts with its water at a higher temperature. When anhydrous, quinine requires the comparatively high heat of 177° C. to fuse it.

The commercial quinine is a very bulky. dingy white powder, possessed of remarkable electric properties.

It does not fuse at a moderate heat, and when subjected to a water-bath temperature loses a trifle of what may be hygroscopic moisture. A further scarcely perceptible diminution of weight results when much higher heated for some time to fusion. These are the properties of the anhydrous base as it is further shown to be in its quantitative chemical relations.

Anhydrous quinine, when warmed with oleic acid in equivalent proportion, readily unites, forming a pasty mass of the appearance and consistence of honey. This is soluble in alcohol in all proportions.

If the alcohol is again expelled at a moderate temperature and the residue is set aside, or if the alcoholic solution is precipitated by water and the residue set aside, a rapid congelation results, and a whitish, seemingly crystalline form is produced. The solid body has the consistency of wax and the colour of cacao fat. By uniting 324 parts of anhydrous quinine and 282 parts of oleic acid the pasty product weighs 606 parts. When this combination is effected in the presence of alcohol which contains water, or if water is added, the air-dried solid product weighs 624 parts.

On subjecting this second product to a water-bath temperature for some time it is reduced in weight to 606 parts and again assumes the pasty condition. These results show that the pasty form is the anhydrous salt represented by the formula (QnH)Ol; molecular weight 606, and that the solid form is a monohydrite represented by the formula (QnH)Ol.Aq.; molecular weight 624.

The hydrous salt readily fuses at a temperature somewhere about 40° C. If the salt is stirred on cooling it speedily sets in its solid form. But if simply placed aside at rest the congelation is much more deliberate, requiring perhaps eight to twelve hours. The solidification then begins at some particular point and gradually pervades the whole mass.

Although the solid oleate contains a little less quinine, 51·92 per cent., whereas the pasty contains 53·46 per cent., the writer deems it the more acceptable salt. It is soluble in alcohol, oils and oleic acid in all proportions.

Perhaps one of the most promising forms is its solution in petrolatum oil. A solution is readily effected by first fusing the salt at a gentle heat and then adding the petrolatum oil in any desirable proportion.

The writer prefers to term the hydrous oleate as distinctively quinine oleate. In referring to the pasty form it can be specially styled the anhydrous salt. Furthermore when exposed to humid air the latter salt slowly absorbs water and becomes solidified.

In using the term hydrite the writer must be understood as meaning a chemical integration of the elements of water in a lower state than that indicated by the term hydrate. The firmer union termed hydrate is invariably characterized by atomic equivalence, whilst in hydrites no such equivalence is apparent. The writer also habitually employs a distinct nomenclature and notation in connection with alkaloidal salts. This is based upon the general theory of salts and is by no means fanciful as ultra-conservatives may think. In illustration it will suffice to cite that, with the exception of some secondary monamines, which are no obstacles to the method, the generality of alkaloids are tertiary monamines or wholly substituted ammonias. It can make no difference whatever in the formation of salts by coalescence with acid molecules whether the nitrogen is united, as in ammonia, with three univalent hydrogen atoms, or one trivalent compound radical. Hence the general formula for chlorides of ammonia derivatives, including the alkaloids, will be properly written N( )iv.Cl.

Should an alkaloid be a diamine, the formula will not differ fundamentally, as in such case it will be written, as the case may be, either N_2( )viij.Cl_2, or N_2( )ix.Cl, without vitiating in such instances the general nomenclature of salts.

When quinine oleate, formed by direct coalescence of acid and base, is dissolved in alcohol a slight brownish, flocculent residue remains undissolved. This is readily separated by filtration. A lighter coloured product is then obtained. Aside from æsthetic grounds, there is nothing objectionable about this trifling contamination, as it is perfectly insoluble in oily media.

The writer recommends the following process for preparing quinine oleate :—

	Parts
Quinine, anhydrous	324
Oleic acid	282
Alcohol,	
Water, of each sufficient.	

Mix the oleic acid with its volume of alcohol and gradually add the quinine, finally warming the mixture, if necessary, to effect complete combination, and filter if desirable. Expel the alcohol with a gentle heat and incorporate a little water with the residue. Set it aside in the open air, occasionally stirring it, until the salt has become firm and perfectly dry.

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THE REGULATION OF PHARMACY IN ROUMANIA.

AMONG the many countries that have from time to time had their pharmaceutical history told in the pages of this Journal, we do not remember that the principality of Roumania has ever yet been referred to. Probably, however, there has been hitherto very little to report on pharmaceutical subjects in respect to the Danubian Principalities. But under the auspices of a ruler of German extraction it seems quite natural that the supply of medicine in Roumania should be brought under strict control, and a decree that was published last month in the official gazette contains some interesting information as to the conditions under which it is intended that the practice of pharmacy shall henceforth be carried on in that country. The first part of the decree concerns the internal arrangement, supervision and control of the pharmacy. It orders that the pharmacies shall be situated in easily found places in accessible streets, and that they shall exhibit the name of the firm and the inscription "Farmacia" legibly written. Every pharmacy, without exception, must be kept open for the convenience of the public from six o'clock in the morning until eleven o'clock at night, besides which provision must be made for the dispensing of physicians' prescriptions presented in the night. Each establishment must include a dispensary, a well-ventilated laboratory for pharmaceutical purposes, a dry room for the keeping of simple and compound medicines, and a dry cellar for the storing of articles that require a low temperature. Everywhere the greatest possible order and cleanliness are to be maintained. The medicines are to be preserved in vessels that will ensure them from undergoing alteration, and these are to be legibly labelled with the pharmacopœia name of the contents and to be arranged in alphabetical order. Powerful medicines are to be kept apart; the narcotic plants are to be placed in wooden boxes provided with lead or zinc covers; and the poisons and alkaloids marked in the pharmacopœia with a † are to be kept in separate well-closed cupboards, the key of which is to be held by the manager. The utensils and apparatus for the preparation and dispensing of medicines are to be sufficient in quantity and of good quality, the weights and measures according to the metric system, and the reagents and apparatus prescribed in the pharmacopœia for the testing of drugs must also be at hand. Ordinarily the stock of pharmacopœia medicines must be equal to at least a month's consumption, and in times of epidemic to three months' consumption; this is to be catalogued in a stock book. The labels for medicines for internal use are to be of white and those for external use of red paper. There is to be a library containing not only books for the master, but manuals for the pupil; also "archives" for official documents, a register for copies of prescriptions, signed and sealed by the district or city medical officer, a pharmacopœia, a price-list, a stamp and seal, and last, but not least, a bell in a conspicuous place at the door for night service.

Having thus minutely provided for the pharmacy itself the decree goes on to arrange for the *personnel.* This must always include a responsible manager and at least one assistant, who, except in places that are not district centres, must be a *magister der pharmacie.* There may be in addition junior assistants and apprentices, but in the latter case there must be already a Roumanian apprentice in the establishment before one of another nationality can be employed. The conductor of a pharmacy, as well as the other seniors, are enjoined to treat apprentices in a paternal manner and to employ them only in pharmaceutical work; further they are to assist them in their studies and to provide them with such books and materials as will enable them to acquire such an elementary grounding in pharmacognosy, chemistry, physics, zoology, botany and mineralogy as they will require for the assistant's examination. Every change in the staff has to be reported at once to the public health authorities. If the manager wants a holiday he may be represented during a fortnight by the senior assistant; but for a longer time, up to three months, another *magister der pharmacie*, qualified to conduct a pharmacy, must be called in, and the temporary change notified to the public health authorities. In like manner the senior assistant may be represented by a junior, but a junior assistant may not be represented by an apprentice. Any contravention of these provisions has to be reported by the inspectors of pharmacies, who are medical officials, and the sanitary authorities may then, if they choose, place an administrator in charge at the cost of the pharmacy. No pharmacist is allowed to conduct more than one pharmacy, either as proprietor, tenant, or administrator. The manager of a pharmacy is made responsible directly to the Minister of the Interior for the way in which the business is carried on; all business is transacted in his name, and he supervises the assistants and decides upon alterations in the staff. He is also responsible in respect to the supply of medicines, the dealing out of poisons, the pricing of medicines according to the officially authorized rate, and the copying of prescriptions in the register. Assistants are responsible for any mistakes made by themselves, and they are

ordered to sign their names on the prescriptions they dispense as well as on the copies.

As to the supply of medicines it is provided that the more powerful shall be delivered only upon the order of a medical man, and never be supplied by an apprentice. Chemical substances for special technical use may, however, be supplied to certain persons. Each prescription is to be dispensed only once, except under the authority of the prescriber, and at the latest five days after the date upon it. Powerful medicines ordered in excess of the dose for twenty-four hours are not to be supplied unless the prescriber uses the words "according to my prescription," or indicates the quantity by a specially conspicuous figure. Otherwise the pharmacist has in such a case to dispense the minimum pharmacopœia dose, and notify the fact to the prescriber in writing. Prescriptions ordering potent medicines without saying how they are to be used must not be dispensed until the omission has been supplied by the prescriber. It is forbidden to dispense illegible prescriptions, or any in which the quantities are not indicated according to the metric system. Every prescription dispensed has to be entered in the copy book, together with the current numbers and the price charged, repetitions being entered as new prescriptions. The medicine supplied has to bear on the label the register number, the date when supplied, and directions for use. In case of any deficiency in the instructions as to the preparation of a medicine the pharmacist is ordered to notify it upon the prescription and on the copy. It only remains to add that the control of the pharmacies in a district is vested entirely in the public health and medical authorities, except in special cases where the minister may order otherwise.

The annual meeting of the German Apotheker-Verein this year is to be held at Düsseldorf in the middle of August, the proceedings commencing on Saturday evening, the 14th, with a friendly meeting and concert in the Town Hall. On Sunday, at noon, the opening of a pharmaceutical exhibition will take place, followed by another concert. In the evening there will be a general "Bier-Commers" of members of the different academical pharmaceutical associations in the Town Hall. On Monday morning there will be a meeting of the Council, and in the afternoon one of the Council and the Local Committee. In the evening there will be a reception of members and their ladies. The first sitting of the general meeting will be held in the Town Hall on Tuesday morning, and whilst the gentlemen are thus engaged the ladies will be taken to see the notable places in the city and neighbourhood. In the evening there will be a concert in the Zoological Gardens, followed by an illumination. Wednesday will be passed in a similar way, with a banquet in the evening. On Thursday morning there will be a meeting of the Council for the confirmation of the minutes, and at midday the exhibition will be officially closed. Business having been thus terminated, in the afternoon there will be an excursion by rail to Königswinter, when the company will have the choice of ascending the Drachenfels on foot, on horses, on donkeys, in carriages, or by the toothed railway. On the Drachenfels there will be a concert, followed by a bengal light illumination of Drachenburg and the ruins of Godesberg, after which the excursionists will return to Düsseldorf by rail.

* * *

The municipal council of Paris has recently adopted a series of regulations for the organization of a pharmaceutical night service in the city. At present the arrangement would appear to be a voluntary one on the part of the pharmacists taking part in it, a list of whom will be kept at the neighbouring police offices. A person desiring in the night to obtain medicine on the prescription of a medical man will have to apply at a police office. If the patient requires public relief the messenger is to be taken by a police officer to the *maison de secours*, and, if the medicine be not available there, then to one of the pharmacists on the list. If the patient is able to pay, the messenger is to be taken direct to the pharmacist, who is to be entitled to charge, in addition to the ordinary price of the medicine, another franc and a half to compensate him for the trouble of getting up in the night.

* * *

According to the *Canadian Pharmaceutical Journal* the pharmacist in Canada serves a useful purpose in barring the way to the practical application of certain posological views that "are by no means uncommon." These views are illustrated by the incident of a young doctor saying, when recently purchasing a stock of drugs, "I shall want a good supply of calomel; give me a pound; the dose is a drachm, you know." Surely our contemporary is a little hard on the medical profession in the Dominion.

* * *

In a recent report by the Ohio Board of Pharmacy astonishment is expressed at the evidence presented in the examination papers as to the little regard paid by pharmacists of that State to the competency of their apprentices. Everywhere, it is remarked, there is proof of utter ignorance of the English language; the handwritings are illegible, the spelling horrible, and the knowledge of mathematics inferior; in addition to which, there exists a dense ignorance in regard to the most simple pharmaceutical manipulations or processes. On the other hand it is pointed out that no State in the Union offers better facilities for acquiring a good education, and it is urged that it is therefore the duty of Ohio pharmacists to select their appprentices only from youths possessing qualifications equal to a graduate of a high school.

* * *

The subject selected for special discussion this year in the Chemical Section of the British Association is the Nature of Solution. The discussion will be opened on Friday, September 3, by Professor Tilden, and Professor Armstrong, Dr. Gladstone, Professor Guthrie, Professor Hartley, and Dr. Nicol are expected to take part in it. Other gentlemen wishing to do so should communicate with the President of the Section, Mr. William Crookes.

* * *

A case is reported in the *Lancet* in which death followed in two hours and a quarter after the swallowing by a man of not more than half an ounce of bisulphide of carbon. Emetics were given about a quarter of an hour after the poison was taken and the stomach pump was used, but without avail; the

man became unconscious and notwithstanding the administration of brandy never rallied, the symptoms being those of narcotic poisoning.

* * *

According to a note by Professor Liebreich in the *British Medical Journal* (p. 107), the lanolin used by him in his earlier experiments contained some not readily fusible cholesterin ethers, which retarded absorption when rubbed on the skin. It was for this reason he at first proposed to add 10 per cent. of lard when making ointments with a lanolin basis, as in the formulæ published in this Journal a short time since (Feb. 20, p. 708). Professor Liebreich now states that the lanolinum puríssimum at present produced has itself the proper consistency for an ointment, and he therefore recommends that the recipes published by him should henceforth be prescribed without the lard.

* * *

Another note in the same journal (p. 116) gives the experience of a Russian doctor in respect to the penetrating properties of lanolin. He states that narcotic extracts, when combined with lanolin, are absorbed by the skin and exercise their pain-relieving action with certainty, the quantity required being about twice that of the dose administered internally. Quinine hydrochlorate mixed with lanolin is also absorbed very easily and potassium iodide appears in the urine in from two to six hours after inunction. It has also been found that the skin of children absorbs lanolin ointment more readily than that of adults, and that as a general rule the action is facilitated by washing the skin with ether before applying the ointment.

* * *

La Nature suggests a method of obviating to some extent the frequent washings of apparatus which are sometimes requisite in chemical manipulations. It consists in the use of small porcelain capsules that have received a coat of lampblack by being held in the smoky flame of a candle. A drop of water or aqueous saline solution placed carefully in such a smoked capsule will retain the spheroid form, which is maintained on the addition to this globule of another drop, or a particle of a solid reagent, and allows of any phenomenon of coloration, precipitation or crystallization being closely observed. At the conclusion of the experiment the globule may be thrown out of the capsule, leaving it quite clean and ready for another experiment. The carbonaceous coating is however attacked by acid, alcoholic and ethereal liquids, so that the method is only available in the case of certain aqueous solutions. This mode of operation may also be extended to certain leaves which are not wetted by water and some solutions, a good instance of which is the nasturtium (*Tropæolum*) leaf.

* * *

The story, which recently went the round of the papers, of the sad fate that befell certain anarchists who broke into a drug store and drank the colchicum wine, is now pronounced by the *Western Druggist* to be a hoax, and simply "the fruit of an average Chicago reporter's inventive brain."

* * *

It is announced that a new variety of filter paper is being made in the United States, which exercises an antiseptic influence upon liquids passing through it. This is said to be effected by the addition of from 5 to 20 per cent. of animal or wood charcoal to the paper pulp.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

July 8, 9, 15, 16, 19, 20 *and* 21, 1886.

Present on the 8th and 9th.—Mr. Carteighe, President; Mr. Gostling, Vice-President; Messrs. Barnes, Benger, Bowen, Corder, Fletcher, Gale, Gerrard, Greenish, Linford, Symons, Tanner, Taylor and Thresh.

Present on the 15th, 16th, 19th, 20th and 21st.—Mr. Carteighe, President; Mr. Gostling, Vice-President; Messrs. Barnes, Benger, Blunt, Bowen, Corder, Fletcher, Gale, Gerrard, Greenish, Linford, Symons, Tanner, Taylor and Thresh.

Dr. Greenhow was present on the 8th, 16th and 20th, on behalf of the Privy Council.

MAJOR EXAMINATION.

8*th.*—*Seven* candidates were examined. *Three* failed. The undermentioned *four* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Baker, Edmund Gilbert .....London.
Buck, William Henry.....Otley.
Ellerington, John Parker .....Hexham.
Hawkins, Lewis Walter .....London.

9*th.*—*Six* candidates were examined. *Two* failed. The undermentioned *four* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Kirby, Herbert Edward .....London.
Lawrence, George Richard.....Boston.
Nurse, James Aldis.....Lowestoft.
Pinder, Robert .....Bourne.

15*th.*—*Seven* candidates were examined. *Three* failed. The undermentioned *four* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Shacklock, James Harvey .....South Cave.
Skyrme, Charles George .....Cardiff.
Smith, John Henry .....Coventry,
Williams, William .....Abergavenny.

16*th.*—*Six* candidates were examined. *Two* failed. The undermentioned *four* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Bostock, John William .....Ashton-under-Lyne.
Liverseege, John Francis .....Nottingham.
Morrall, Edward Ernest .....Bridgnorth.
Wilson, Richard ... .Kidderminster.

MINOR EXAMINATION.

8*th.*—*Twenty-four* candidates were examined. *Nineteen* failed. The undermentioned *five* passed, and were declared qualified to be registered as Chemists and Druggists:—

Allan, Charles Joseph.....Tadcaster.
Blinkhorn, William Steeper .. Wellingborough.
Bradley, Frederick William ...Wisbech.
Cartwright, Arthur .....Alford.
Charles, William Frederick ...Loughborough.

9*th.*—*Twenty-four* candidates were examined. *Seventeen* failed. The undermentioned *seven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Cooper, George Thomas... .....Market Bosworth.
Davey, Harry Doidge .....Stonehouse.
Delarue, Edward Ludlow .....London.
Dixon, Philip Thomas.....King's Lynn.
Elliott, Alfred .....Stowmarket.
Fisher, George Robert.....Scarborough.
Fleetcroft, John Frederick .....Chester.

15*th.*—*Twenty-two* candidates were examined. *Eleven* failed. The undermentioned *eleven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Coles, Joseph.....Rye.
Evans, Richard David.....Dowlais.
Forbes, Edward.....Bolton.
Foulds, Robert.....Liverpool.
Francis, John Herbert.....Wrexham.
Gant, Robert Richard.....Norwich.
Garton, Robert Taylor .....Rugby.
Gasson, William .....Crawley.
Goodess, Frederick William ...Leicester.
Goodman, Frederick William...Newport Pagnell.
Gould, Charles William .....London.

16*th.*—*Twenty-six* candidates were examined. *Eighteen* failed. The undermentioned *eight* passed, and were declared qualified to be registered as Chemists and Druggists :—

Hurst, Samuel John.....Boston.
Isaac, Henry Oswald .....Bristol.
Jenkins, John .....Haverfordwest.
Jones, Tom Young .....Carmarthen.
Judkins, William Edward .....Bedford.
Kelly, Philip Alfred .....London.
Kimber, Arthur Weaving .....Tyfield Wick.
Leech, Frederick Samuel . ....Gateshead.

19*th.*—*Thirty-one* candidates were examined. *Twenty-one* failed. The undermentioned *ten* passed, and were declared qualified to be registered as Chemists and Druggists:—

Lees, James Nall.....Rochdale.
Lewis, Thomas Wright .....Bloxwich.
Martin, William .....Exeter.
Mays, Frank Webb..... .....Grantham.
Minchin, William.....Bedford.
Mussellwhite, William..... .....Basingstoke.
Oliver, John Robert.....Lynn.
Parsons, Thomas .....Bourton-on-the-Water.
Procter, Henry Raithby .....Boston.
Thomas, Edward .....Garstang.

20*th* —*Twenty-nine* candidates were examined. *Seventeen* failed. The undermentioned *twelve* passed, and were declared qualified to be registered as Chemists and Druggists :—

Sansom, Frederick James .....Barrow-in-Furness.
Sewell, Thomas Arthur W..... Lee.
Shepperd, William John.....Newport.
Siggers, George William.....Colchester.
Skewes, Josiah..... ..Penryn.
Skirrow, William.....Bingley.
Smith, George .....Worcester.
Street, Albert Ernest .....London.
Symonds, James Alfred ....Leamington.
Thornton, William ... .Curdworth.
Ward, Thomas Armistead .....Wigan.
Wright, Joseph Pretty .....Buxton.

21*st.*—*Thirty* candidates were examined. *Eighteen* failed. The undermentioned *twelve* passed, and were declared qualified to be registered as Chemists and Druggists :—

Hodder, George William.....Frome.
Long, Herbert Henry .....London.
Morris, Daniel .....Portmadoc.
Smyth, Thomas Spring .....London.
Southall, Wilfred Francis .....Birmingham.
Warner, William .....Bath.
Waterhouse, William Maudson.London.
Watts, Robert .....Sheffield.
Wilkinson, John E. Beaumont.Manchester.
Williams, Alfred .....London.
Williamson, Leonard Wright...Darlington.
Wood, Arthur William .....London.

MODIFIED EXAMINATION.

20*th.*—*One* candidate was examined and failed.

PRELIMINARY EXAMINATION.

21*st.*—The undermentioned certificates were received in lieu of the Society's examination :—

Certificates of the College of Preceptors.

Greenwood, George Lister ... ..Keighley.
Inge, Edward Gane.....Farnham.

Certificates of the University of Cambridge.

Harper, Edmund William .....Ossett.
Lodder, Arthur Edward .....Reading.
Pinson, Harry Everitt Kerr ...London.
Sturch, Harry Howes .....Kidderminster.
Westrap, Thomas Hembury ...Warwick.
Wolfendale, Richard .....Farnworth.

Mr. F. Baden Benger.

At the meeting of the Board on the 21st, the following resolution was passed unanimously-—

"That the members of this Board desire to record their high appreciation of the services rendered to the Society by Mr. F. Baden Benger during the thirteen years he has been one of their colleagues, and regret that the increasing demands on his time have rendered it necessary for him to sever his connection with them. They beg to assure him that he carries with him the hearty good wishes of every member of the Board."

EXAMINATIONS IN EDINBURGH.

July 14, 15, 16, 20, *and* 21, 1886.

Present—Messrs. Clark, Dott, Gibson, Gilmour, Kinninmont, Maben, Nesbit and Stephenson.

Professor Sir Douglas Maclagan was present on the 14th, 15th, 16th and 21st on behalf of the Privy Council.

MAJOR EXAMINATION.

14*th.*—*Two* candidates were examined. *One* failed. The undermentioned passed, and was declared qualified to be registered as a Pharmaceutical Chemist :—

Jack, James .....Arbroath.

MINOR EXAMINATION.

14*th.*—*Thirteen* candidates were examined. *Seven* failed. The undermentioned *six* passed, and were declared qualified to be registered as Chemists and Druggists :—

Bowie, George .....Aberdeen.
Brown, George .....Dublin.
Butters, George .....Perth.
Cockshott, William Arthur.....Manchester.
Craven, Henry Ernest.....Newcastle-on-Tyne.
Cummings, William .....Alloa.

15*th.*—*Fifteen* candidates were examined. *Ten* failed. The undermentioned *five* passed, and were declared qualified to be registered as Chemists and Druggists :—

Dawson, Theophilus Ernest ...Gateshead.
Greaves, William.....Ironville.
Hay, James .....Edinburgh.
Hope, John ....Wigton.
Johnstone, James.....London.

16*th.*—*Thirteen* candidates were examined. *Seven* failed. The undermentioned *six* passed, and were declared qualified to be registered as Chemists and Druggists :—

Kirkness, Robert.....North Shields.
McCorquodale, John Campbell.Dumbarton.
Marshall, Robert Hay.....Aberdeen.
Maxwell, John ..... Kilmarnock.

Moffet, William Emslie .....Carlisle.
Munro, John Joyner .....Strichen.

20*th.*—*Fifteen* candidates were examined. *Seven* failed. The undermentioned *eight* passed, and were declared qualified to be registered as Chemists and Druggists :—

Paterson, Alexander .....Aberdeen.
Pickering, Richard .....Blackburn.
Pottage, John William Dick ...Edinburgh.
Raffan, Robert.....Buckie.
Robb, David .....Ossett.
Robertson, William.....Dennistoun.
Robson, Robert .....Darlington.
Scott, Alexander .....Kelso.

21*st.*—*Thirteen* candidates were examined. *Nine* failed. The undermentioned *four* passed, and were declared qualified to be registered as Chemists and Druggists :—

Whyte, Joseph Allan Fowlie...Aberdeen.
Wilson, James .. ..Chesterfield.
Wood, David Moffat .....Portobello.
Woods, Joseph James Birkett...Tunstall.

Professor Sir Douglas Maclagan.

The Board of Examiners for Scotland, at their meeting on the 14th inst., passed the following resolution, which was ordered to be engrossed in the minutes, and a copy sent to Sir Douglas Maclagan, whose reply is also appended :—

"The Members of the Board of Examiners for Scotland, of the Pharmaceutical Society, desire to record the great gratification with which they have learned that it has pleased Her Majesty recently to confer the honour of Knighthood on Sir Douglas Maclagan.

"They regard the bestowal of this dignity as a singularly fitting and appropriate recognition of the varied abilities and attainments by which Sir Douglas has, throughout a long and brilliant career, shed fresh lustre on his profession, and enhanced the name and the fame of the Edinburgh School of Medicine ; as well as of the many public services in various departments which he has rendered during that time ; while, from the universal respect and esteem which his many personal and social qualities have inspired, they feel assured it will command general satisfaction.

"In addition to these considerations they have to refer to the circumstance that Sir Douglas has for many years been associated with this Board as Privy Council Assessor at their meetings, and they recall with pleasure the fact that his relations to the Board in that capacity have always been of the most amicable and harmonious nature, and they ascribe this in great part to the uniform courtesy and consideration which he has ever displayed. They gladly, therefore, take this occasion to offer him respectfully their warm congratulations and best wishes."

In name of the Board,
J. B. Stephenson, *Chairman.*

"28, Heriot Row, Edinburgh,
"*July* 14, 1886.

"My dear Sir,—I am extremely gratified by the cordial congratulations conveyed to me on the honour which Her Majesty has been pleased to bestow upon me, and by the warm terms in which your Examining Board have been pleased to express themselves regarding me personally.

"I am most desirous fully to express my sense of the pleasant relations which have subsisted between your Board and myself in my capacity of Privy Council Assessor, and my satisfaction at being able to state, most conscientiously, my belief in the earnestness and fidelity with which your examiners perform their important duties.

"I trust that these relations may continue unchanged so long as I am entrusted with these duties by the Privy Council ; and they will be made all the more agreeable to me that I have received at the hands of the Board so cordial an expression of their regard.

"Please convey to your colleagues and accept for yourself my most sincere thanks, and believe me

"Yours very truly,
(Signed) "Douglas Maclagan.

"J. B. Stephenson, Esq.,
"*Chairman of the Board of Examiners in Scotland.*"

Proceedings of Societies in London.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

The annual meeting was held on Thursday, July 15, Dr. Attfield, F.R.S., President, in the chair.

The minutes of the previous meeting having been read and confirmed, the Secretary read the annual report of the executive committee, as follows :—

Annual Report of Executive Committee.

The executive committee of the School of Pharmacy Students' Association have transacted the business of the past session at four committee meetings.

At a meeting held on November 26, 1885, the Secretary reported that nomination papers had been printed at the commencement of the session and forwarded to all members who had previously paid their annual subscriptions.

At the same meeting the following gentlemen were appointed as a Committee of Reporters to report upon the progress made in the various branches of science allied to pharmacy.—Pharmacology, Mr. T. S. Dymond ; Practical Pharmacy, Mr. R. A. Cripps ; Botany, Mr. E. H. Farr ; Materia Medica, Mr. J. O. Braithwaite ; Physics, Mr. F. J. Yeatman ; Organic Chemistry, Mr. W. H. Ince ; Inorganic Chemistry, Mr. H. R. Hoyles ; Analytical Chemistry, Mr. C. Thompson.

At a meeting held March 4, 1886, a grant of fifteen shillings from the Research Fund was made to Mr. W. F. Southall for the purpose of examining commercial fluid extracts of cinchona, and the Committee received with regret the resignation of the Reporter on Practical Pharmacy, Mr. R. A. Cripps, on account of business engagements. At a meeting held April 29, 1886, a grant of 17*s.* 6*d.* from the Research Fund was made to Mr. W. P. Want to defray the cost of samples, etc., in an examination of commercial tincture and extract of opium. The results obtained with the aid of these grants have in each case formed the subject of a communication to the Association during the session.

At a meeting held July 15, 1886, the following statement of the Committee of Reporters was read by the Secretary on behalf of the Committee :—

The Committee of Reporters on Science have since their appointment in November, 1885, held two meetings for the transaction of business. At a meeting held on November 26 Mr. Dymond was elected Chairman of the Committee and the order of reports for the ensuing session was arranged. The following reports have been made by the members of the Committee during the session :—Report on Pharmacology, by Mr. T. S. Dymond—

"Recent Additions to Materia Medica;" two Reports on Practical Pharmacy, by Mr. R. A. Cripps—"Pharmaceutical Notes on the New Pharmacopœia," and "Preliminary Note on Cascarilla;" two Reports on Botany, by Mr. E. H. Farr—"Vernation as Protective against Radiation," and "Recent Contributions to the Study of Transpiration and Respiration;" Report on Materia Medica, by Mr. J. O. Braithwaite—"The Percentage of Prussic Acid in Essential Oil of Almonds;" Report on Physics, by Mr. F. J. Yeatman—"Dark Lines in the Solar Spectrum;" two Reports on Organic Chemistry, by Mr. W. H. Ince—"Organic Explosives," and "Methods of Estimating Tannin, with a Note on a New Test for Nitrates;" two Reports on Analytical Chemistry, by Mr. C. Thompson—"The Estimation of Free Alkali in Soap," and "The Estimation of Resin in Soap."

This statement was approved by your Committee.

The following statistics show the progress of the Association during the session:—The number of members on the books is 63, including two ladies; the number of meetings held has been 14 including to-night's annual meeting; the gross attendance at the meetings has been 220, and the average attendance at each meeting 16. This shows a decline of 18 from last session in the total number of members, but the average attendance at the meetings remains the same. Twenty-four communications have been read, viz., 11 reports and 13 papers. The following is a list of the papers:—"Introductory Address," by Emeritus Professor Redwood; "Notes on the Production of Hydrobromic Acid," by Mr. T. S. Dymond; "Iodide of Sulphur," by Mr. J. G. Tingle; "Chemical Notes on the New Pharmacopœia," by Mr. R. A. Cripps; "Stomata," by Mr. E. G. Baker; "The History of Organic Synthesis," by Mr. W. H. Ince; "Commercial Fluid Extract of Cinchona," by Mr. W. F. Southall; "The Purity of Cream of Tartar of Commerce," by Mr. J. W. Bostock; "Micro-organisms and their relation to Pharmacy," by Mr. J. Kunz; "Commercial Tincture and Extract of Opium," by Mr. W. P. Want; "Note on a Sample of Elemi," by Mr. E. J. Eastes; "Oxycarbonate of Bismuth," by Mr. L. W. Hawkins; "A Kino from Eucalyptus Maculata," by Mr. E. N. Grimwade. Ten of these papers and eight reports have been published in full by the Editor of the *Pharmaceutical Journal*, as well as abstracts of all the others. There have also been many discussions on miscellaneous business at the close of the meetings, although this department is open to further development.

The Treasurer's accounts, to be presently audited, show that the receipts have exceeded the ordinary expenditure by £1 10*s.* 8*d.*, which has been transferred to the Research Fund, the balance of the latter being now £13 1*s.* 2*d.*

Messrs. G. W. Hodder and H. H. Long were appointed as auditors to audit the Treasurer's accounts, which they reported to be correct.

The Chairman then moved the adoption of the Report, which by seconded by Mr. R. Thomas and carried unanimously.

Having passed votes of thanks to the Chairman, Officers, and Committee of Reporters, the meeting adjourned.

ROYAL INSTITUTION OF GREAT BRITAIN.

New Applications of the Mechanical Properties of Cork to the Arts.*

BY WILLIAM ANDERSON, M. INST. C.E., M.R.I.

It would seem difficult to discover any new properties in a substance so familiar as cork, and yet it possesses qualities which distinguish it from all other solid or liquid bodies, namely, its power of altering its volume in a very marked degree in consequence of change of pressure. All liquids and solids are capable of cubical compression or extension, but to a very small extent; thus water is reduced in volume by only $\frac{1}{20000}$ part by the pressure of one atmosphere. Liquid carbonic acid yields to pressure much more than any other fluid, but still the rate is very small. Solid substances, with the exception of cork, offer equally obstinate resistance to change of bulk; even india-rubber, which most people would suppose capable of very considerable change of volume, we shall find is really very rigid.

I have here an apparatus for applying pressure by means of a lever. I place a piece of solid india-rubber under the plate and you see that I can compress it considerably by a very light pressure of my finger. I slip this same piece of india-rubber into a brass tube, which it fits closely, and now you see that I am unable to compress it by any force which I can bring to bear. I even hammer the lever with a mallet, and the blow falls as it would on a stone. The reason of this phenomenon is that in the first place, with the india-rubber free, it spread out laterally while being compressed longitudinally, and consequently the volume was hardly altered at all; in the second case the strong brass tube prevented all lateral extension, and because india-rubber is incapable of appreciable cubical compression, its length only could not be sensibly altered by pressure.

Extension, in like manner, does not alter the volume of india-rubber. In this glass tube is a piece of solid round rubber which nearly fills the bore. The lower end of the rubber is fixed in the bottom of the tube, and the upper end is connected by a fine cord to a small windlass, by turning which I can stretch the rubber. I fill the tube to the brim with water, and throw an image of it on to the screen. If stretching the rubber either increases or diminishes its volume the water in the tube will either overflow or shrink in it. I now stretch the rubber to about three inches, or one-third of its original length, but you cannot see any appreciable movement in the water-level, hence the volume of the rubber has not changed.

Metals when subjected to pressures which exceed their elastic limits so that they are permanently deformed, as in forging or wire-drawing, remain practically unchanged in volume per unit of weight.

I have here a pair of common scales. To the under sides of the pans I can hang the various specimens that I wish to examine; underneath these are small beakers of water which I can raise or lower by means of a rack and pinion. Substances immersed in water lose in weight by the weight of their own volume of water; hence if two substances of equal volume balance each other in air, they will also balance when immersed in water, but if their volumes are not the same, then the substance having the smaller volume will sink, because the weight of water it displaces is less than that displaced by the substance with the larger volume. To the scale on your left hand is suspended a short cylinder of ordinary iron, and to the right-hand scale a cylinder of ordinary copper. They balance exactly. I now raise the beakers and immerse the two cylinders in water; you see the copper cylinder sinks at once, and I know by that that copper has a smaller volume per pound than iron, or as we should commonly say, it is heavier than iron. I now detach the copper cylinder, and in its place hang on this iron one, which is made of the same bar as its fellow cylinder, but forced, while red hot, into a mould by a pressure of sixty tons per square inch, and allowed to cool under that pressure. The two cylinders balance, as you see. Has the volume of the iron in the compressed cylinder been altered by the rough treatment it has received? I raise the beakers, immerse the cylinders, the balance is not destroyed; hence we conclude that although the form has been changed the volume has remained the same. I substitute for the hot compressed cylinder one pressed into a mould while cold,

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and held there for some time, with a load of sixty tons per square inch ; the balance is not destroyed by immersion, hence the volume has not been altered. I can repeat the experiments with these copper cylinders and the result will be found the same. Extension also is incapable of appreciably altering the density of metals. I attach to the scales two specimens of iron taken from a bar which had been torn asunder by a steady pull. One specimen is cut from the portion where it had not been strained, and the other from the very point where it had been gradually drawn out and fractured. The specimens balance, I immerse them, you see the balance is not destroyed ; hence the volume of the iron has not been changed appreciably by extension.

But cork behaves in a very different manner. I place this cylinder of cork into just such a brass tube as served to restrain the india-rubber and apply pressure to it in the same way ; you see I can readily compress the cork, and when I release it it expands back to its original volume ; the action is a little sluggish on account of the friction of the cork against the sides of the tube. In this case, therefore, a very great change in the volume of the material has been easily effected.

But although solids evidently do not change sensibly in bulk, after having been released from pressures high enough to distort them permanently, yet while actually under pressure the volumes may have been considerably altered. As far as I am aware this point has not been determined experimentally for metals, but it is very easy to show that india-rubber does not change.

I have here some of this substance, which is so very slightly lighter than water that, as you see, it only just floats in cold water, but sinks in hot. If I could put it under considerable pressure while afloat in cold water, then if its volume became sensibly less it ought to sink. In the same way, if I load a piece of cork and a piece of wood so that they barely float, if their volumes alter they ought to sink.

In this strong upright glass tube I have at the top a piece of india-rubber, immediately below it a piece of wood, and below that a cork ; the wood and the cork are loaded with metal sinkers to reduce their buoyancy. The tube is full of water and is connected to a force-pump, by means of which I can impose a pressure of over 1000 lbs. per square inch. The image of the tube is now thrown on the screen and the pressure is being applied. You see at once the cork is beginning to shrink in all directions, and now its volume is so reduced that it is incapable of floating, and sinks down to the bottom of the tube. The india-rubber is absolutely unaffected, the wood does contract a little, but not sufficiently to be visible to you or to cause it to sink. I open a stop-cock and relieve the pressure; you see that the cork instantly expands, its buoyancy is restored, and it floats again. By alternately applying and taking off the pressure I can produce the familiar effect so well known in the toy called "the bottle imps." It is this singular property which gives to cork its value as a means of closing the mouths of bottles. Its elasticity has not only a very considerable range but it is very persistent. Thus in the better kind of corks used in bottling champagne and other effervescing wines you are all familiar with the extent to which the corks expand the instant they escape from the bottles.

I have measured this expansion and find it to amount to an increase of volume of 75 per cent., even after the corks have been kept in a state of compression in the bottles for ten years. If the cork be steeped in hot water the volume continues to increase till it attains nearly three times that which it occupied in the neck of the bottle.

When cork is subjected to pressure, either in one direction, as in this lever press, or from every direction, as when immersed in water under pressure, a certain amount of permanent deformation or "permanent set" takes place very quickly. This property is common to all solid elastic substances when strained beyond their elastic limits, but with cork the limits are comparatively low. You have, no doubt, noticed in chemists' and other shops that, when a cork is too large to fit a bottle, the shopkeeper gives the cork a few sharp bites, or, if he be more refined, he uses a pair of specially-contrived pincers ; in either case he squeezes the cork beyond its elastic limits, and so makes it permanently smaller. Besides the permanent set, there is a certain amount of what I venture to call sluggish elasticity ; that is, cork, on being released from pressure, springs back a certain amount at once, but the complete recovery take an appreciable time.

While I have been speaking, a piece of fresh cork, loaded so as barely to float, has been inserted into the vertical glass pressure-tube. I apply a slight pressure, you see the cork sinks. I release the pressure and it rises briskly enough. I now apply a much higher pressure for a moment or two, I release it, and the cork will either not rise at all, or will do so very slowly ; its volume has been permanently altered ; it has taken a permanent set.

In considering the properties of most substances, our search for the cause of these properties is baffled by our imperfect powers, and the feeble instruments we possess for investigating molecular structure. With cork, happily, this is not the case ; an examination of its structure is easy, and perfectly explains the cause of its peculiar and valuable properties.

All plants are built up of minute cells of various forms and dimensions. Their walls or sides are composed chiefly of a substance called cellulose, frequently associated with lignine, or woody matter, and with cork, which last is a nitrogenous substance found in many portions of plants, but is especially developed in the outer bark of exogenous trees, that is, trees belonging to an order, by far the most common in these latitudes, the stems of which grow by the addition of layers of fresh cellulose tissue outside the woody part and inside the bark. Between the bark and the wood is interposed a thin fibrous layer, which in some trees, such as the lime, is very much developed, and supplies the bass matting with which all are familiar. The corky part of the bark, which is outside, is composed of closed cells exclusively, so built together that no connection of a tubular nature runs up and down the tree, although horizontal passages radiating towards the woody part of the tree are numerous. In the woody part of the tree, on the contrary, and in the inner bark, vertical passages or tubes exist, while a connection is kept up with the pith of the tree by means of medullary rays. In one species of tree, known as the cork oak, the corky part of the bark is very strongly developed.

I project on the screen the magnified image of a horizontal section of the bark of the cork oak ; you see nine or ten bands running parallel to each other, these are the layers of cellulose matter that have been deposited in successive years. I turn the specimen, and you now see the vertical section with the radiating passages clearly marked.

The difference between the arrangement of cells or tissue forming the woody part of the tree and the bark is easily shown. I have here three metal sockets supported over a shallow wooden tray. Into them are fitted, first a cork, cut out of the bark in a vertical direction, next, a cork cut in a radial direction, and lastly, a piece of common yellow pine. By means of my force-pump I apply a couple of atmospheres of hydraulic pressure. I project an image of the apparatus on the screen, and you see the water has made its way through the wood and through the cork cut in the radial direction, while the cork cut in the vertical direction is impervious.

The cork tree, a species of evergreen oak, is indigenous in Portugal and along both shores of the Mediterranean, where it attains a height of 30 to 40 feet ; it is not cultivated in any way but grows like trees in a

park. The first crop is not gathered till the tree is thirty years old, the next nine or ten years later ; both these crops yield inferior cork, but at the third crop, gathered when the tree is fifty years old, the bark has attained full maturity, and after that will yield the highest quality of cork every nine or ten years. In the autumn of the year, when the bark is in a fit state, that is, for small trees, from three-quarters of an inch to one inch thick, and for larger ones up to one inch and a half, a horizontal cut is made by means of a light axe through the bark a few inches above the ground ; succeeding cuts are made at distances of about a yard, up to the branches, and even along some of the large ones, then two or more vertical cuts, according to the size of the tree, and the bark is ripped off by inserting the wedge-shaped end of the axe handle. In making the cuts great care is taken to avoid wounding the inner bark, upon the integrity of which the health of the tree depends ; but where this precaution is taken, the gathering of the cork does not in any way injure the tree.

After stripping, the cork is immersed for about an hour in hot water, it is dressed with a kind of spokeshave, then laid out flat and weighted in order to take out the curvature ; it is then stacked in the open air without protection of any kind, for cork does not appear to be susceptible of receiving injury from the weather.

The minute structure of the bark is very remarkable. First, I project on the screen a microscopic section of the wood of the cork tree. It is taken in a horizontal plane, and I ask you to notice the diversity of the structure, and especially the presence of large tubes or pipes. I next exhibit a section taken in the same plane of the corky portion of the bark. You see the whole substance is made up of minute many-sided cells about $\frac{1}{70}$ of an inch in diameter, and about twice as long, the long way of the cells being disposed radially to the trunk. The walls of the cells are extremely thin, and yet they are wonderfully impervious to liquids. Looked at by reflected light, if the specimens be turned, bands of silvery light alternate with bands of comparative darkness, showing that the cells are built on end to end in regular order.

The vertical section next exhibited shows a cross section of the cells looking like a minute honeycomb. In some specimens large numbers of crystals are found. These could not be distinguished from the detached elementary spindle-shaped cells, of which woody fibre is made up, were it not for the powerful means of analysis we have in polarized light. I need hardly explain to an audience in this Institution that light passed through a Nicol prism becomes polarized, that is to say, the vibrations of the luminiferous ether are all reduced to vibrations in one plane, and, consequently, if a second prism be interposed and placed at right angles to the first, the light will be unable to get through ; but if we introduce between the crossed Nicols a substance capable of turning the plane of vibration again, then a certain portion of the light will pass. I have now projected on the screen the feeble light emerging from the crossed Nicols. I introduce the microscopic preparation of cork cells between them, and you see the crystals glowing with many coloured lights on a dark ground.

Minute though these crystals are, they are very numerous and hard, and it is partly to them that is due the extraordinary rapidity with which cork blunts the cutting instruments used in shaping it. Cork-cutters always have beside them a sharpening-stone, on which they are obliged to restore the edges of their knives after a very few cuts.

The cells of the cork are filled with gaseous matter, which is very easily extracted, and which has been analysed for me by Mr. G. H. Ogston, and proved to be common air. I have here a glass tube in which are some pieces of cork which have been cut into slices so as to facilitate the escape of the air. I connect the tube with an exhausted receiver and project the image on the screen ; you see rising from the cork bubbles of air as numerous, but much more minute than the bubbles which rise from sparkling wines ; much more minute, because the bubbles you see are expanded to seven or eight times their volume at atmospheric pressure on account of the vacuum existing in the tube. The air will continue to come off for an hour or more, and from measurements made by Mr. Ogston I find that the air occluded in the cork amounts to about 53 per cent. of its volume. The facility with which the air escapes, compared with the impermeability of cork to liquids is very remarkable.

I throw on the screen the image of a section cut from a cork which was kept under a vacuum of about 26 inches for five days and nights ; aniline dye was then injected, and yet you see that the colour has not more than permeated the outermost fringe of cells—those, in fact, which had been broken open by the operation of cutting the cork. By keeping cork for a very long time in an almost perfect vacuum, and then injecting dye, a slight darkening of the general colour of a section of the cork may be noticed, but it is very slight indeed. How, then, does the air escape so readily when the cork is placed *in vacuo* ?

The answer is, that gases possess the property of diffusion ; that is, of passing through porous media of inconceivable fineness. When two gases, such as hydrogen and air, are separated by a porous medium, they immediately begin to pass into each other, and the lighter gas passes through more quickly than the heavier.

I have here a glass tube, the upper end of which is closed by a thin slice of cork, the lower end dips into a basin of water. Some hours ago the tube was filled with hydrogen, which you know is about fourteen and a half times lighter than air ; consequently, according to the law of diffusion, it will get out of the tube through the cork quicker than the air can get in by the same means, and the result must be that a partial vacuum will be formed in the tube, and a column of water drawn up. You see that such has been the case, and we have thus proved that the cells of cork are eminently pervious to gases. The pores in the cell-walls appear, however, to be too minute to permit the passage of liquids.

I closed the end of a glass tube 11 mm. diameter, with a disk of cork 1·75 mm. thick, cut at right angles to the axis of the tree ; I placed a solution of blue litmus inside the tube, and suspended it in a weak solution of sulphuric acid. Had diffusion taken place, both liquids would have assumed a red colour, but after sixteen hours no change whatever could be detected. A like inertness was exhibited when the tube was filled with a solution of copper sulphate and suspended in a weak solution of ammonia ; a deep blue colour would have appeared had any intermixture taken place, and the same tube is before you immersed in ammonia and filled with red litmus solution. It has been in this condition since February 28, but no diffusion has taken place. A disk of wood 6 mm. thick, under the same circumstances, showed, after a couple of hours, by the liquids turning blue, that diffusion was going on actively. It is this property of allowing gases to permeate while completely barring liquids that enables cork to be kept in compression under water or in contact with various liquids without the air-cells becoming water-logged, and that makes cork so admirable an article for waterproof wear, such as boot-soles and hats, for, unlike india-rubber, it allows ventilation to go on while it keeps out the wet. The cell-walls are so strong, notwithstanding their extreme thinness, that they appear when empty, to be able to resist the atmospheric pressure, for the volume of the cork does not sensibly diminish, even when all the air has been extracted. Viewed under very high power, cross-stays or struts of fibrous matter may be distinguished traversing the cells ; these, no doubt, add to the strength and resistance of the structure.

From what you have seen you will have no difficulty in arriving at the conclusion that cork consists, practi-

cally, of an aggregation of minute air-vessels, having very thin, very water-tight, and very strong walls, and hence, if compressed, we may expect the resistance to compression to rise in a manner more like the resistance of gases than the resistance of an elastic solid such as a spring. In a spring the pressure increases in proportion to the distance to which the spring is compressed, but with gases the pressure increases in a much more rapid manner; that is, inversely as the volume which the gas is made to occupy. But from the permeability of cork to air, it is evident that, if subjected to pressure in one direction only, it will gradually part with its occluded air by effusion, that is by its passage through the porous walls of the cells in which it is contained. This fact can be readily demonstrated by the lever press which I have used, for, if the brass cylinder containing the cork be filled with soap and water and pressure be then applied, minute bubbles will be found to collect on the surface, and their formation will go on for many hours.

On the other hand, if cork be subjected to pressure from all sides, such as operates when it is immersed in water under pressure, then the cells are supported in all directions, the air in them is reduced in volume, and there is no tendency to escape in one direction more than another. An india-rubber bag, such as this, distended by air, bursts, as you see, if pressed between two surfaces, but if an india-rubber cell be placed in a glass tube and subjected to hydraulic pressure, it is merely shrivelled up; the strain on its walls is actually reduced.

To take advantage of the peculiar properties of cork in mechanical applications, it is necessary to determine accurately the law of its resistance to compression, and for this purpose I instituted a series of experiments of this kind. Into a strong iron vessel of $5\frac{1}{2}$ gallons capacity I introduced a quantity of cork, and filled the interstices full of water, carefully getting out all the air. I then proceeded to pump in water, until definite pressures up to 1000 pounds per square inch had been reached, and, at every 100 pounds, the weight of water pumped in was determined. In this way, after many repetitions, I obtained the decrease of volume due to any given increase of pressure. The observations have been plotted into the form of a curve, which you see on the diagram on the wall. The base line represents a cylinder containing one cubic foot of cork divided by the vertical lines into ten parts; the black horizontal lines according to the scale on the left hand represent the pressures in pounds per square inch which were necessary to compress the cork to the corresponding volume. Thus to reduce the volume to one-half, required a pressure of 250 pounds per square inch. At 1000 pounds per square inch the volume was reduced to 44 per cent.; the yielding then became very little, showing that the solid parts of the cells had nearly come together, and this corroborates Mr. Ogston's determination that the gaseous part of cork constitutes 53 per cent. of its bulk. The engineer, in dealing with a compressible substance, requires to know not only the pressure which a given change of volume produces, but also the work which has to be expended in producing the change of volume. The work is calculated by multiplying the decrease of volume by the mean pressure per unit of area which produced it. The ordinates of the dotted curve on the diagram with the corresponding scale of foot-pounds on the right-hand side are drawn equal to the work done in compressing a cubic foot of cork to the several volumes marked on the base line. I have not been able to find an equation to the pressure curve; it seems to be quite irregular, and hence the only way of calculating the effects of any given change of volume is to measure the ordinates of the curve constructed by actual experiment. As may be supposed the pressures indicated by experiment are not nearly so regular and steady as corresponding experiments on a gas would be, and the actual form of the curves will depend on the quality of the cork experimented on.

The last point of importance in this inquiry relates to the permanence of elasticity in cork.

So far as preservation of elasticity during years of compression is concerned, we have the evidence of wine corks to show that a considerable range of elasticity is retained for a very long time. With respect to cork subjected to repeated compression and extension, I have very little evidence to offer beyond this, that cork which had been compressed and released in water many thousand times had not changed its molecular structure in the least, and had continued perfectly serviceable. Cork which has been kept under a pressure of three atmospheres for many weeks appears to have shrunk to from 80 to 85 per cent. of its original volume.

I will conclude this lecture by bringing under your notice two novel applications of cork to the arts.

Before the lecture table stands a water-raising apparatus called a hydraulic ram. The structure of the machine may be described as follows. The ram consists of an inclined pipe, which leads the water from a reservoir into a chamber which terminates in a valve opening inwards. Branching up from the chamber is a passage leading to a valve, opening outwards and communicating with a regulating vessel, which is usually filled with air, but which I prefer to fill with cork and water. Immediately beyond the inner valve is inserted a delivery pipe, which is laid to the spot to which the water has to be pumped, in this case to the fountain jet in the middle of this pan.

The action of the ram is as follows:—The outer valve, which opens inwards, is, in the first instance, held open, and a flow of water is allowed to take place through it down the pipe and chamber. The valve is then released, and is instantly shut by the current of water which is thus suddenly stopped, and, in consequence, delivers a blow similar to that produced by the fall of a hammer on the anvil, and just as the hammer jumps back from the anvil, so does the water recoil back to a small extent along the pipe.

During this action, first, a certain portion of water is forced by virtue of the blow through the inner valve, opening outwards, into the cork vessel, and so to the delivery pipe, and instantly afterwards the recoil causes a partial vacuum to form in the body of the ram, and permits the atmospheric pressure to open the outer valve and re-establish a rush of water as soon as the recoil has expended itself. In the little ram before you, this action, which it has taken so long to describe, is repeated 140 times in a minute.

The ram is now working. You hear the regular pulses of the valve, and you see a jet of water rising some 10 feet into the air. I throw the electric light on the water, and I ask you to notice the regularity of the flow. You can, indeed, detect the pulses of the ram in the fountain, but that is because I am only using a regulating vessel of the same capacity as that generally used for air, and you will recollect that 44 per cent. of the substance of cork is solid and inelastic. By closing a cock I can cut off the cork vessel from the ram; you see the regularity of the jet has disappeared, it now goes in leaps and bounds. This demonstrates that the elasticity of cork is competent to regulate the flow of water. When air is used for this purpose the air-vessel has to be filled, and, with most kinds of water, the supply has to be kept up while the ram is working, because water under pressure absorbs air. For this purpose a "sniff-valve" is a necessary part of all rams. It is a minute valve opening inwards, placed just below the inner valve; at each recoil a small bubble of air is drawn in and passed into the air-vessel. This "sniff-valve" is a fruitful source of trouble. Its minuteness renders it liable to get stopped up by dirt; it must not, of course, be submerged, and, if too large, it seriously affects the duty performed by the ram. The use of cork gets rid of all these difficulties, no sniff-valve is needed, the ram will work deeply submerged, and there is no fear of the cork

vessel ever getting empty. The duty which even the little ram before you has done is 65 per cent., and larger ones have reached 80 per cent.

The second novel application of cork is for the purpose of storing a portion of the energy of the recoil of cannon, for the purpose of expending it afterwards in running them out.

The result of the explosion of gunpowder in a gun is to drive the shot out in one direction, and to cause the gun to recoil with equal energy the opposite way. To restrain the motion of the gun "compressors" of various kinds are used, and in this country, for modern guns, they are generally hydraulic, that is to say, the force of recoil is expended in causing the gun to mount an inclined plane, and, at the same time, in driving a piston into a cylinder full of water, the latter being allowed to squeeze past the piston through apertures, the areas of which are either fixed or capable of being automatically varied as the gun recedes; or else the water is driven out of the cylinder through loaded valves. As a rule, the gun is moved out again into its firing position by its weight causing it to run down the inclined plane, up which it had previously recoiled. For naval purposes, however, this plan is inconvenient, because the gun will not run out to windward if the vessel is heeling over, on account of the inclined plane becoming more horizontal, or even inclined in the reverse direction, and should the ship take a permanent list, from a compartment getting full of water, the inconvenience might be very considerable.

In land service guns, when mounted in barbette, the rising of the gun exposes it and the loading detachment more to the enemy's fire, and in both cases, when placed in ports or embrasures, the ports must be higher than if the gun recoiled horizontally, and will therefore offer a better mark to the enemy's fire, especially that of machine guns, while the sudden rise of the gun in recoiling imposes a severe downward pressure on the deck or on the platform.

To obviate these disadvantages I have contrived the gun-carriage a model of which is before you on the table, and a diagram of which on the wall illustrates the internal construction. The gun is mounted on a carriage composed of two hydraulic cylinders, united so as to form one piece. The carriage slides on a pair of hollow ways, and also on to a pair of fixed rams, the rear ends of which are attached to the piece forming the rear of the mounting. There are water passages down the axes of the rams, and these communicate through an automatic recoil-valve, opening from the cylinders, with the two hollow slides. There is a second communication between the cylinders and slides by means of a cock, which can be opened or shut at pleasure. The hollow slides are packed full of cork and water, the latter also completely filling the cylinders, rams, and various connecting passages.

By means of a small force-pump enough water can be injected to give the cork so much initial compression as will suffice to run the gun out when the slides are inclined under any angle which may be found convenient.

When the gun is fired, the cylinders are driven on to the rams, and the water in the cylinders is forced through the hollow rams into the cork and water vessels formed by the slides, and the cork is compressed still farther. When the recoil is over, the automatic recoil-valve closes, and the gun remains in its rearward position ready for loading.

As soon as loaded, the running-out cock is opened, the expansion of the cork drives the water from around it into the cylinders, and so forces the gun out.

If it be desired to let the gun run out automatically immediately after recoil, it is only necessary to leave the running-out cock open, and then the water forced among the cork by recoil returns instantly to the cylinders, and runs the gun out quicker than the eye can follow the motion.

I will now load the model and fire a shot into this strong steel cylinder, at the bottom of which is a thick layer of soft wood. I will close the running-out valve, so that the gun shall remain in the recoiled position. Sir Frederick Abel has kindly arranged some of his electric fuses specially to fit this minute ordnance, and I can fire the gun by means of a small electro-magnetic battery. The gun has now recoiled, and remains in its rear position. I load again, open the running-out cock, the gun runs out, and I fire without closing the cock. You see the gun has recoiled and run out instantly again.

The arrangement I have adopted may be made by using air instead of cork, but air is a troublesome substance to deal with; it leaks out very easily, and without showing any signs of having done so, which might readily lead to serious consequences. A special pump is required to make up loss by leakage.

The merit of cork is its extreme simplicity and trustworthiness. By mixing a certain proportion of glycerine with the water it will not freeze in any ordinary cold weather.

SOCIETY OF CHEMICAL INDUSTRY.

In continuation of our report of the proceedings at the annual meeting of this Society in Liverpool last week, we now publish the list of officers and council for the ensuing year:—

President:—Mr. David Howard.

Vice-Presidents:—Sir I. Lowthian Bell, Bt., F.R.S.; Professor James Dewar, F.R.S.; Dr. P. Griess, F.R.S.; Dr. F. Hurter; Mr. E. K. Muspratt; Dr. W. H. Perkin; Sir H. E. Roscoe; Mr. J. Spiller; Mr. E. C. C. Stanford; Mr. J. C. Stevenson; Mr. John Williams and Mr. Philip Worsley.

Members of Council:—Mr. J. Calderwood; Mr. Eustace Carey; Mr. R. Forbes Carpenter; Mr. H. Doulton; Dr. J. Evans; Mr. S. H. Johnson; Mr. I. Levinstein; Mr. J. Pattinson; Mr. S. A. Salder; Sir B. Samuelson, Bt.; Sir Charles Tennant, Bt., and Mr. L. T. Wright.

Treasurer:—Mr. E. Rider Cook.

Foreign Secretary:—M. Ludwig Mond.

Parliamentary and Law Proceedings.

Poisoning by Cyanide of Potassium.

At Stoke, on Saturday, the 17th inst., Mr. J. Vaughan held an inquest on the body of William Conn, a French tutor, who had been found in bed that morning under circumstances which showed that he had taken his own life. Evidence having been given showing that the deceased had been for some time past in pecuniary distress, Mr. Thom, surgeon, said he had examined the body, and it was not necessary to hold a *post-mortem* examination. He found a bottle (produced) marked "Poison," with a written label underneath, "Cyanide of potassium." This was a chemical used by photographers, and a person getting it would have to sign a book. There was a tumbler (produced) by the side of the bottle. The stopper was lying alongside. There was a small quantity of the poison in the tumbler, apparently of the same strength as that in the bottle. He was sure he could detect the odour of cyanide of potassium in the body. Taking all the circumstances into consideration, and the position in which the body was found (the face turned towards the bottle, the hands outside the bed, and the right hand stretched towards the tumbler), witness was of opinion that deceased had committed suicide. Witness believed that deceased had some knowledge of chemistry. Death would quickly ensue after the poison had been taken.

The Jury returned a verdict that deceased had committed suicide whilst in a state of insanity.

Review.

THE PRACTICE OF PHARMACY; a Treatise on the Modes of Making and Dispensing Officinal, Unofficinal and Extemporaneous Preparations, with Descriptions of their Properties, Uses and Doses. By JOSEPH P. REMINGTON, Ph.G.*

A bulky volume, containing upwards of one thousand pages of matter of interest to pharmacists of all countries must necessarily be welcomed as an important addition to pharmaceutical literature, and a careful consideration in detail of the work before us has convinced us that it will receive such a welcome. The improvements that are almost daily being made in pharmaceutical apparatus and manipulation require judicious periodical compilation to render them really useful. Professor Remington's book certainly includes such compilation and thus supplies a want keenly felt at the present time by English pharmacists.

The author, whose name is well known in connection with the United States Pharmacopœia and the Dispensatory, has for the past twelve years occupied the Chair of the Theory and Practice of Pharmacy in the Philadelphia College of Pharmacy and the experience thus gained entitles him to speak with authority.

The division and subdivision of the subject matter have been skilfully made; the list of contents gives a comprehensive view of the six parts, which may be conveniently reviewed in succession.

Part I. is devoted to "detailed descriptions of apparatus and definitions and comments on general pharmaceutical processes," and is one of the most interesting sections of the work. All pharmaceutical processes and the apparatus by which they may be most appropriately carried out are here described in detail, such as the operations of weighing and measuring, the various kinds of balances, different forms of furnaces, the means of generating steam, its use in pharmaceutical operations, drying closets, drug mills, a variety of percolators and percolating shelves; indeed the whole part deserves close attention. Amongst the numerous presses, however, described by the author we cannot find one suited to the requirements of the ordinary retail pharmacist in this country, who will reject one-half as too large and expensive and the other half as too weak or unpractical. The space devoted to the description of the Enterprise press, which has in our hands proved very inefficient for general pharmaceutical work, might well have been devoted to a notice of Duchscher's or some other compact and powerful press. Similarly there is no description of a reasonable pharmaceutical still adaptable to either evaporation or distillation by steam heat, although truly such a one is figured in the plate of the "Laboratory" on p. 904.

The chapter devoted to percolators and percolation is replete with interest for pharmacists of this country, where liquid extracts are coming daily into greater request. A notice of the Rosenwasser narrow percolators and method of percolation would doubtless have been acceptable to many retail pharmacists, for it is claimed that by them a liquid extract 1 in 1 can be made in a few hours without heat.

In Part II. "officinal preparations alone are considered. Due weight and prominence are thus given to the Pharmacopœia, the national authority which is now so thoroughly recognized," whilst Part III. treats of "inorganic chemical substances in which precedence is given to officinal preparations."

These two parts comprise just 400 pages, or about two-fifths of the whole, and consists of a more or less literal transcript of the United States Pharmacopœia, with explanatory annotations designed for facilitating the study of that work.

It is difficult, however, to understand upon what principle unofficinal galenical preparations have been excluded (with the exception of infusions and decoctions) whilst unofficinal chemical substances have been introduced in considerable numbers and with a brevity of description extending almost to mere enumeration. Surely it is more important to the pharmacist to be acquainted with the menstrua, ingredients, etc., of the many unofficinal galenical preparations (such as fluid extract of cascara sagrada), than to have a vague outline of the processes by which such chemicals as bromide, fluoride, chloride and iodide of chromium are produced.

Part IV. treats of organic chemical substances, which are divided into groups, from cellulin, starchy bodies, etc., up to the most "highly organized" (*sic*) alkaloids, including products from animal substances. This part also contains a chapter on pharmaceutical testing, which is, we think, deficient, since it assumes a knowledge on the part of the operator sufficient to enable him to dispense with it, whilst to the student it must be almost uselessly brief. Much of this part is a condensed "Materia Medica and Therapeutics," which seems out of place in a Practice of Pharmacy.

Part V. is devoted to extemporaneous pharmacy, and must, as a whole, be commended. The hints on the arrangement of the shop, the laboratory and the cellar, of the shelves, bottles, drawers, etc., the details of the prescription-counter, deserve careful attention, although American customs evidently differ in many ways from those prevalent in this country. The directions for making cachets, troches, etc., for coating pills with gelatin, chalk, and so on are useful, but some of the operations of daily occurrence are treated with inexplicable brevity. Every pharmacist will admit the importance of his being able to produce a perfect pill mass, or an irreproachable emulsion, yet, strange to say, the directions for making either are most scanty. Only one typical mucilage and oil emulsion is described, the student being left to grope his way in the dark with any emulsion differing from this, whilst we may fairly say that there are none but general rules for forming a good pill mass, such as would be dictated by the common sense of the most inexperienced apprentice. Special excipients for special substances are entirely ignored.

Part VI. is a formulary of unofficinal preparations in any mixtures, pills, ointments etc. Unofficinal liquid extracts, tinctures, elixirs and the like, as in Oldberg's 'Unofficinal Pharmacopœia,' seem to be excluded.

Whilst it must be admitted that the work commends itself to pharmacists by reason of the abundance of interesting matter that it contains, yet the conviction forces itself upon us that the attempt has been made to include in it subjects that may be considered without the scope of a Practice of Pharmacy, and that are sufficient to constitute of themselves special works, such as a Materia Medica, a Pharmacopœia, etc., and this at the cost of thoroughness in certain sections of the work.

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Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE NORTH BRITISH BRANCH.

Sir,—Owing to the late hour at which the last meeting of Council terminated and the evident and very proper resolution of its members that it was necessary to give the subject deliberate consideration, I had no opportunity of addressing the Council at any length and so refrained altogether. But it has since occurred to me that by the time we meet to discuss the question in the General Purposes Committee many of the members of Council may

have made up their minds on the subject, and it will be rather late in the day to hope to influence the result materially. I therefore venture to address a letter to you in order that I may feel that I have left no stone unturned to bring about a satisfactory settlement.

To commence with the "legality question," of which personally I think rather much has been made; it appears to me to stand thus. The Council at the present moment has not power (strictly speaking) either to appoint a committee, except of its own members, or to create a Branch of the Society. But to stigmatize either of these courses as "illegal" is, in my opinion, a misuse of language. For while there is no direct and distinct authorities in the Charter or Acts for either course, there is, on the other hand, nothing which directly or distinctly prohibits either. The reasons that I am still opposed to the amended Bye-law on this subject are, first, that I believe it will be rejected by the Privy Council on the simple ground that it is so completely general and indefinite, and does not indicate the use the Council intends to make of it; and secondly, because it does not meet the demand of the Scottish members for a definite and final arrangement, as it gives no security that a Scottish committee shall always be appointed, nor does it define its constitution. It would not and could not effect a permanent settlement of the question; and on that ground there would probably be active opposition to it from Scotland, unless the Scottish difficulty were settled beforehand in another manner.

This manner might well be that proposed by the deputation for Scotland, not by creating any novelty, but by modifying and confirming an arrangement which has all the prestige of thirty years and more of a successful existence, and which really nobody but the Council itself can or will interfere with. If the Council itself had not moved in the matter first, the Scottish members would not have demanded to be put in a legal position, as they now do. The key of the position is the retention of the term Branch, qualified by some national adjective such as North British, or Scottish. When that is granted it is very easy and simple to permit that Branch to select certain officials of the Branch, who with a little care may readily be kept distinct from officials of the Society. If the matter be properly stated in the Calendar of the Society, and the local directory, there never need be the least confusion or mistake. It is the mystery that has been allowed to hang round the subject that has given rise to these, which after all are very few and far between. That the election of these officers of the Branch should be subject to confirmation from headquarters is a very proper arrangement, and one which, properly regarded, is a great advantage for the officials, and an increased responsibility for the Council itself. Still it is for the electors a derogation from their former independence of choice, and in that sense a concession from the Scottish side. The second concession, one which, like the first, was never very seriously objected to in Scotland, was the surrender of the term Council of the Branch. This brings one to the third and further concession offered by the deputation, viz., to accept two vice-presidents (senior and junior), as the chief officials of the Branch, in place of the old titles president and vice-president. This was offered not because the change was welcome either to the deputation or those they represented, but really to show the anxiety of the deputation to push concession to the utmost limit for peace sake. The suggestion is quite a workable one, however, although as I never could understand the objections to having a president of the Branch, I do not pretend to prefer that solution. As I have said in your columns before, I consider the possession of such titles by us in Scotland "a necessity of the case," so I can never be a party to sweeping them away altogether.

No doubt the crowning and vital advantage on the side of the proposal of the deputation is that it is satisfactory to the bulk of Scottish members, which other schemes are not. The point I have been aiming at all through this controversy, and which I hope I have now gained, is to convince the Council of the strength of the feeling in Scotland on this subject. The real question for the Council to decide is, whether it will make Scottish members loyal or disloyal to them, for any further rebuff on the part of the Council will certainly make the majority of them disloyal, especially those of most ability and influence. I do, therefore, most earnestly implore every member of Council to do his utmost to conciliate that majority. The Society is in a critical position, and cannot afford to be defeated again, and unless it presents a united front it is certain to meet with reverses. The Scottish contingent, while small in number, is not without considerable influence even in Parliament itself, and the Council must face this fact, and do its utmost to keep that influence on their own side.

On the subject of Branches generally there appears to be two parties in the Council, one anxious that there should be a number of Branches, the other opposed to the idea altogether. The North British Branch is apparently attacked by both, but on opposite grounds. It would be both unfortunate and unfair if that organization were crushed through a combination of persons of opposite views. I do not think, indeed, after what was said by the deputation, that the advocates of branches ought to persevere in their attack, as the deputation disclaimed any opposition to the principle, and the Branches contemplated being on a considerable scale it is very doubtful whether Scotland would ever require or demand more than one. Railway communication is always improving, and the Forth and Tay Bridges when completed will bring our northern brethren practically much nearer to us, and thus enable the executive of the Branch to become more thoroughly representative than even hitherto.

I would not have re-opened this question in your columns, but as that was done last week by Mr. Martin's kindly letter I thought it a favourable opportunity of stating my views, which otherwise I was minded to convey rather to my fellow councillors personally. But as I really could not face the labour of writing each individually I ventured once again, and I hope finally as to this question, to avail myself of your pages.

Edinburgh. H. BELLYSE BAILDON.

ALTERATION IN MORPHINE SOLUTIONS.

Sir,—Seeing a note in the *Pharmaceutical Journal* as to apomorphine being found in a solution of morphine hydrochlorate, I at once remembered that Dr. Rogers (a short time since, when ordering some injectio morphinæ hypodermica), said that he believed that some chemical change must take place when the hypodermic solution is kept for any length of time, as it caused very considerable vomiting, without the slightest apparent cause. He has noticed the same on several different occasions.

To-day he informed me that the freshly-made solution acted when adminstered to the same patients in a perfect manner. In the case referred to the morphine injection had been used a number of times with the usual results.

Is it possible that apomorphine could be formed from an acetate solution so strong as the hypodermic injection, or might that portion which adheres to the neck and stopper of the bottle and exposed to the air become so converted and find its way into the bottle when using?

W. ELLIOTT.

C. F.—We presume you mean a water filter, and, if so, any one that works quickly and clarifies thoroughly will recommend itself. We cannot recommend any one in particular.

Maenan Myfra.—*Hypericum androsæmum.*

T. F. Walker.—(1) *Spiræa Filipendula.* (2) *Eupatorium cannabinum.* (3) *Origanum vulgare.* (4) *Cakile maritima.* (5) *Poterium Sanguisorba.* (6) *Gymnadenia conopsea.* (7) *Chenopodium Bonus-Henricus.* (8) *Teucrium Scorodonia.* (9) *Prunella vulgaris.*

J. R. Marten.—*Trifolium pratense.*

W. Cole.—We will try to obtain the information, and communicate it to you.

P. H. Marsden.—Infusions should be merely strained.

F. A. Dobson.—We do not remember such a case being reported in the Journal.

Delta (who should have sent his name and address).—(1) No; because a man must pass the Minor examination before he can become an Associate in Business. (2) We do not feel called upon to express an opinion as to the value of the "system" referred to. (3) No.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Leeney, Schacht, Robinson, Langton, Thompson, Lewis, Fisher.

"THE MONTH."

A long but very interesting article on "Beavers and their Ways" appears in the *Zoologist* for July, from the pen of Mr. J. E. Harting, F.L.S. He remarks that it derives its name of *Castor fiber* from its Greek name, καστωρ, and *fibrum*, a term denoting the edge or margin of the water where the animal loves to dwell. So little is mentioned about Russian castoreum in modern works of materia medica, that the following remarks by Mr. Harting may prove interesting :—"In 1832, after an interval of two years, the druggists at Walk, in Livonia, received the last pair of castoreum sacs from indigenous beavers. They weighed 11 ounces, and realized 15 roubles or 45*s.* per *loth*, *i.e.*, half an ounce, or in other words £4 10*s.* per ounce." The specimen of Russian castoreum in the Museum of the Society purchased in 1835, of Messrs. Horner and Faukes,* at 40*s.* per ounce, must therefore have probably been of Siberian rather than of Russian origin. Mr. Harting further remarks :—"Castoreum may be regarded as the prototype of 'Holloway's Ointment,' or 'Cockle's Pills,' for it was supposed to cure half the diseases under the sun. Pliny, for example, tells us (book xxxii, chap. 13) that it was employed for the cure of vertigo, spasms, affections of the sinews, sciatica, paralysis, epilepsy, as a neutralizer of aconite, as an antidote to white hellebore, as a cure for toothache (when mixed with oil, and injected into the ear on the side affected), and as a remedy also for earache. He added that 'applied with Attic honey in the form of ointment it improves the eyesight, and when taken with vinegar it arrests hiccup.' . . . At the present day, of course, its use has been superseded by other medicines, doubtless much more efficacious in their operation. Had these only been discovered a little earlier, the beaver might still be roaming in haunts where the importunities of druggists have now caused its extinction." This is rather a sad reflection for the druggist who may be enjoying, during the holiday season, a ride through the grand scenery of the Vale of Beavers (Nant Francon) in North Wales, or who may happen to reside in the English towns of Beverley, Beverage, Bevercotes, Beverstone or Beversbrook. In this allegation Mr. Harting is decidedly unfair to the druggist, since he himself (*l.c.*, p. 282) shows that the extermination of the animal in this country was due to the hatters. The beaver, however, has been reintroduced into the Isle of Bute, and is still thriving there (see Harting, 'Extinct British Animals.')

Dr. C. Rice directs attention in the *American Druggist* (p. 121) to the fact that chrysarobin, as at present sold, does not appear to have the effect or strength which it had some five or six years ago. He suggests that Goa powder may contain some substance still more active than chrysarobin, which is left behind when that substance is extracted by benzol. In support of this idea he quotes from Messrs. Gehe's report to the effect that the mother-liquor left after the crystallization of chrysarobin contains an amorphous substance, which has been shown by Dr. Lesser, of Leipzig, to be considerably more active than chrysarobin. It may be further remarked that Goa powder formerly came to this country of a much darker colour than recently and had apparently undergone some change through absorption of ammonia and moisture from the atmosphere, since such samples were found to yield less chrysarobin than the lighter coloured samples.

Among some 'Contributions from the Department of Pharmacy in the University of Wisconsin,' recently issued in a pamphlet form, is an interesting account of an experiment in poppy culture made by Mr. E. Weschke last year in Minnesota. No less than fifty different varieties of seeds, French, German and American, were sown. Many of these failed to germinate and the only plants of practical importance were those of *Papaver somniferum*, some of which produced capsules the size of a small lemon. From these was obtained a small quantity of opium of a rich dark-brown colour, with a very bitter taste and strong odour, which yielded on analysis equal to 15·28 per cent. of morphine, 0·416 per cent. of codeine and 0·325 per cent. of narcotine. Judging from his experience, however, Mr. Weschke is not of opinion that the cultivation of opium in that country would be attended with profit, for besides the high price of labour he thinks the plants would require more attention than they would be likely to get.

About four years ago (*Pharm. Journ.*, [3], xii., 812) Professor Power announced that a pupil had separated from the bark of the white ash (*Fraxinus americana*) a substance that was "apparently a strong base," an interesting observation if confirmed, since it would have been the first alkaloid obtained from an oleaceous plant. The bark appears to have been recently submitted to another examination by Mr. Kremers, also a pupil of Professor Power ('Contributions Univ. Wisconsin,' p. 19), but with only negative results so far as an alkaloid was concerned. A glucosidal principle, fraxin, was obtained, readily soluble in water and alcohol and showing even in dilute solutions a strong blue fluorescence that disappeared on the addition of an acid and was restored by an alkali, as well as the decomposition product, fraxetin. A reaction with alkaloidal reagents resembling that of a basic substance was found to be due to a resinous principle. On the other hand, Mr. Roberts has recently reported (*Amer. Journ. Ph.*, March, p. 117) that he has found an alkaloid in a petroleum and an alcoholic extract of the root bark of *Fraxinus americana*.

Two others of the 'Contributions' are devoted to the subject of the alleged poisonous properties of the root of the common parsnip (*Pastinaca sativa*), when growing wild. It appears to be a popular belief in some parts of the United States that if the edible roots of the cultivated parsnip remain three years in the ground they revert to the wild form, and then possess poisonous properties. Mr. J. T. Bennett failed, however, to separate from wild roots any principle that produced poisonous symptoms when administered to the lower animals, and Mr. Wells gives direct testimony that he has eaten, both cooked and raw, roots from a parsnip patch that has been allowed to run wild for probably half a century. It is concluded, therefore, that the frequently reported cases of poisoning by wild parsnip root ought to be attributed to one or other of the umbelliferous roots resembling it which are known to possess poisonous properties.

Bonduc seeds are official in the Pharmacopœia of India, in which country they are credited with febrifuge and tonic properties. The official seeds are leaden grey, and are the product of *Guilandina Bonducella*, L., but there is also a yellow kind, which

* 'Museum Catalogue,' p. 269.

is yielded by *Guilandina Boduc*, Roxb. These have recently been the subject of communications from Messrs. Heckel and Schlagdenhauffen, who have obtained from the cotyledons of both kinds a bitter principle as a white bitter powder, without acridity, soluble in alcohol, acetone, chloroform and glacial acetic acid, slightly soluble in ether and bisulphide of carbon, and nearly insoluble in light petroleum spirit and in water. It is also soluble in volatile and fixed oils (*Comptes Rend.*, ciii., 89). From a solution it is precipitated in white flocks by water. This bitter principle is scarcely affected by alkalies. Hydrochloric acid added to a solution causes it to darken in colour and slowly become rose-coloured; nitric acid causes the separation of red resinous drops; and sulphuric acid produces a brown colour, which passes in half an hour to purple red. There can be little doubt but that this substance is identical with that already separated from the seeds of *Guilandina Bonducella* by Professor Flückiger ('Pharmacographia,' 2nd edit., p. 212), although no allusion is made to the fact. Analysis yielded results corresponding with the formula $C_{14}H_{15}O_5$. Clinical experience is reported to have proved beyond doubt that this bitter principle represents the therapeutic properties of the seed, and Dr. Isnard reports that in doses of 10 to 20 centigrams its effects in intermittent fever equal those of the salts of quinine.

The American cranberry (*Vaccinium macrocarpon*, L.), has been examined by Mr. Claassen in order to determine whether it contains either arbutin, like the allied cowberry (*V. Vitis-Idæa*, L.), or kinic acid. M. Claassen reports (*Amer. Journ. Ph.*, July, p. 321) that he failed to detect arbutin, but that all parts of the plant contain a bitter uncrystallizable glucoside that he proposes to name "oxycoccin." It is described as a yellowish-brown extract, giving when dried a very hygroscopic powder, readily soluble in water and alcohol and very sparingly so in ether and chloroform. It resembles arbutin in its behaviour towards some reagents, especially in giving a blue colour with phosphomolybdic acid and ammonia.

Whilst engaged in working upon the constituents of the celandine (*Chelidonium majus*) Herr Schmidt was struck with the resemblance presented by chelidonic acid, which occurs in all parts of this plant, with jervic acid, isolated by Dr. Weppen from white hellebore root (*Veratrum album*). These acids have hitherto been represented by somewhat different formulæ—chelidonic acid by $C_7H_4O_6+H_2O$, and jervic acid by $C_{14}H_{10}O_{12}+2H_2O$—and also as being of different basicity. A careful investigation of the two acids and of a series of salts and derivatives was therefore undertaken, and the results leave no doubt as to the absolute identity of jervic acid with chelidonic acid, the acid being bibasic, and represented by the formula $C_7H_4O_6+H_2O$ (*Archiv*, June, p. 513). It is curious that an acid which has hitherto been observed only in one papaveraceous species should be found in a plant so far removed botanically as the monocotyledonous *Veratrum album*. In addition to chelidonic acid there occurs in the celandine smaller quantities of another acid, which has been called chelidoninic acid, and represented by the formula $C_{14}H_{11}O_{13}$ (old notation). This acid has also been investigated by Herr Schmidt (*Archiv*, June, p. 531), who has confirmed a previously existing suspicion that it is identical with ordinary succinic acid. By these two investigations, therefore, two names have been eliminated from the unwieldy list of organic compounds.

It is generally stated in works on materia medica that angelic acid is a constituent of sumbul root, and its separation has been reported by more than one chemist. But it was not quite clear whether the angelic acid existed as such in the root, or was a product of decomposition. This point appears to have been now determined by Herr Schmidt, who reports (*Archiv*, June, p. 528) that a liquor obtained by boiling the comminuted root in a weak solution of sodium carbonate contained no angelic acid. But upon exhausting the root with boiling petroleum spirit a balsam-like extract was obtained, which in contact with alcoholic potash solution underwent partial decomposition with the formation of angelic acid and the isomeric methylcrotonic acid. This observation recalls the experience of Dr. Külz with laserpitin, the bitter principle of *Laserpitium latifolium*, which, when treated with strong sulphuric acid, yielded methylcrotonic acid, whilst with alcoholic hydrochloric acid it yielded angelic acid (*Pharm. Journ.*, [3], xiii., 879).

Asparagin, as hitherto known, is lævogyre in its action on polarized light, and forms hemihedral crystals with a left-handed face. While preparing the compound on a large scale, upon concentrating a mother-liquor from a first crystallization, M. Piutti has obtained, together with a further quantity of ordinary asparagin, another substance having the same chemical properties and composition, and differing apparently only in the crystals being right-handed hemihedra, in its dextrorotatory power on polarized light, and in the taste being sweet instead of insipid. Upon dissolving a mixture of the two compounds a solution was obtained that was inactive on polarized light, but from which, when allowed to evaporate spontaneously, both right-handed and left-handed crystals separated, all attempts to obtain a holohedral crystallization of inactive asparagin having failed. The new substance when treated with hydrochloric acid yields a dextrogyre aspartic acid, that from ordinary asparagin being lævogyre; but when a mixture of the two asparagins in molecular proportions is operated upon, an optically inactive aspartic acid is obtained, identical with the aspartic acid prepared by Dessaignes from malate of ammonium, and which M. Piutti proposes to distinguish as "asparagenic acid" (*Comptes Rend.*, ciii., 134). A question having being raised as to the explanation of the great difference in the taste of the two asparagins,—one being insipid, and the other sweet,—M. Pasteur suggested that although two bodies inversely dissymetrical might present in their combinations with inactive bodies chemical and physical properties exactly similar and even identical, yet these same inversely dissymetrical bodies might yield compounds having entirely different properties, when united to bodies themselves dissymetrical and optically active, as all the primordial substances of life—albumen, fibrin, gelatin, etc. —are known to be.

Colocynthin, the bitter principle of colocynth, has been examined by M. E. Johannson (*Journ. de Pharmacologie*, p. 258), who finds that when heated with dilute sulphuric acid it yields colocynthein, elaterin and bryonin.

The actual preparation of vanillin from asafœtida is reported by Herr Schmidt (*Archiv*, June, p. 434). It was effected by shaking an ethereal extract of the

gum resin with strong solution of sodium bisulphite, adding to the solution excess of sulphuric acid, and, after driving off sulphurous acid, extracting the liquid with ether. Upon evaporation of the ether crude vanillin was left as a residue, which after purification corresponded in every respect with vanillin from other sources. The possibility of deriving vanillin from asafœtida was suggested ten years ago by Tiemann (*Pharm. Journ.*, [3], vi., 813), who showed the connection between that compound and ferulic acid.

The physiological action of vanillin has been studied by M. Grasset, of Montpellier, who finds that it acts as a convulsive agent on the lower animals, causing epileptiform movements. It is, however, difficult to determine its toxic action on human beings, since as much as 10 or 15 grams have been administered without noxious results. It is probable, therefore, that vanillin only acts injuriously in cases of idiosyncrasy. Indeed, Dr. Grasset suggests its use as a stimulant of an excito-motor character in atonic dyspepsia, etc. The symptoms produced on the lower animals were found to be relieved by the subsequent administration of chloral.

The substance of which edible birds' nests (see pp. 41, 42) are composed has been examined by Mr. J. R. Green (*Journ. Physiol.*, vi., p. 40–45). He finds that neossin, the name given to this substance by Krukenberg (see *Journ. Chem. Soc.*, vol. xlix., p. 481), resembles mucin, but differs from it chiefly in being insoluble in 5 per cent. hydrochloric acid and in dilute alkalies, while mucin is soluble in both. Acetic acid only renders a solution of neossin opalescent, but precipitates mucin. Neossin is digested by pepsin, but mucin is not. Mucin, when dissolved in soda, yields to ether a substance which is coloured green by ferrous chloride, but the nest substance does not. The author believes that the nest material is an animal product formed by the glands described by Bernstein (*Journ. Ornithol*, 1859, p. 111), which he states are remarkably developed in the nest-building season, but become atrophied afterwards.

According to Dr. Hesse (*Berichte*, x., 2154) quinidine (conchinine) crystallizes from alcoholic solution with two and a half molecules of water of crystallization, of which half a molecule is given off at the ordinary temperature, and the other two molecules are driven off at 120° C. According to Dr. F. Mylius (*Berichte*, xix., 1773), a hot solution of quinidine in absolute alcohol deposits on cooling well-formed prisms which contain no water of crystallization but a molecule of alcohol in combination ($C_{20}H_{24}N_2O_2 + C_2H_6O$). These two statements, however, though placed in apposition, as if intended to indicate that they are contradictory, are not so necessarily, for it seems fairly obvious that it was not absolute alcohol that Hesse referred to as yielding a crystallization containing two and a half molecules of water, and at the most the official alcohol of specific gravity ·830 to ·834. But in addition Dr. Mylius states that in his experience the alkaloid is deposited from a hot aqueous solution anhydrous. Besides the compound with ethylic alcohol, Dr. Mylius states that he has obtained similar combinations with methyl, propyl and allyl alcohols, as well as with the bivalent ethylene alcohol, in the last instance the combination being one molecule of alcohol with two of alkaloid.

As a further contribution to the history of the alkaloid or alkaloids designated "wrightine" and "conessine" (see vol. xv., p. 721), Herr Polstorff states (*Berichte*, xix., 1682) that he has obtained from a sample of seeds of the East Indian *Holarrhena antidysenterica* a small quantity of an alkaloid that corresponds in melting point, behaviour towards solvents and elementary composition with the alkaloid conessine obtained by him from the bark of *Holarrhena africana*. As to the alkaloid wrightine, obtained from these seeds by Herr Warnecke, and represented by a formula differing from that assigned to conessine by CH_2, Herr Polstorff expresses an opinion that it is probably identical with conessine, and points out that the analytical data are not inconsistent with that supposition.

The use of the seeds of *Holarrhena antidysenterica* in the Mauritius in the preparation of a local remedy against dysentery, known as the "Mauvis remedy," has recently been the subject of a notice by Dr. Clarence (*Journ. Pharm.*, July 1, p. 19). It would appear that there is more than one form for this remedy. In one case an infusion in 500 grams of water of about 26 grams of the dried and pulverized seeds, known locally as "anderjou," is given daily in one dose; in the other a decoction of ten grams of pulverized anderjou in 500 grams of water is given in divided doses before and after meals every twenty-four hours. In each case a small proportion of the anderjou used is roasted. It is stated that this remedy is very valuable where the dysentery has become chronic.

Eczema, according to Dr. Wyss (*Nouv. Rém.*, July 15, p. 326) may be effectually relieved by applications of resorcin. Being himself a sufferer from eczema in the hands he employed a vaselin ointment containing 10 per cent. of resorcin to allay the intolerable itching consequent upon the vesicular eruption and the infiltration of the skin. The effect was surprising, the itching and the infiltration disappearing rapidly. He afterwards tried it in other cases and always with success. The period most favourable for the application of resorcin is when the eruption is oozing, and when desiccation has commenced. During the desquamation a solution in glycerine (1 in 3) has been found to determine a rapid cicatrization of any fissures and stimulate the formation of new epidermis. In addition the resorcin was used as a powder mixed with rice powder or talc (1 in 10), though the hygroscopic character of the resorcin is rather a disadvantage, and also as a solution of one or two parts in thirty parts each of olive oil and almond oil.

The use of a mixture containing salicylate of iron is recommended by Dr. Braithwaite, of Leeds, in cases of diarrhœa in children where the motions are fetid. The formula for a child two years of age is—sulphate of iron, ℈j; salicylate of soda, ℈j; glycerine, ℥iij; water to three ounces. The iron and the salicylate should be dissolved separately, and the solutions mixed; the colour is darker than port wine, and the taste is said not to be unpleasant. One teaspoonful to be given every hour until the motions become well blackened, and then at longer intervals, with an occasional dose of castor oil to counteract the constipating effect.

Some experiments on the anæsthetic action of carbolic acid and the cresol group of compounds have been made by Dr. McNeill. He reports (*Ed. Med. Journ.*, June) that a mixture of three parts of acid and two of oil renders the skin of the arm insensitive to pain caused by superficial incisions. A

sensation of heat that is produced may be removed, without affecting the anæsthesia, by the application of glycerine; but if a mixture of carbolic acid with glycerine, instead of oil, be used the strength has to be increased twenty per cent. to produce an equal effect. Paracresol acts still more powerfully, equal parts of it and oil producing an anæsthetic action. A mixture of ortho and paracresol, sold as cresolene, was, on the other hand, less effective than carbolic acid, and benzol and toluol had no effect. Somer minor operations have been performed without pain with the aid of carbolic acid and oil and it was found that even the deeper parts might be opened painlessly by introducing some of the mixture into the tissue laid open. Dr. McNeill suggests that as carbolic acid is less corrosive when mixed with glycerine than with oil, glycerine would be a better remedy than oil to adminster in cases of poisoning by carbolic acid.

At the meeting of the Pharmaceutical Conference in Glasgow (*Pharm. Journ.*, [3], vii., 272), Mr. Taylor called attention to the fact that the suint from the fleeces of sheep contains a considerable quantity of benzoic acid, which at present is lost, being destroyed in the carbonization of the organic matter for the sake of the potash it contains. The subject has recently received the attention of M. Buisine, who has examined the portion of suint soluble in water, which represents the product of the sudoric secretion, the insoluble portion being secreted from the sebacic glands (*Comptes Rend.*, ciii., 66). In the sudoric liquid he has found the principles normally met with in the urine of herbivorous animals, or the products of their decomposition, together with, in state of combination with potash, benzoic acid derived from hippuric acid, and a large number of fat acids, nearly all being represented from the lower up to the cerisic acids. Some of these are present in quantities that would allow of their recovery on an industrial scale. Thus, the dry residue from the suint of Australian wool yielded, acetic acid, 7·1 per cent.; propionic acid, 4 per cent.; benzoic acid, 2·6 per cent; lactic acid, 2·5 per cent.; and capric acid 1 per cent. These fat acids exist in the suint liquors in the state of potash soaps, which are formed by the action of carbonate of potassium upon them during the washing.

It is known that alcoholic solution of potash behaves differently under varying conditions, some times like an alcoholic solution and sometimes as though it contained potassium ethylate. M. Engel believes that he has found an explanation in the formation of a compound that he has obtained in a crystalline form, which has the composition represented by the formula $KOH + 2C_2H_6O$, corresponding to a hydrate of potassium with two molecules of water. The crystals were prepared by suspending a platinum basket containing caustic potash in absolute alcohol until saturation had taken place, and then submitting the alcoholic layer that formed at the top to a temperature of 0° during twenty-four hours. This compound, to which M. Engel has given the possibly misleading name of "alcoholate of potash," is very unstable. It may be preserved in well-closed bottles at zero; but at a higher temperature it gradually decomposes, apparently giving rise to the formation of potassium ethylate and another compound as yet unidentified (*Comptes Rend.*, ciii., 155).

The isolation of fluorine, not previously obtained in the elementary condition, has possibly been recently effected in the electrolysis of hydrofluoric acid, by M. Moissan (*Comptes Rend.*, cii., 1543; ciii., 202). Pure anhydrous hydrofluoric acid, prepared according to Fremy's method, by distilling the potassium salt, was submitted to electrolysis in a current of fifty Bunsen's elements. At the negative pole there was a disengagement of gas that was ascertained to be simply hydrogen. At the positive pole there was a regular evolution of a colourless gas in which cold crystalline silicium burnt with a brilliant flame, being converted into fluoride of silicium; boron burnt with more difficulty to form fluoride of boron; antimony and arsenic in powder became incandescent; sulphur ignited and iodine combined with a pale flame and lost its colour; water also was decomposed by it with the formation of hydrofluoric acid and ozone and organic substances were acted upon energetically. By a series of exclusive experiments M. Moissan has arrived at the conclusion that the gas in question is either fluorine or a perfluoride of hydrogen, and he is engaged in endeavouring to clear up this point.

In a recent communication Herr O. Sonnenschein criticizes as illusory the method of drying fats usually recommended of first heating them to 100°-110° C., and then allowing them to stand over sulphuric acid. He points out that upon the melting of the fat the water forms a layer at the bottom, and can with difficulty make its way up through the overlying fat. He prefers an arrangement of a flask provided with two bent tubes, a long one through which a current of dry air can be conveyed to the bottom of the flask, and a shorter one connected with an air pump. Upon suction being set up the current of dry air passes up through the melted fat, carrying with it the moisture (*Zeit. anal. Chemie*, July, p. 372).

In the *Répertoire de Pharmacie* (July, p. 321 to 324) Messrs. Schmidt and Langlebert have published the analysis of an occidental bezoar, from which it appears that in this particular instance the principal ingredient consisted of oxalate of lime, a gram having the following composition: oxalate of calcium 0·525, phosphate of calcium and magnesium 0·197, oxide of iron 0·061, alumina 0·015, sulphate of calcium 0·019, water 0·012, silica and non-volatile organic matter 0·020, volatile organic matter 0·150. It does not appear from previous analyses that oxalate of calcium is a constant ingredient. The specimen examined weighed about 130 grams and is said to have been obtained as an intestinal calculus from a species of antelope, *Antilope rupicapra*, in South America. The price obtained for these bezoars in the countries where they are found is still enormous, as much as 200 francs being sometimes asked for a single specimen.

A mixture of two parts by weight of vaselin and one part of melted india-rubber has been recommended by Mr. H. G. Madan (*Nature*, July 22, p. 265), as a lubricant for the brass parts of apparatus where it is desirable to avoid the corrosive action of the compounds usually used. The india-rubber (unvulcanized) should be cut into shreds and melted at the lowest possible temperature in an iron cap, being constantly pressed down against the hot surface and stirred until a uniform glutinous mass is obtained. The vaselin is then added and the whole stirred together. Such a mixture, Mr. Madan says, may be left on an air-pump plate for a couple of years without perceptible alteration in the mixture or the metal.

A bright yellow fungus observed on a small cake of Turkey opium on cutting it open has been identified by Professor Trelase as *Eurotium herbariorum*, Link. As its name implies the fungus is one of frequent occurrence on herbarium specimens that have been allowed to get damp, and is not uncommon on many kinds of vegetable products if not kept dry; but Professor Trelase says that he has never met with it before on opium. So long ago as 1854 De Bary demonstrated that this *Eurotium* is the ascosporic fruit of the common green mould, *Aspergillus glaucus*, Link, and he named it therefore *Eurotium Aspergillus-glaucus*.

A new fungus found in the interior of potato has recently been described by Mr. Worthington Smith, under the name of *Phycomyces splendens*. It is remarkable for the jet-black colour and brilliant gloss of the vertical threads, which, when fully developed, are at least four inches high, and as thick or even thicker than horsehair, and the sporangium which crowns the apex of the hair contains when mature as many as 30,000 spores.

In the *Journal of Botany* for July Mr. A. Bennett records the occurrence of *Potamogeton coriaceus*, Nolte, in Cambridgeshire, where it was discovered by Mr. A. Fryer last year, and by an oversight was omitted from the London Catalogue recently published. It comes near to *P. Zizii* according to Mr. Bennett. Specimens of *Echinospermum Lappula*, Lehm., a plant recorded in Babington's 'Manual' only from Southwold in Suffolk, have this year been met with near Diss in Norfolk and at Sevenoaks in Kent, in the latter place as a garden weed, in company with *Plantago arenaria*. *Echinospermum Lappula* bears much resemblance to a *Myosotis*, but the simple stem with short spreading flowering branches at the top and the seeds covered with small prickles readily distinguish it.

In a note in the *Gardeners' Chronicle* (July 10, p. 41) on some Chinese economic plants, Mr. W. B. Hemsley states concerning the two species of *Rhamnus* known to yield the beautiful green dye that passes under the name *vert de Chine*, viz., *R. chlorophorus*, and *R. utilis*, Decaisne, that he cannot distinguish the former from the European *R. tinctorius*, nor the latter from *R. davuricus*, a species which he prefers to hold as distinct, although Maximowicz considers it to be a variety of *R. catharticus*. Mr. Hemsley further remarks that there is probably a third species, an evergreen, which is used for making a green dye. It grows about ten miles north of Riveiyang, in the province of Szechuen, at an elevation of 6500 feet, but the specimens seen by Mr. Hemsley have neither flowers nor fruit. A fine series of specimens of *R. utilis* and *R. chlorophorus* exists in the Hanbury Herbarium in the possession of the Pharmaceutical Society, the late Mr. D. Hanbury having paid considerable attention to this subject ('Science Papers,' p. 125 to 127).

In the *Ann. Sc. Nat.* ([7], iii., p. 267) M. A. Lemaire publishes a long account of the origin and development of lateral roots. His investigations lead him to the conclusion that the immense majority of roots originate in the deeper tissues of the axis, that they are in fact endogenous; in the *Cruciferæ*, however, the lateral roots are exogenous.

Some interesting examples of dimorphism in plants are given in the *Gardeners' Chronicle* (June 26, p. 815). One of these is a form of *Berberis*, in which the older leaves are evergreen, alternate, and in form, colour and substance resemble those of the common holly. In the axils of these there are borne tufts of leaves like those of the *Berberis vulgaris* in form, texture, serration and decidous character, but differing in being ternate or trifid (*l.c.*, p. 825, fig. 185, 186). The plant proves to be a hybrid between the purple-leaved variety of *Berberis vulgaris* and *B. Aquifolium*, and presents an excess of development as compared with the ordinary form of *Berberis vulgaris*, which affords evidence of imperfect development in the simple leaves, jointed at the base, and in the three spines, free from connecting cellular tissue, and which, in the hybrid above mentioned, are developed in the form of a holly-like leaf.

Another example of dimorphism is given on p. 816, *l.c.*, fig. 180. The plant which affords it is *Leptospermum lævigatum*, in which a small tuft of branches and shoots with very small leaves emerges from a branch of the ordinary character. It is suggested by the writer in the *Gardeners' Chronicle* that this curious development may have some reference to the occasional need for greater leaf surface and additional stomates or transpiration pores.

Under the head of "New Tanning Materials" an analysis is published in *Leather* (July 5, p. 9) of some of the tanning materials exhibited at the Colonial and Indian Exhibition. One of these, Sal bark (*Shorea robusta*), was also highly spoken of at the Forestry Exhibition at Edinburgh. According to the analysis now given in *Leather*, it affords 32·29 per cent. of tannin. A mangrove bark from N. Borneo (see p. 41) affords 41·398 per cent. of tannin and is said to be better than any mangrove bark previously tested and likely to supersede mimosa bark to some extent if obtainable at a reasonable price. A specimen of cutch from Burmah afforded 65·177 per cent. of tannin.

The attempt that has been made by the Afforestation Department of Hong Kong to grow *Cinnamomum Cassia* appears to have met with an unexpected check. According to the report of the Superintendent of the Department, the Chinese persistently break off the leaves and branches of the plants, and notwithstanding the vigilance of the forest guard they manage to keep the plants in an almost leafless condition. The reason assigned is that the Chinese use the leaves in medicine (*Gard. Chron.*, July 17, p. 82).

The *Gardeners' Chronicle* gives a list of plants grown in the open air at Menabilly, in Cornwall, which includes several medicinal and economic plants that are usually not seen out of greenhouses. Amongst these may be noted *Aralia papyrifera*, *Drimys aromatica*, *Eucalyptus citriodora*, *E. amygdalina*, *E. rostrata*, *E. viminalis*, *Illicium anisatum*, *Tasmannia aromatica* and *Laurus Sassafras*.

The reports of Messrs. Crokes, Odling and Tidy upon the water supplied by the water companies to London, which have hitherto taken somewhat the form of antidotes to the official reports, present a new feature in the latest issue. The reporters appear to have taken up the subject of the possibilities of micro-organisms in stored and running water, and give a preliminary account of some experiments with the one known as *Bacillus anthracis*, which is characteristic of splenic fever. Different sorts of wholesome water were infected with this bacillus, and after being kept at varied known temperatures for a greater or less number of hours, were then added to sterilized culture fluid or jelly. The general result

observed was that water, if added within a few hours of it being infected, set up a growth of the characteristic bacilli in the culture medium to which it was added, but after a time it appeared to lose the power of communicating the infection. It seems probable, therefore, that water is more likely to act as a destroyer than as a carrier of this particular pest.

THE PURIFICATION OF WATER BY ALUM.*

BY PROF. PETER T. AUSTEN, PH.D., F.C.S.

There is no subject which gives the manufacturer greater anxiety at times than the water which he is using in the works. Even where he is so lucky as to be located on the banks of some clear and sparkling brook, and hence is free from many of the troubles known to his less fortunate brethren, his brook may not seldom get into a troubled state and refuse to be clarified of its suspended clay and other matters by an ordinary process available to him. In no industry is this vexation from dirty water greater than in dyeing. Hence it is a matter of great importance, meaning a saving of hundreds and sometimes thousands of dollars, to have a simple means of clearing water, so that it can be used in ordinary manufacturing processes, and yet not in any way injure the properties of the water for subsequent use.

For large works which use water requiring continual purification, some constant process should be employed, as the Hyatt filter, for instance. The Norfolk and New Brunswick Hosieries filter all the water which they use in their works, and in this way get a most beautifully clear and sparkling water out of a rather muddy looking source (the canal). In this establishment four large Hyatt filters are used, and I have had occasion to satisfy myself of the efficacy of their working. But there are many small establishments which could not afford to put in large filters and pumps, and there are many others which do not require to purify their water, except at certain seasons of the year. Hence some simple process is needed, one that can be worked without trouble and which will give a clear water, and by which no detrimental qualities shall be added to the water.

In a recent report to the State Geologist of New Jersey on the purification of drinking water by alum, I have, in conjunction with Professor F. A. Wilber, made this matter of the clarification of water the subject of a special investigation. The use of alum as a purifier of water seems to date back a long time. Particular attention was directed to its use by Jeunet in 1865, in an article published in the *Moniteur Scientifique*. He found that 0·4 grm. of alum to a litre of water (23·3 grains to a gallon) rendered it drinkable, even when it was quite full of foreign matter. The time taken for this clarification was from seven to seventeen minutes.

Alum is a double sulphate of potassium and aluminium, and in this case breaks into potassium sulphate, which remains in solution, and a basic aluminic sulphate. This basic aluminic sulphate, the composition of which is undetermined, precipitates as a more or less gelatinous and flocculent mass, and carries down with it the foreign matters and humus bodies. The sulphuric acid set free in the formation of the basic aluminic sulphate attacks the earthy and alkaline carbonates which are always present, and forms with them sulphates, setting the carbonic acid free. Aluminic sulphate acts like alum. Ferric chloride (perchloride of iron) acts in the same way as alum.

In late years an extensive use has been made of alum in the many processes of purifying water, sewage, etc. It is not improbable that, aside from its effect in precipitating matter mechanically by envelopment within the precipitating basic aluminic sulphate, the alum exerts a distinct coagulative action on the albuminous substances in the water, rendering them insoluble, and thus causing their precipitation; perhaps the same or similar effect that alum produces in the tawing of leather. Alum has the great advantage that it is cheap, can be obtained everywhere, and is not highly poisonous. Thirty grains can be given at a dose, and the dose repeated four times a day without danger. Then again it has another very great argument in its favour, and that is its cheapness. To get practical results from the purification by alum it is evident that it must be added in very small amounts. The amount of alum used by Jeunet seemed to be unnecessarily high. On repeating his experiments, using New Brunswick hydrant water, which at the time the experiments were made carried considerable clayey matter, we found 23·3 grains of alum to a gallon produced an immediate coagulation of the suspended matters in the water, but no settling took place under six hours or more, as stated by Jeunet. On longer standing, however, the water settled perfectly, and was as clear as could be wished for. The water after treatment had no taste of alum, but gave a perceptible test for alumina, showing that some alum remained in solution. Our next procedure was to determine what was the minimum amount of alum that was needed to clarify this particular water. Tall cylinders were filled with water and alum added in varying amounts. Depending on the amounts of alum added. gelatinous precipitates settled out after a greater or lesser lapse of time. It would be impossible to make any general rule for the addition of alum to water, because the amount of impurities will of course be very much greater in one sample of water than in another, but we were able to determine what the practical minimum limits were for this particular water. 1·2 grains of alum to the gallon was about as small an amount of alum as it seemed practical to use to get a perfect separation of the impurities. The larger the amount of alum added to the water, the more quickly will the separation take place; the smaller the amount added, the longer will the water have to stand before a clarification will be effected. Again, large bodies of water will be precipitated by smaller amounts of alum than one would infer from experiments on a small scale, as the mechanical action of the precipitate here, in enveloping and carrying down suspended matter, is greater in a large body of water than in a small one It will be better, however, to err on the side of too large an amount, for even then the amount of alum added will be insufficient to impart any detrimental properties to the water.

Sixteen gallons of the city water were treated with 31 grs. of alum and the whole allowed to stand. After forty-eight hours the precipitation seemed complete and the bottom of the vessel was covered with a brownish slimy deposit. This substance after being dried gave 59·28 per cent. of ash which contained silica and alumina in relatively large amounts. The clear water gave no reaction for alumina, showing that there was no free alum in solution. The addition of more alum to the water failed to produce any further precipitation, showing that all the matter precipitable by alum had been thrown down.

It may hence be inferred that the addition of 2 grains of alum to a gallon of water will clarify it by standing. Some waters may require less, and some may require a longer standing than forty-eight hours, but this is a matter very easily determined for any particular case which may arise.

The water, after precipitation has taken place, is perfectly clear and sparkling, and has neither taste nor smell imparted to it. For use in the dye house there can be no possible objection made to it. The most practical way of applying this method in clarifying water for use in manufacturing where filters are not used, will be as follows. Two vats, or hogsheads, or similar deep tanks, are filled with the water and treated with alum at the rate of half an ounce of alum for every

* From the *Textile Colorist*. Reprinted from the *Chemical News*, July 23.

100 gallons of water. The alum should be dissolved in a little hot water, so that it can be mixed with the large bulk of water without difficulty. The mixing can be done with a long-handled dyer's stirrer. A few minutes' stirring will suffice to mix the alum and the water very thoroughly. After the mixing has been done, the water should be allowed to stand undisturbed for forty-eight hours or until the water clarifies, which can be easily seen by its appearance. If the clarification takes place in less time, so much the better. The water is now racked off for use. When the vat has been emptied to as low a level as is possible without disturbing the sediment, the plug in the bottom should be knocked out and the vat cleaned out with a strong jet of water. The slimy deposit is easily dislodged and washed away by a stream of water. While one reservoir is thus being used the other is full of water precipitating, so that the supply is continuous. The best means of drawing the water from the tanks without disturbing the sediment is about as follows:—The pipe should enter the side of the vat and pass to the middle and there be bent upwards so as to end about a foot above the bottom of the vat. The water is thus drawn downward, and no agitating of the bottom is produced. If the pipe is turned toward the bottom of the vat, the current of water will disturb the sediment.

I think that this method will be found of very great value to many works which now have trouble with their water in the rainy season, and I can call to mind offhand several which could use it to advantage. A few trials with the beautifully clear water produced by the alum treatment will make the hands feel loth to go back to the natural water even at its best. I am quite certain that many streams not now available to the manufacturer can be made so by this treatment.

TESTING FOR BROMINE IN THE HYDROBROMIDES OF CERTAIN ALKALOIDS, AND THE REACTION OF QUININE AND QUINIDINE WITH CHLORINE OR BROMINE.*

BY A. WELLER.

Dr. A. Weller, connected with Zimmer's quinine works in Frankfurt o. Main, reports that a customer of the firm had returned some hydrobromide of quinine which he claimed did not contain any bromine at all, while it was, on the contrary, perfectly pure. As is well known, one of the most commonly used methods to detect bromine in combination is to add to the compound some chlorine water (which liberates the bromine), and then some bisulphide of carbon, which dissolves it with a characteristic colour. Heretofore it had not been pointed out in chemical literature, that the above-mentioned method fails to detect the presence of bromine in the hydrobromides of certain (and perhaps most) alkaloids. Iodine is, however, quite readily detected in this manner, but care must be taken that the solutions are dilute and rather strongly acidulated with hydrochloric acid. Only in this case will the violet coloration of the bisulphide become plainly distinguishable. In concentrated, or in but feebly acidulated or neutral solutions, addition of chlorine water produces copious precipitates of brown periodides, which are apt to mislead, as they are dissolved by bisulphide of carbon with a violet-brown or dark brown colour. But when this precipitate is produced in a dilute acid solution, it does not interfere with the reaction.

Dr. Weller now points out that, when the above-mentioned test for the presence of bromine is performed *in presence of cinchona alkaloids, no colour is imparted to the bisulphide of carbon.* The reason is this, that the liberated bromine combines at once with the alkaloids, forming bromated bodies which yield up no colour to the bisulphide. The four principal cinchona alkaloids, *quinine*, *quinidine*, *cinchonine* and *cinchonidine*, behave exactly alike in this respect. And it is, moreover, immaterial whether their solutions are concentrated or diluted, neutral or acidulated (with HCl or HBr). Yet the persence of bromine may be easily and certainly proved, if the alkaloids are first removed by soda and the filtrate, after being acidulated, treated in the usual manner.

According to Dr. Weller, the bromine reaction fails to show itself also, under similar conditions, in solutions of the hydrobromides of morphine, codeine, strychnine and brucine. In these cases the bromine may likewise be easily detected if the alkaloids be first removed. For this purpose, strychnine and brucine may be precipitated by soda; morphine must be separated by sodium carbonate, and codeine by sodium carbonate and agitating with ether. The bromine in hydrobromide of quinoline can likewise be detected only after the quinoline has been removed from the solution, previously rendered alkaline, by ether.

On the other hand, the bromine reaction succeeds without difficulty in solutions of the hydrobromides of caffeine, cocaine, atropine, coniine and pyridine. It is, however, advisable, in these cases, to use dilute and acidulated solutions, in order to avoid turbidity or precipitates which might be produced by the chlorine or liberated bromine.

Even in the case of codeine and the other alkaloids mentioned in connection with it, the addition of chlorine water sometimes causes secondary effects. For instance, a neutral solution of hydrobromide of codeine is coloured rose-red by chlorine water; solution of brucine is coloured red by chlorine and bromine, and in solution of strychnine a white turbidity or precipitate is produced by chlorine.

Dr. Weller also gives some interesting details on the action of chlorine and bromine upon quinine and quinidine.

When chlorine water is added to the hydrobromide of quinine or of quinidine, the solutions will usually acquire a more or less intense red colour. This colour belongs to the same class as the well-known thalleioquin and other similar colours, and has been repeatedly noticed before, but no practical use appears to have been made of the fact.

Since bromine acts more promptly than chlorine, it is best to examine first the behaviour of the two alkaloids towards bromine water. On adding a few drops of the latter to a neutral and highly concentrated solution of hydrochlorate of quinine or quinidine, which had best still contain some undissolved salt, there is at first produced a yellow precipitate which rapidly disappears. After a short time, however, the liquid acquires a rose tint, which becomes gradually more intense, and finally has a magnificent cherry-red colour. This colour is not lasting, but disappears after a while, but a fresh addition of bromine water will easily reproduce it. The reaction succeeds still better if the solutions are slightly warmed before the bromine is added. In this case the colour appears instantly when bromine water is dropped in. In dilute solutions, the reaction appears likewise, but much less prompt or intense, though even here it is hastened by warming.

Dr. Weller points out that this reaction is by no means as searching and delicate as the thalleioquin or Vogel's reaction, and that it will, therefore, not displace the latter. In presence of acids, the red colour does not appear at all; the same happens if too much bromine water is added. This produces a copious, golden-yellow precipitate, which consists very probably of brominated substitution-products.

The same phenomena are observed, though not so promptly, when treating the free alkaloids, quinine and quinidine, in this manner.

The *commercial* salts of cinchonine and cinchonidine likewise give the reaction more or less intensely. But

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* From *Arch. d. Pharm.*, ccxxiv., 161. Reprinted from the *American Druggist*, July.

Dr. Weller could not produce it with the chemically pure salts.

Chlorine water produces the same result as bromine water, but less promptly or intensely. On the other hand, if added in excess, it does not produce a precipitate. Strong mineral acids prevent the reaction, but acetic or tartaric acids alter the red colour only slightly. An excess of chlorine discolours the red solution, hence it must be added cautiously.

Solutions of quinine and quinidine which have been turned red by chlorine water show a peculiar behaviour towards ammonia. If the red colour had been produced by a very small quantity—2 or 3 drops—of chlorine water, ammonia produces in this solution a light rose-tinted precipitate, which retains its tint a long time, and, when warmed, runs together to a more intensely red-coloured, resinous mass. On the other hand, if the colour had been produced by the addition of a larger quantity of chlorine water, the rose-red precipitate is here first produced by ammonia likewise, but it soon turns green, and so does the liquid it is suspended in; in other words, the thalleioquin reaction takes place. As the amount of chlorine water is increased, the rose tint becomes less perceptible, and the green colour appears the more rapidly.

If bromine water be substituted for chlorine water, the addition of ammonia likewise produces a rose tint, but it passes very rapidly over into green, even though but one or two drops of bromine water have been used.

TROPICAL FRUITS.*

BY D. MORRIS,

Assistant-Director, Royal Gardens, Kew.

Amongst objects of productive industry receiving attention at present in our colonial possessions, tropical fruits are at once the newest and most interesting of all. Many of these fruits are practically unknown in England in a fresh state, and hence before tropical fruits are largely consumed here, it is necessary to diffuse knowledge respecting them, and to render them as familiar to English home people as they are to their colonial friends.

At the present Exhibition, owing to the suggestion of the Council of the Royal Horticultural Society, fresh fruits are shown from nearly every part of the British Empire. Thanks to the Colonial Market established in connection with the Exhibition, oranges, lemons, and grapes are shown from the Australian Colonies; oranges of several kinds from Natal, fresh cocoa-nuts from the West Coast of Africa, pine-apples from Antigua, bananas from Jamaica, naseberries (*Achras sapota*), Avocado pears, papaws, bread-fruit and limes from British Guiana; melons from Barbadoes, prickly pears and dates from British India, and most luscious pine-apples from Singapore.

Although not exclusively a tropical fruit, the orange is found and flourishes throughout the eastern and western Tropics. Taking this fruit as an example, it is remarkable what a large increase has taken place in the consumption of this fruit in the United Kingdom during the last fifteen years. In 1870 the number of oranges imported into the United Kingdom was 80,000,000. In 1885 this number had increased to 500,000,000, or at the rate of fourteen per head of population. Dates are consumed to the extent of 5000 tons per annum, while cocoa-nuts are imported by the shipload.

Being the nearest to England, as well as the most productive in the way of tropical fruits, the West Indian Islands naturally supply, and should supply, the English market more readily than any other. At the present day in the West Indian Islands the value of the fruit exported is nearly £400,000 per annum.

In Jamaica alone fruit is annually exported to the value of over a quarter of a million sterling—consisting chiefly of bananas, oranges, pine-apples, and cocoa-nuts. The Bahamas export chiefly pine-apples, both fresh and canned, to the value of £50,000 per annum. Trinidad grows and exports chiefly cocoa-nuts. British Honduras, connected by a mail route with New Orleans, exports bananas, cocoa-nuts and plantains to the value of £15,000 per annum. Montserrat is chiefly interested in limes, and exports limes and lime juice to the annual value of £11,000. Dominica exports limes, tamarinds, and concentrated lime-juice to the value of £4000; while flat and sugary Antigua exports only pine-apples, but those, though small, of very superior quality. From their geographical position it is only natural to suppose that a large proportion of the fruit of the West Indian Islands finds its way to the United States and Canada, where there are nearly fifty millions of people, with all of whom fruit enters largely into their daily food.

The banana (*Musa sapientum*) is the chief fruit at present cultivated in the West Indies, and this fruit is the one which in the future will be more largely offered in the English market than any other. There are numerous varieties of this fruit under cultivation; the Martinique banana is found the most profitable to grow for export, although a smaller fruit, known as the fig banana, is more luscious and more highly esteemed locally as a dessert fruit. Jamaica exports bananas to the value of nearly £200,000 per annum, and is capable of growing fully three times the quantity now exported without any diminution in the larger staples.

The pine-apple (*Ananas sativa*) is no doubt indigenous in Jamaica, where an inferior kind, known as the "Cowboy macca," is still found wild. The pine-apple is incorporated in the arms of Jamaica, and certainly nowhere, except perhaps at Pernambuco, can pine-apples of such size and delicacy be grown as in some parts of this island. Antigua is noted for its pine-apples; the pitch-lake pine of Trindad has at least a local reputation; but the Bahamas export more pine-apples in the fresh and cured state than any other part of the world. The chief supply of pine-apples for the English market at present comes from Madeira, the Canary Islands and the Azores. Should the interesting experiments now being carried on by Messrs. Scrutton and Sons, who have fitted up one of their ships with a refrigerating chamber, be successful, we shall before long have large supplies of pine-apples direct from the West Indies, and at a very moderate cost.

The West Indian lime (*Citrus medica, var. acida*) is a fruit which is not much known in England. It is possibly little grown anywhere else except in the West Indies, where a large industry is arising in connection with the preparation of raw and concentrated lime juice for the manufacture of citric acid.

The mango (*Mangifera indica*) is the "apple" of the Tropics, and is a most nutritious and wholesome food as well as a dessert fruit. Originally an East Indian tree, the mango has become thoroughly naturalized in the West Indies, and is forming large groves in waste places in Jamaica, where negroes, horses, pigs and fowls feed upon the fruits for nearly four months of the year. The West has given to the East the Anona fruits, known as sour-sop (*A. muricata*), the custard apple (*A. reticulata*), sweet-sop (*A. squamosa*), and the cherimoyer (*A. cherimolia*), but practically only the second and third appear to have become established in their new home. The guava fruits (*Psidium Guayava*) are very common everywhere, and utilized chiefly for making the well-known guava jelly, and for flavouring cordials and syrups. The litchi, rambutan, and longan of the East Indies are co-related by the genip (*Genipa americana*) of the West Indies. The fruit of the spine-armed *Zizyphus jujuba*, allied to the "seductive sweet fruit," the lotus of the

* Abstract of a paper read at a Conference held at the Colonial and Indian Exhibition. Mr. W. T. Thiselton Dyer, F.R.S., C.M.G., in the chair. From the *Gardeners' Chronicle*, July 24.

ancient Lotophagi, has become cosmopolitan in its distribution, and will soon find its way to England from the West as well as from the East. The passion-fruits are amongst the most delicate and refreshing of tropical fruits, and some of them have been successfully introduced to England. The most common are the granadilla (*Passiflora quadrangularis*), the nomme d'or or water lemon (*P. laurifolia*), the sweet-cup (*P. edulis*), and the calabash sweet-cup (*P. maliformis*).

Of tropical fruits known generally as nuts we have a long list, some of which are seldom seen in England. The cocoa-nut is too well known to need description. It is computed that over three million acres of land are under cultivation in cocoa-nuts in tropical countries, and the annual export value of nuts, oil, copra and coir is estimated at nearly two million and a quarter pounds sterling. The Brazil nut (*Bertholetia excelsa*) is obtained entirely from wild trees which are of immense size; and the same may be said of the Sapucaya nut (*Lecythis sapucajo*), and the Souari or butter-nut (*Caryoca nuciferum*).

India is so badly off for fruit herself that she is not likely to be able to export any to this country; but the wild apricot of the Himalayas, of the Punjaub and North West Provinces, is produced in such immense quantities, and so easily cured by simply drying in the sun, that it might be imported at a very low price. It is the *Prunus armeniaca* of botanists, known in India as the mish-mush or Moon of the Faithful. This latter appellation it has obtained from the fact that it is sometimes pressed out into sheets or "moons" and kept in that state until required for used. The delicious fruits of Singapore and the Malay peninsula, amongst which the mangosteen and the durian are the best known, are not likely to come direct from those countries. The former has, however, been fruited both in Trinidad and Jamaica, and large trees of the latter exist at these islands, as well as at Dominica, Grenada, and St. Vincent. Hence West Indian mangosteens and durians are objects not impossible to be seen in England during the next decade.

AN IMPROVED ELECTRIC BATTERY.

An electric battery invented by Mr. Upward, for which it is claimed that it does away with nearly all the difficulties hitherto accompanying the employment of batteries, has recently been described in *Engineering*. The constant addition of corrosive fluids, the amalgamation of the zinc, the rejection of spent liquids, and the clearing of porous pots, are alike avoided, and the only operations which are required in the battery itself are the addition of a little water from time to time, and the renewal of the zincs when they have wasted away. There is no local action, and the cells may be left for months without attention, and started again without any loss in the interval. The electromotive force is high, 2·1 volts, and is maintained constant, as there is no depolarizing fluid to become diluted and lose its power.

These advantages are due, says *Engineering*, to the use of a gas as the agent to convert one of the solid elements of the battery into a salt. The method by which this result is attained will be best understood by a description of the battery. The three elements are zinc, carbon, and chlorine. The zinc is contained in an inner porous pot, and is surrounded by a solution of chloride of zinc. The carbon is placed in the outer pot, and is partly in the form of hard plates, and partly in fragments. The latter are packed in to fill the entire space unoccupied by the plates, and are of such a size that the interstices between them afford ample passage for the chlorine gas, which is admitted near the bottom of the cell, and overflows near the top by a pipe leading to the next cell. The accumulation of liquid in the outer pot is prevented by an outlet near the bottom. A number of these cells are coupled together to form a battery, just in the usual way, with the addition that the outer cells, which are sealed at the top, are joined by pipes so that the gas can flow from the first to the second, and the second to the third, and so on to the last. As soon as the circuit is closed, the chloride of zinc solution in the porous pot is decomposed, molecule by molecule, the zinc passing through the earthenware jar to combine with the gas on the outer side, and the chlorine taking up another atom of zinc from the plate. There is sufficient percolation of water through the porous partition to wash the chloride of zinc out of the carbon and carry it away through the drip-cock at the bottom of the jar. This cock has a light water seal, to prevent the escape of chlorine or the admission of air.

The affinity existing between zinc and chlorine is sufficient to insure the circulation of the latter through the cells, and as each atom of chlorine disappears another flows in from the reservoir to take its place. But as the gas is seldom perfectly pure, and may contain air or other admixture, it follows that in time an accumulation of this foreign matter takes place in the last cell, and if not removed, would stop its action, and eventually produce the same result in each of the preceding cells. This difficulty has been got over by Mr. Upward by an ingenious arrangement of an aspirator, which comes into play whenever the electromotive force of the last cell falls a little, and continues in action until it has drawn out all the inert gas. The water tap of the aspirator, which is of the ordinary kind used in laboratories, is controlled by an electro-magnet, to which the current is admitted by a contrivance resembling a relay. This relay is worked by a current from the last cell, and makes the connection to the magnet as soon as the electromotive force falls sensibly.

It detracts from the great convenience of the new battery, that chlorine gas is not an article of commerce, and is scarcely likely to be. It must be produced on the premises where it is to be used, and its manufacture entails some little trouble, and, if not carefully conducted, may prove a nuisance.

The apparatus devised by Mr. Upward for the generation of the gas has been specially designed to avoid these inconveniences, and renders the operation as simple as it can be made. It consists of a short vertical cylinder or retort placed in a sand bath heated by a gas jet. Into this cylinder there is placed oxide of manganese, and then it is closed by a cover which dips into a water seal. Acid is run on to the manganese from a reservoir, and the gas evolved is led by a pipe to a holder constructed of earthenware pipes. As the gas is much heavier than air, it displaces the latter, and consequently there is no necessity for the use of a bell or of any moving parts in the holder. When the charge of manganese is spent, water is turned into the retort, and the liquid and gaseous contents are washed out into the drains. The lid is then raised, and the manganese, which is contained in an earthenware tray, is removed and replaced by a fresh quantity.

It is evident that this will be a cheap battery to work. There are no expensive materials used, such as nitric acid or bichromate of potash, and there is no waste from local action. What the exact expense is we are unable to say, and can only give the following figures, which are supplied by Mr. Upward, as a rough approximation. Chlorine gas costs from $\frac{1}{2}d.$ to $1d.$ per cubic ft., and the consumption of it in a battery applied to electric lighting with Woodhouse and Rawson's lamps is equal to 1 ft. per thirty candle-hours. The consumption of zinc is, of course, similar to that in any other battery having the same electromotive force, and the cost is about $\frac{1}{3}d.$ per 30 candle-hours. Thus the expenses of the materials together amount to from $\frac{7}{8}d.$ to $1\frac{1}{3}d.$ per 30 candle-hours, or half that amount per lamp hour. This makes no allowance for interest or depreciation, or for the renewal of lamps.

These figures show that the inventor does not put forward his battery as a source of energy which can vie in economy with a steam or gas engine in situations

where these motors are admissible. But there are numerous places where the only source of artificial light are lamps and candles, and for such situations this battery is a distinct improvement on its predecessors. In its mechanical features great care has been taken to render it as independent of attention as possible. The battery itself requires nothing but water, and even this can be admitted automatically by an apparatus acting on the principle of the bird fountain. The gas retort is made so large, that one charge of manganese will give a week's supply of gas, and this can be generated at one operation or more, according to the amount of acid admitted. The battery itself is kept at work all the twenty-four hours, and its current is received in an accumulator from which the lamps are fed. The loss in the accumulator is more than compensated for by the gain in working the battery under selected conditions, while the first cost is greatly reduced by this arrangement.

THE MANUFACTURE OF CERESIN FROM OZOKERITE.*

BY E. SAUERLANDT.

In the showcase of a Belgian manufacturer of candles, at the Antwerp Exhibition, was to be seen a fragment of waxlike substance labelled "Ozokerite, or Vegetable Wax." This fact shows how little is known, even by those most nearly interested, of an industry which, dating back only about fifteen years, has attained an annual value of upwards of half a million pounds sterling. The ignorance is no doubt due, mainly, to the paucity of information that has been published respecting the industry and the raw material used in it.

The first attempt at bleaching mineral wax known to the author dates from 1870. The first industrial results were obtained by H. Sljhely, of Stockerau, near Vienna, Dr. Pilz, of Carlsbad, and J. F. Otto, of Frankfort-upon-Oder; ceresin was introduced into the market by these different houses in the course of 1872.

During the last ten years a number of processes for the purification of ozokerite have been proposed, very few of which have been practically successful. At the present time scarcely more than two processes are employed, both of which are based upon the employment of sulphuric acid. In the more important establishments where mineral wax is refined, the ozokerite is heated in contact with sulphuric acid to a temperature of 180° C., and even higher, by which means an almost complete decomposition of the sulphuric acid and carbonization of the substances separated by it is effected. In some smaller factories where the operations are conducted at a much lower temperature, the acid, charged with the impurities, collects at the bottom of the vessel as a black tarry mass that is easily separated.

In whatever way the operation is conducted, it is necessary first to free the crude ozokerite, as delivered from the melters of Borislaw in eastern Galicia, from the small quantity of water that it always contains; for which purpose it is dried by heating it to 120° C., at which temperature the water is entirely driven off. The mineral wax requires to be heated very slowly to avoid sudden ebullition of the melted mass, through the superheating of the water, and small pieces of the crude wax are thrown into it whenever it threatens to rise. In some cases this heating is effected in the same boilers as the heating with sulphuric acid; in others a special vessel is used which allows of the deposit of mechanically mixed impurities at the bottom. The vessels for the preliminary boiling, which should be of a capacity sufficient for a day's product, are heated either over a bare fire, or are jacketed and heated by steam. In the former case the apparatus takes the form of an alembic, consisting of a hemispherical boiler with dome and cooling worm, in which any vapour of the light oil given off during the melting is condensed. When the heating is effected by steam, the small quantities of hydrocarbon carried away with the steam do not necessitate any arrangements for condensation.

In carrying out the first-mentioned method of bleaching, where the temperature is raised to 180° C., the mixture of the ozokerite with the sulphuric acid is effected either by means of an iron or copper stirrer worked by hand, or by a mechanical agitator. Although the latter arrangement would appear in principle to be much the more rational of the two, it is not the most used, even in the larger manufactories, in consequence of practical difficulties that have not yet been satisfactorily overcome. After the earth-wax has been freed from water it is placed in the acidifying vessel with a mixture of vitriol and fuming sulphuric acid in proportions corresponding to the quality required; it is then gradually heated with constant stirring to 180° C., at which temperature the sulphuric acid is almost completely driven off. After neutralization of the last traces of acid and partial decolorization, the mixture is allowed to stand. The tolerably clear layer of ceresin that forms at the top is drawn off and filtered through paper; the residue is pressed, whilst still in a warm pasty condition, in hydraulic presses, the runnings being also filtered through paper. As a result of these operations only about two-thirds of the ceresin present in the ozokerite is obtained, the other third being retained in the press residue. This is now generally recovered by extraction, petroleum benzine being the solvent used in most factories, and only here and there carbon bisulphide. The ceresin extracted is freed from traces of the solvent by passing superheated steam through it and then filtered. The entire yield by this method of operating amounts to 70 to 75 parts of white, or 80 to 85 parts yellow ceresin from 100 parts of ozokerite used.

According to the second method of working the dehydrated ozokerite is introduced into the mixing vessel in the melted condition at the lowest possible temperature, and then mixed by means of a mechanical stirrer or a current of dry air with exactly the quantity of sulphuric acid required to effect the reaction. After standing the top layer of dark coloured but clear ceresin is drawn off into another vessel, where it is neutralized and decolorized and then filtered. The black tarry residue is neutralized and submitted to distillation, the distillate consisting of paraffin and mineral oils. This method has many disadvantages and is not largely followed. Both methods are, indeed, defective, since it is known that crude ozokerite can be made to yield 90 to 92 per cent. of a white bleached product instead of the 70 to 75 per cent. usually obtained in manufactories.

The filtered ceresin, if intended for yellow goods, is brought up to the right tint by means of gamboge, turmeric, dragon's blood, or one of the various aniline colours soluble in fats, and then poured into moulds to cool. The "half white" and "white" ceresin is stirred continually while cooling to prevent crystallization, and it is not until it has solidified to a pasty consistence that it is poured into the moulds. In this way a whiter appearance in reflected light is produced.

White ceresin is frequently mixed by the manufacturers with the lower-priced paraffin and the yellow ceresin with resin. The addition of paraffin cannot be detected either by chemical tests or determination of the specific gravity. It is, however, hardly to be deemed an adulteration since in some cases, as for illuminating purposes, its presence is advantageous. The addition of resin ought, however, to be deemed an adulteration. For its determination the suspected ceresin should be dissolved in hot alcohol, and the mixture then cooled and filtered. The ceresin being almost insoluble in cold alcohol is removed, and any resin present will be found in the residue upon evaporation of the filtrate.

* Abstract of a paper in the *Chemiker Zeitung*, 1886, pp. 21 and 33.

The Pharmaceutical Journal.

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Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

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PRACTICAL APPLICATION OF THE LIQUEFACTION OF GASES.

IN the early days of the School of Pharmacy in Bloomsbury Square it was the custom of Professor FOWNES, in the lectures on Physics with which he commenced his course, to exhibit the apparatus devised by THILORIER for liquefying carbonic acid, and on some occasions the experiment was carried out during the lecture. At that time the liquefaction of this gas was regarded as having an interest of a purely experimental nature, and the demonstration of the fact at an educational lecture may even have been considered out of place by those who were inclined to confine all teaching to what is of immediately available utility. Since then the possibility of liquefying even those gaseous bodies to which the term permanent gas was applied has been still further demonstrated, but until quite recently there has not been any practical application of the fact, except in the case of nitrous oxide, which is employed in the liquefied condition for producing anæsthesia. A further step has now been made in the application of liquefied gaseous substances by the introduction of liquid carbonic acid as an article of commerce suitable for the preparation of aerated water or any other purposes for which the gas is required in a state of purity. The source from which it is obtained is not the decomposition of carbonates by sulphuric acid, but one which furnishes the gas in a state of great purity and in very great abundance, viz., the natural exhalation that occurs in certain districts which have probably been at some remote period the scene of volcanic action. In BISCHOFF'S 'Chemical Geology' frequent reference is made to this exhalation of carbonic acid from the earth, both in connection with mineral springs as well as under other conditions, and it is spoken of by that writer as constituting one of the most stupendous of terrestrial phenomena, exercising both in past and present periods most important influences upon the decomposition and alteration of rocks. In the neighbourhood of the Lake of Laach, situated near the left bank of the Rhine, between Bonn and Coblenz, copious exhalations of carbonic acid gas occur, and it is at this place that provision has been made for collecting the gas and compressing it into iron cylinders until they are filled with the liquefied carbonic acid, which can thus be easily transported to the places where it is required for use in the gaseous form. One important feature of natural carbonic acid is its great purity. That met with in the neighbourhood of the Lake of Laach is almost entirely absorbed by caustic potash, and at the utmost there is only a very minute bubble of the gas that is not so taken up. It is also quite free from sulphuretted hydrogen, and has consequently been used in the manufacture of white lead at places where it occurs in sufficient abundance. This great purity of the natural carbonic acid exhaled in localities where volcanic action has taken place calls to mind the similar purity of the ammonia which occurs under conditions of a like nature and has therefore been found so eminently suitable for making ammoniacal preparations.

One of the prominent applications for which the natural liquefied carbonic acid is suitable is the preparation of aerated water of various kinds. In addition to the advantage of the gas being of a high degree of purity, and therefore rendering unnecessary any arrangements for washing and cleansing, the use of liquefied carbonic acid does away with the necessity for those operations by which the gas is generated under the usual system. The cumbrous apparatus with which this part of the work is carried out is no longer requisite, and consequently the manufacture of aerated water can be undertaken within a limited space that would otherwise be quite inadequate for the purpose. Moreover, there is no troublesome waste material to be got rid of, as the residuum of the action of sulphuric acid upon chalk. If it were not for the difficulties attending this part of the manufacture of aerated water it would be in many instances possible for chemists in country places to make their own soda or seltzer water with convenience and profit, and it is from this point of view that the possibility of obtaining a supply of pure carbonic acid in a portable and compact form appears to present points of interest for the retail chemist and to deserve consideration in regard to the manufacture of aerated water on a small scale.

The tubes in which liquid carbonic acid is supplied are made of wrought iron, and are about four feet long by five inches diameter. At one end is fitted a screw valve, to which a discharge tube can be fitted when the liquid carbonic acid is to be drawn off. In transporting the tubes, this valve is protected by a cap of wrought iron screwed down over it. The tubes are of great strength, and tested to bear a pressure of two hundred and fifty atmospheres before being used. This testing is carried out by Government officers, who stamp each tube on examination when it is found to be satisfactory. Every year the same test has to be renewed so as to ensure the strength and sound condition of the tubes. Each tube holds about ten

kilos of liquid acid, equivalent to upwards of four thousand litres of gas at the ordinary temperature and pressure. In drawing off the carbonic acid for use the tube is first connected with a small gas holder by a tube screwed to the valve, and the tube is placed in a slanting position, with the valve depressed, so that upon opening it the liquid carbonic acid runs out and expands into the gas holder in the gaseous state. By means of a pressure gauge attached to the gas holder it can be seen when sufficient liquid acid has been drawn off to fill the gasholder with gas at a pressure of about one and a half atmospheres and then the valve is closed. The liquid carbonic acid in assuming the gaseous condition absorbs a considerable amount of heat, and advantage can be taken of this circumstance to cool the water with which it is intended to aerate the gas. For this purpose the tube into which the liquid carbonic acid is allowed to run from the iron bottle should be extended in the form of a coil, which is surrounded in a tank by the water to be used for aeration and bottling. In this way a considerable reduction of temperature can be attained and as a consequence the charging of the bottled water with carbonic acid gas is proportionately facilitated. Works upon an extensive scale have been erected at Niedermendig, on the Rhine, for the collection and liquefaction of the natural carbonic acid that is given off from the interior of the earth at that place, and the arrangements are such as to admit of the liquefaction of very large quantities of gas, amounting to several tons daily. The apparatus employed for the purpose consists of a series of compression pumps, in which the gas drawn from the earth is progressively compressed in passing from one pump to another, until it is ultimately forced into the iron bottles or tubes and there liquefied under a pressure of about sixty or eighty atmospheres, according to the external temperature. The pumps by which this compression is effected are driven by powerful steam engines, and, notwithstanding the great power employed, the whole operation goes on as regularly and quietly as the bottling of soda water in an aerated water factory. This new enterprise bids fair to be of great service, not only for the particular purpose already mentioned, but also in various other branches of industry, and the use of the liquid acid is indeed already found to be advantageous in carrying out operations in which carbonic acid is required. It constitutes an interesting illustration of the fact that the experiment which appears to-day to be of merely scientific interest, may very shortly meet with an application that renders it a factor of practical importance for industrial operations. Further instances of this truth might be easily offered if it were necessary to enforce it more strongly than is done by the records of invention and progress, to be observed by everyone who gives attention to the current literature of science and industry.

In accordance with the decision of the Council in respect to the retail sale to the public of "insect-killing bottles" containing cyanide of potassium by naturalists and other unregistered persons, steps are now being taken by the Registrar to call the attention of these dealers as to the illegality of such sales. We have reason to believe that the Registrar will be glad to receive from our readers any assistance they may be able to afford in making this notification known as widely as possible to the parties concerned.

* * *

The Executive Committee for carrying out the arrangements for the coming Pharmaceutical Conference at Birmingham is evidently determined to leave nothing undone towards securing the success of the gathering. At a meeting of the Committee, on the 21st inst., at which Mr. F. H. Alcock was elected Assistant Honorary Secretary, it was decided to accept the offer of the Leamington chemists to entertain at luncheon one hundred and fifty members of the Conference. A Reception and Conversazione Committee has been appointed, which has Mr. W. F. Wyley for a Chairman and Mr. W. F. Haydon for Honorary Secretary, as well as a Finance Committee, with Mr. Alfred Southall as Chairman and Mr. W. Jones as Honorary Secretary.

* * *

In addition we are informed by the Local Secretary, Mr. Charles Thompson, that arrangements have been made with the London and North Western, Great Western and Midland Railway Companies, for those members of the Conference who prefer to reside during the meeting in Leamington, Salford, or any other town within fifty miles of Birmingham, to travel to and fro at a single fare for the double journey.

* * *

We are glad to learn also that the project of Messrs. Southall Bros. and Barclay for the reproduction of an ancient alchemists' laboratory in the exhibition to be held in Bingley Hall in connection with the meeting of the British Association has been extremely well received. In addition to the gentlemen mentioned in our previous note as having promised assistance, the firm expresses its indebtedness to a large number of others for valuable help in carrying out the idea.

* * *

So much has been said as to the losses the planters of cinchona in Ceylon have sustained through the glut in the bark market that it is refreshing to hear something on the other side. The exception is a plantation in the neighbourhood of Nuwara Eliya, consisting of about ninety acres, with three thousand trees, from three to five years old, to the acre. The total outlay on this estate is estimated by the *Tropical Agriculturist* as probably not over 70,000 rupees. Since 1878 it has yielded 105,000 lbs. of good bark, and 72,000 of branch bark and dust, and is said still to look as if its quarter of a million of trees had never been cropped.

* * *

A correspondent of the *Daily Telegraph* is responsible for transmitting a story to the effect that the medical officer of Tiree, the inhabitants of which island are just now in antagonism to the authorities on the crofter question, has received from an enterprising druggist a circular in which he says, "In case of civil war in Tiree, I beg respectfully to solicit your esteemed order for lint, bandages, etc."

Proceedings of Societies in London.

ROYAL SOCIETY.

The Sympathetic Vibration of Jets.*

BY CHICHESTER A. BELL, M.B.

After a brief historical notice of the observations of Savart, Masson, Sondhauss, Kundt, Laconte, Barret and Tyndall, Decharme, and Neyreneuf, on the sympathetic vibrations of jets and flames, the author describes his own experiments. Attention was directed to the subject by the accidental observation that a pulsating air-jet directed against a flame caused the latter to emit a musical sound. The pitch of this sound depended solely on the rapidity of the jet pulsations, but its intensity was found to increase in a remarkable way with the distance of the flame from the orifice. In order to study the phenomenon, air was allowed to escape against the flame from a small orifice in the diaphragm of an ordinary telephone, the chamber behind the diaphragm being placed in communication with a reservoir of air under gentle pressure. Vibratory motions being then excited in the diaphragm, by means of a battery and a microphone or rheotome in a distant apartment, the discovery was made that speech as well as musical and other sounds could be quite loudly reproduced from the flame. Certain observations led the author to suspect that motion of the orifice rather than compression of the air in the chamber was the chief agent in the phenomenon; and, in fact, precisely similar results were obtained when a light glass jet-tube was cemented to a soft iron armature, mounted on a spring in front of the telephone magnet.

Experiment also showed that an air-jet at suitable pressure directed against a flame repeats all sounds or words uttered in the neighbourhood. Except, however, where the impressed vibrations do not differ widely in pitch from the normal vibrations of the jet (discovered by Sondhauss and Masson), these effects are likely to escape notice, owing to the inability of the ear to distinguish between the disturbing sounds and their echo-like reproduction from the flame.

In these experiments the primary action of the impressed vibrations was undoubtedly exerted on the air-jet; but a singular and perplexing fact was that no sound, or at best very faint sounds, could be heard from the latter when the flame was removed, and the ear or the end of a wide tube connected with the ear was substituted for it. Suspecting, finally, that the changes in the jet, effective in producing sound from the flame, must be relative changes of different parts of it, the author was led to try a *very small* hearing orifice, about as large as the jet orifice. The results were most striking. By introducing this little hearing orifice into the path of a vibrating air-jet, the vibrations can be heard over a very wide area. Close to the jet orifice they are so faint as to be scarcely audible; but they increase in intensity in a remarkable way as the hearing orifice is moved away along the axis of the jet, and reach their maximum at a certain distance. Experiments with smoked air showed that this point of maximum sound is that at which the jet loses its rod-like character, and expands rapidly; it has been named the "breaking point," because just beyond it the sounds heard from the jet acquire a broken or rattling character, and at a greater distance are completely lost. The distance of the breaking point from the orifice diminishes as the intensity of the disturbing vibrations is increased, and also depends to some extent on their pitch, and on the velocity of the jet. With orifices of 1 to 1½ mm. in diameter it usually varies from 1 to 6 cm. The vibrations of an air-jet may also be heard at points not situated on the axis; but they are always most intense along the axis, and become rapidly fainter as the distance from it increases.

With glass jet and hearing tubes, and a light gas bag to serve as reservoir, these experiments are easily repeated; but simple apparatus for more careful experiments is described. The author's general conclusions from his experiments and those of others are as follows:—

A jet of air at moderate pressure (below 10 mm. of water) from an orifice 1 to 1½ mm. in diameter, forms a continuous column for a certain distance, beyond which it expands and becomes confused.

Any impulse, such as a tap on the jet support, or a short and sharp sound, causes a minute disturbance to start from the orifice. This disturbance increases in area as it progresses, and finally causes the jet to break. By directing the jet against a flame or a hearing orifice it is readily perceived that such disturbance travels along the jet path with a velocity which is not that of sound in air. In fact, the sound heard in the ear-piece resembles an echo of the disturbing sound.

The disturbances produced by sounds of different pitch travel along the jet path with the same velocity. This is evident; since otherwise accurate reproduction of the complex vibrations of speech at a distance from the orifice would be impossible. This velocity is much less than that of sound in air, and is probably the mean velocity of the stream.

A vibrating air-jet playing into free air gives rise to very feeble sounds, but these sounds are much intensified when the jet impinges on any obstacle which serves to divide it into two parts. Of such arrangements the best is a perforated surface, the orifice being placed in the axis of the jet.

A jet of air at low pressure responds to and reproduces only sounds of low pitch. Sounds above a certain pitch, which depends on the pressure, either do not affect it or are only faintly reproduced.

At pressures between 10 and 12 mm. of water an air-jet reproduces all the tones of the speaking voice, and those usually employed in music, with the exception of very shrill or hissing noises. When the pressure in the reservoir equals about 13 mm. of water, hissing sounds are well reproduced, while sounds of low pitch become fainter At high pressures, up to about 25 mm. of water, shrill or hissing noises produce very violent disturbance, while ordinary speech tones have little effect. But at these pressures sounds of high pitch frequently cause the jet to omit lower sounds of which they are harmonies.

In general a pressure of about 12 mm. of water will be found most suitable for reproducing speech or music. Under this condition the jet is very sensitive to disturbances of all kinds, and will reproduce speech, music and the irregular sounds classified as "noises."

It must be understood that the pressures here given are only suitable for jets of not too small diameter. When the diameter of the orifice is only a small fraction of a millimetre the above limits may be much exceeded; since the velocity of efflux no longer depends solely on the pressure.

A jet of air escaping from a perfectly circular orifice does not vibrate spontaneously so as to emit a musical sound. But musical vibration may be excited in it by the passage of the air on its way to the orifice through a resonant cavity, or through any irregular constriction.

An air-jet impinging on any obstacle, such as a flame, frequently vibrates spontaneously, if the obstacle is at sufficient distance and of such a nature as to diffuse the disturbances produced by impact or throw them back on the orifice. This constitutes one of the chief objections to the use of a flame as a means of rendering audible the vibrations of a jet. The disturbances excited in the surrounding air by the impact of the stream upon it are so intense as easily to react on the orifice. When, therefore, the jet is thrown into any state of vibration it tends to continue in the same state, even after the exciting sound has ceased.

* Abstract of a paper read before the Royal Society, May 13.

A jet of air usually responds most energetically to some particular tone or set of related tones (Sondhauss). Such a particular tone may be called the jet fundamental. The practical inconvenience arising from this may be diminished by raising the air pressure until the jet fundamental is higher than any of the tones to be reproduced.

When a flame and an air-jet meet at right angles vibrations impressed upon the flame orifice also yield sound. The conditions of pressure, etc., are somewhat different; but the changes produced at the orifice grow in the same way as those in the air-jet. The best results are obtained when a gentle current of air is directed from a *wide* tube just below the apex of the blue zone.

It is difficult at first sight to account for the fact that a vibrating jet gives rise to sound only when it strikes upon some object which divides it into two parts. The following experiments, however, in some sense explain this. The relative normal velocity at different points in the stream may be measured by introducing into its path the open end of a capillary tube which is connected with a water manometer. This velocity diminishes continuously along the axis from the orifice to the breaking point; and also diminishes continuously from any point of the axis outwards towards the circumference. Now a sudden disturbance communicated to the air at the orifice will be bound to produce a *fall* in velocity along the axis of the jet, but a *rise* in velocity along its extreme outer portions. It thus appears that the changes along the axis and along the circumference, produced by a disturbance, are of opposite character. When the jet plays into free air these opposing changes neutralize each other in the main; but this interference is prevented when the jet strikes upon any object which serves to divide it.

When a vibrating air-jet plays against a small flame, the best sounds are heard when the stream strikes the flame just below the apex of the blue zone. At the plane of contact an intensely blue flame ring appears, and this ring vibrates visibly when the jet is disturbed. The production of sound from it doubtless depends on changes in the rate of combustion of the gas. This may be proved by inserting into the ring a fine slip of platinum, connected in circuit with a battery and a telephone. When the jet is thrown into vibration the consequent variations in the temperature of the platinum affect its conductivity, and hence a feeble reproduction of the jet vibration may be heard in the telephone.

To Savart we are mainly indebted for our knowledge of the sympathetic vibrations of liquid jets. This physicist showed that a liquid jet always tends to separate into drops at a distance from the orifice in a regular manner; and that this tendency is so well marked, that when the jet strikes upon any object, such as a stretched membrane, so arranged that the disturbances caused by impact may be conducted back to the orifice, a definite musical sound is produced. The pitch of the sound, or the number of drops separated in a given time, varies directly as the square root of the height of liquid in the reservoir, and inversely as the diameter of the orifice. Savart further showed that external vibrations impressed upon the orifice may act like the impact disturbances, and cause the jet to divide into drops. Impact on a stretched membrane may then cause the reproduction as sound of the impressed vibrations. The tones capable of producing this effect were considered to lie within the limits of an octave below and a fifth above the jet normal.

The author has found, however, that jets of every mobile liquid are capable of responding to and reproducing all sounds whose pitch is below that of the jet normal, as well as some above; and that the *timbre* or quality of the impressed vibrations is also preserved, provided that the jet is at such pressure as to be capable of responding to all the overtones which confer this quality. Other essential conditions for perfect reproduction are, that the receiving membrane should be placed at such distance from the orifice that the jet never breaks into drops above its surface; and that it should be insulated as carefully as possible from the orifice.

In order to assist the action of aërial sound-waves on the fluid, it is advisable to attach the jet-tube rigidly to a pine sound-board about three-eighths of an inch thick. The surfaces of the board should be free, otherwise it may be supported in any way. The receiving membrane is formed by a piece of thin sheet rubber, tied over the end of a brass tube about three-eighths of an inch in internal diameter. A wide flexible hearing tube furnished with an ear-piece is attached to the brass tube. The jet-tube is connected with an elevated reservoir by an india-rubber pipe.

With an apparatus of this kind, and a tolerably wide jet-tube having an orifice about 0·7 mm. in diameter, a pressure of about 15 decimetres of water is required to bring the jet into condition to respond to all the tones and overtones of the speaking voice (except hissing sounds) and those employed in music. At a somewhat higher pressure it will reproduce hissing sounds. It is not easy for an untrained ear to distinguish between the disturbing sounds and their reproduction by the jet, when both are within range of hearing. Vibrations may, however, be conveyed to a jet from a distance in a fairly satisfactory way, by attaching one end of a thin cord to the jet-support, and the other to the centre of a parchment drum. The cord being stretched, an assistant may speak, sing, or whistle to the distant drum. Other devices for conveying vibrations from a distance are described.

Now when the jet is disturbed in any way, and the receiving membrane is introduced into its path close to the orifice, scarcely any sound can be heard in the ear-piece. But if the membrane be moved away from the orifice along the path of the jet the sound becomes gradually louder, until at a certain distance (which varies both with the character of the orifice and the intensity of the impressed vibrations) a position of maximum purity and loudness is reached. At greater distances the reproduction by the jet becomes at first rattling and harsh and finally unintelligible. In the latter case the jet will be seen to break above the membrane.

From this experiment we may draw the conclusions previously arrived at for air-jets; viz., that all changes produced by sound at the orifice grow in accordance with the same law; and that all changes travel with the same velocity, which is probably the mean velocity of the stream.

The mode in which the jets act upon the membrane becomes apparent when instantaneous shadow photographs of vibrating jets are examined. When the jet is steady, and the orifice strictly circular and well insulated, the outline in the upper part of the stream is that of a slightly conical rod, the base of the cone being at the orifice. When, however, vibrations are impressed upon the support, swellings and constrictions appear on the surface of the rod, which become more pronounced as the fluid travels downwards. At the breaking point the constrictions give way, those due to the more energetic sound impulses being the first to break. When the impressed vibrations are complex, the outline of the jet may be very complicated. When the membrane is interposed, we have then a constantly changing mass of liquid hurled against it, and vibratory movements are therefore excited in it proportional to the varying cross section of the jet at its surface.

It would appear at first sight that the mode of growth of the vibratory changes in a liquid jet must be different from that which characterizes the vibrations of an air-jet. It is possible, however, by special arrangements, to receive the impact of only a small section of a vibrating liquid jet, and thus to get a reproduction of its vibrations

as sound. We are thus led to conclude that the sound effects of a vibrating liquid jet may not be simply due to its varying cross section, since actual changes occur in the translation- or rotation-velocity of its particles. Experiment shows that these changes are greatest along the axis of the jet.

One of the most interesting and beautiful methods of studying the vibrations of a jet consists in placing some portion of it in circuit with a battery and telephone, whereby its vibrations become audible in the telephone. A number of forms of apparatus for this purpose have been constructed, but one will serve as a type. Savart in the course of his experiments showed that the vibrations of the jet are preserved in the "nappe" or thin sheet of fluid formed when the jet strikes normally on a small surface. So far then as vibratory changes are concerned, the nappe has all the properties of the main stream. Although the diameter of this excessively thin film is about the same whatever be the distance of the surface from the orifice, the intensity of the vibratory changes propagated to it varies with this distance, as for the jet itself. It is simply necessary then to insert into the nappe two platinum electrodes in circuit with a telephone and a battery having an electromotive force of from 12 to 30 volts, to get an accurate and faithful reproduction of the jet vibrations. Loud sounds can thus be obtained from a jet which is finer than the finest needle, and the arrangement constitutes a highly sensitive "transmitter."

A jet transmitter, in its simplest form, consists essentially of a glass jet-tube which is rigidly attached to a sound-board, and supplied from an elevated reservoir containing some conducting liquid (distilled water acidified with $\frac{1}{300}$th of its volume of *pure* sulphuric acid is the best); and a couple of platinum electrodes, embedded in an insulator, such as ebonite, against which the jet strikes. The jet may issue from a circular orifice, about $\frac{1}{4}$th of a millimetre in diameter, in the blunt and thin-sided end of a small glass tube. Much smaller jets may be used: but for one of the given size the pressure required for distinct transmission of all kinds of sounds will not exceed 30 inches. The receiving surface is the rounded end of an ebonite rod, through the centre of which passes a platinum wire. The upper end of the rod should be about 1 millimetre in diameter, and should be surrounded by a little tube of platinum; and the end of the central wire and the upper margin of the tube should form a continuous slightly convex surface with the ebonite, free from irregularities. The inner and outer platinum electrodes are joined respectively to the terminals of the circuit. The jet is allowed to strike on the end of the central wire, and thence radiating in the form of a nappe, comes into contact with the tube, thus completing the circuit. The dimensions of the apparatus may be varied to suit jets of different sizes; it is highly desirable, however, that the jet nappe should well overlap the inner margin of the ring-shaped electrode.

With small jets the impact disturbances are so feeble that slight precautions are necessary to insulate the receiving surface from the orifice, unless the former is placed low down in the path. The strength of battery may be increased until the escape of electrolytic gas-bubbles causes a faint hissing noise in the telephone. The liquid on its way to the jet should pass downwards through a wide tube lightly packed with coarse clean cotton, by which minute air-bubbles which violently disturb the jet, and small particles of dust which might obstruct the orifice, are stopped. This tube should never be allowed to empty itself.

Experiments are given to show that in this instrument the jet may act upon the electric current in two ways: firstly, by interposing a constantly changing liquid resistance between the electrodes; and secondly, by causing changes in the so-called "polarization" of the electrodes. In one form of instrument, namely, that in which both jet and electrodes are entirely immersed in a mass of liquid of the same kind as the jet liquid, the action must be entirely at the surface of the electrodes.

In the latter case a liquid jet becomes similar in structure and properties to a jet of air in air, and the velocity at different points when it is steady and when it is disturbed varies in precisely the manner already described.

The author briefly passes in review the leading facts to be accounted for, and lays stress upon the parallelism of the properties of gaseous and liquid jets. Some shadow photographs of vibrating smoke jets have shown that these also present drop-like swellings and contractions which grow along the jet path. The most satisfactory explanation of the phenomena will then be one which refers the vibratory changes in jets of both kinds to the same origin.

The beautiful and well-known experiments of Plateau have supplied a satisfactory explanation of the normal vibrations af a liquid jet in air. He has shown that a stationary liquid cylinder, whose length exceeds a certain multiple of its diameter, must break up under the influence of the "forces of figure" into shorter cylinders of definite length, which when liberated tend to contract into drops. Now, the jet being regarded as such a stationary cylinder, we have a satisfactory explanation of the musical tone resulting when its discontinuous part strikes upon a stretched membrane, and when the impact disturbances may be in any way conducted back to the orifice. These disturbances then accelerate the division of the jet after it leaves the orifice. Plateau endeavoured to show that division of the jet might take place at other than the normal points, thus explaining Savart's experimental conclusion that a jet can vibrate in sympathy with a limited range of tones. Lord Rayleigh, moreover, has recently shown that the inferior limit of this range is not so sharply defined theoretically as Savart's experiments would prove it to be.

Both Savart and Magnus, however, describe experiments in which a water-jet, carefully protected from impact and other disturbances, does not exhibit the peculiar appearances characteristic of rhythmical division; and the author's experiments conclusively prove that this rhythmical division does not take place in a well insulated jet. While the tendency so to divide may therefore be admitted, and the normal rate of vibration of the jet and its greater sensitiveness to particular tones may thereby be explained, Plateau's theory cannot be held to account for the uniform growth along the jet-path of all changes, however complex their form. For this growth takes place independently of the "forces of figure," and under conditions in which they are entirely absent, as when a gaseous or liquid jet plays within a mass of fluid of its own kind.

The author is inclined rather to refer the properties of jets of all kinds to conditions of motion on which hitherto little stress has been laid, viz., the unequal velocities at different points in the stream after it has left the orifice. From the axis towards the circumference of a jet near the orifice the velocity diminishes continuously, and the motions of the stream may be regarded as resultants of the motions of an infinite series of parallel and coaxial vortex-rings. In many respects, in fact, the appearance of a jet resembles the appearance of a vortex-ring projected from the same orifice. Thus a jet from a circular orifice, like a vortex-ring from a round aperture, remains always circular. In a frictionless fluid a vortex-ring, uninfluenced by other vortices, would remain of constant diameter; a condition to which a horizontal liquid jet approximates. When, however, the ring moves through a viscous fluid it experiences retardation and expansion, which are precisely the changes which a jet playing in a fluid of its own kind undergoes. The vibrating smoke-ring projected from an elliptical aperture changes its form in exactly the same manner as a jet, at sufficiently

low pressure, from an elliptical orifice. These analogies might be considerably extended.

In a liquid jet in air, or in a vacuum, internal friction must gradually equalize the velocities. At a distance from the orifice, therefore, depending on the viscosity of the liquid, such a jet must approach the condition of a cylinder at rest, and must tend to divide in accordance with Plateau's law. The *rapidity* with which drops are formed depends mainly on the superficial tension of the liquid. The length of the continuous column should therefore bear some inverse ratio to the viscosity and superficial tension of the liquid; a view which is in harmony with the results of Savart's experiments, and some of the author's, in this direction.

Where the jet plays into a fluid of its own kind the retardation and expansion which it experiences are mainly due to its parting with its energy to the surrounding medium. When, as a result of vibration, growing swellings and contractions are formed in it, this loss must be more rapid, and the jet therefore shows a diminution of mean velocity along the axis, which increases with the distance from the orifice.

Such being the conditions, it is evident that any impulse communicated to the fluid, either behind or external to the orifice, or to the orifice itself, must alter the vorticity of the stream. That vortex-rings are generated by impules of the first kind is well known; the action when the orifice is moved is intelligible, if we consider that a forward motion of it will produce acceleration, a backward motion retardation, of the outer layers of the jet. As a result of a rapid to-and-fro motion we may then imagine two vortex-rings to be developed—the foremost layer of greater energy and moving more slowly than the hindmost. These two rings in their onward course will then act on each other in a known manner; the first will grow in size and energy at the expense of the second, at the same time diminishing in velocity; the second will contract while its velocity increases. The inequalities in cross-section, initiated at the orifice, thus tend to grow along the jet-path, and will be attended also by growing inequalities of the normal and rotational velocities of the particles. Since the stream lines of a vortex-ring are crowded together at its centre, the disturbances produced by impact of the jet-rings will be greatest along the axis, and least along the circumference.

Indeed the sound disturbances produced by impact of a common vortex-ring are quite analogous to those of a vibrating jet. Let an air-ring be projected into a trumpet-shaped tube connected with the ear, and little more than a rushing noise will result. But let it be projected against a *small* orifice in the hearing-tube, and a sharp click will be heard at the moment of impact. This click is loud when the centre of the ring strikes the tube, but faint, although still of the same character, when produced from the circumference.

The foregoing considerations may be extended to cases in which the motions of the orifice are complex vibrations. Expansions and contractions are then initiated in the fluid proportional at every point to the velocity of the orifice. The inequalities must tend to further diverge in the manner described.

Similar considerations apply to cases in which the motions of the orifice are the result of lateral impulses. In these cases the rings formed in the jet will not be perpendicular to its direction, and in their onward course may possibly vibrate about a mean position.

The author further points out how the viscosity and surface-tension of the fluid may influence its sensitiveness. When the surface-tension is very high, as in mercury, it produces a tendency in the jet to break easily under the influence of moderate impulses.

The foregoing is little more than the outlines of a new theory of jet-vibrations. The author hopes to supply in the future further experimental evidence in support of it.

ROYAL INSTITUTION OF GREAT BRITAIN.

Anatomical and Medical Knowledge of Ancient Egypt.*

BY PROFESSOR ALEXANDER MACALISTER, M.D., F.R.S.

The surviving fragments of the early literature of Egypt are mainly of a religious character; but this is not to be wondered at, for the genius of the people was essentially religious, and their doctrine of the future state leavened their national life in almost every particular; to them the body was an integral part of the immortal humanity, therefore it must not be permitted to turn to decay, but it must be preserved from corruption that it may be a fit receptacle for the soul to dwell in through eternity.

Their treatment of the body is thus dependent on their belief of its relation to the soul, and this, we learn from their religious writings, was a relationship of eternal interdependence.

To secure perpetual preservation the body must be properly embalmed. The cavaties must be opened and subjected to the action of antiseptics. Even though the body is sacred, under the special protection of the god Thoth, though each part is under the guardianship of a special divinity, yet this sacredness does not preclude careful inspection and the processes necessary for preservation, for all parts have to be perpetuated.

Embalming is a religious rite, to be performed by the priests of the cultus, and the historian Herodotus has preserved for us what is doubtless a substantially accurate account of the different methods whereby it was done, in the later times in which he lived.

There is in Diodorus Siculus an account of an episode in the operation of embalming, which has long passed current as authentic. He says that when the sacred scribe inspected the body he marked on its left side how much it was lawful to cut. Then the paraschistes, holding in his hand a knife of Ethiopian stone, dissected the flesh as far as the law permitted; then turning suddenly he fled away as fast as he was able to run, pursued by the execrations of the bystanders, often pelted with stones and otherwise maltreated. Then the taricheutæ enter, and passing their hands through the incisions into the body remove therefrom the digestive organs, the heart, the kidneys, and other viscera. Then they wash out the cavities with palm wine and aromatics, and finally replace the parts which have been anointed with antiseptics.

While some portions of this description agree both with the earlier account given by Herodotus, and with the national literature, yet the first part I believe to be purely fictitious. There is no confirmation in Egyptian literature of that portion which relates to the ill-treatment of the outcast paraschistes. There is no trace of any such popular commotion in any of the pictures representing the stages of the process. Nay, we have direct testimony on the subject, for it is written in the Rhind papyrus, concerning the embalming of the Lady Ta-ani, "they made the incisions by the hand of a χar-heb in the place of opening at the eighth hour." It was this grade of priests who began and who carried out the work of embalming. M. Revillout has proved conclusively that the *paraschistes* and *taricheutæ* are two Greek names for the same functionaries, whose native name is χar-heb. In the Rhind papyrus before quoted, it is written, "preserved is the body by the χar-heb, who is thoroughly acquainted with the science of embalming." From other passages in Egyptian writing we learn that these χar-hebs were priests, sacred scribes, men of high character, physicians, to whom even magical powers are ascribed, for the breath from the mouth of a χar-heb has power to dissipate disease of the heart. Further, we learn from several records that the incisions were not all made at once, but in at least two series; for the perfect preservation of a

* Abstract of an Address delivered at the Weekly Evening Meeting, Friday, March 5.

mummy was accomplished gradually, the process spreading over seventy days.

The χar-hebs were men with no civil disabilities; they bought and sold land, they made contracts, they drew up formal marriage settlements for their wives, and received payment in money, vegetables, wine, and other articles.

The organs removed from the bodies of persons of the better classes were not returned into the body, but were preserved in vases of alabaster or stone, surmounted by the heads of the four divinities of Hades, the sons of Horus and Isis. The vessel which contained the stomach and colon bore the human head of Amset; that which held the lungs and heart was under the protection of the jackal-head of Tuaut-mutef; that which contains the small intestine was beneath the baboon-head of Hapi; while the liver was guarded by the hawk-head of Kabhsenuf.

During the ascendancy of Greek influence in Egypt, Alexandria earned the reputation of being the chief school of anatomy and medicine in the world. Erasistratus, who lived in the days of Ptolemy Soter, B.C. 285, was an anatomist of such enthusiasm, that he and his disciples receiving from the king criminals condemned to death, "*vivos inciderint considerarintque etiam, spiritu remanente, ea quæ natura ante clausisset, eorumque posituram, colorem, figuram, magnitudinem, ordinem, duritiem, mollitiem, lævorem, contactum, processus deinde singulorum et recessus et sive quid inseritur alteri sive quid partem alterius in se recipit.*" It is recorded by Herophilus, the successor of Erasistratus, by Tertullian, that he dissected six hundred bodies.

But this Alexandrian school, although upon Egyptian soil, was essentially Greek in spirit; even Herophilus had learned some of his anatomy from Praxagoras of Cos, although, as the anatomy of the earlier Greek school was originally derived from Egypt, it was but returning to the mother-country the traditions of culture derived therefrom. It was in Egypt Democritus of Abdera studied, and so was fitted to teach anatomy to Hippocrates, the father of medicine. The three pithy and graphic letters on anatomy which are extant, which it is supposed Democritus sent to Hippocrates, may well have been the result of his Egyptian training. At a later period, it was at Alexandria that Galen pursued his study of anatomy under Heraclianus, and the anatomical school of Alexandria survived until the Mohammedan invasion of Amru in A.D. 640. That much even of the earlier Greek medicine, anatomy, and pathology was derived from Egypt, we learn, both directly and indirectly. Most of the vegetable drugs in use in Greece were natives of Egypt; and Galen, speaking of one prescription called Epigonos, tells us that it was obtained from the adytum of the temple of Ptah, at Memphis. He quotes it, and other Egyptian prescriptions from the book Narthex, written by Hera of Kappadokia.

Medical colleges of far greater antiquity than that of Alexandria existed in the priestly schools of Memphis, Heliopolis, Sais, and Thebes. These were much more faithful exponents of the purely Egyptian system of the art of physic.

It was natural that Memphis should have been the centre of medical training in Egypt, as Imhotep, the patron god of medicine, was son of Ptah the creator, the great god of the Memphite triad. Here was the great library wherein students of the medical priesthood could learn their traditional lore. Even as late as the time of Clement of Alexandria, we read of the "*Tesserakonta ai panu anagkaiai tō Hermē gegonasi Biblioi*," which these pastophori studied; and of these, six were purely medical books which were respectively on Anatomy, on Disease, on Drugs, on Ophthalmology, on Surgical Instruments, and on Gynæcology. It is interesting to note that Clement gives to anatomy the first place in the curriculum, as the foundation of medicine. Possibly the treatise Ambres, whose title has been preserved by Horapollo, may have been one of these. It was a sacred book whose rules were used by the physicians to make their prognosis, whether a patient was capable of recovery or no. It is probably from the title of this book that Hesychius has framed the verb ambrizein, which he defines as *Therapeuein en tois ierois*. I cannot, however, find this verb in use by any author, and it has not obtained a place in Liddell and Scott. Such a book might well be the *peri Nosōn* of Clement. The name is strictly not a proper one, but is the Greek transliteration of the first words of one of these medical works.

Scant remains are left of these once famous seats of learning. Of the city of Memphis itself nothing remains but heaps which can scarcely be dignified as ruins, and of its medical library only a few fragments have been preserved.

Of the ancient medical literature of Egypt, two nearly complete treatises are still extant, and six or seven fragments of others. These vary in date and in perfection. The most complete are the Papyrus Ebers, and the Medical Papyrus of Berlin. The fragments which are noteworthy are:—The British Museum Papyrus, formerly the property of the Royal Institution, the Papyrus VI. of Boulaq, the Magical Papyri of Turin and Paris, the Coptic Medical Manuscript in the Borgia Library, and the Greek Papyri 383 and 384 of Leyden.

In the very brief sketch which the time at our disposal allows of the contents of these works, I cannot enter into the analysis of all these works, nor into discussion of disputed points of translation, but I hope soon to be in a position to publish a detailed and critical study of this medical literature at fuller length. We shall confine ourselves principally in our survey to the first and second.

The most complete of all these papyri is that which is known by the name Papyrus Ebers, said to have come from a tomb at El Assassif; and this is not improbable, as the Medical Papyrus VI. of Boulaq is from that place. It is in good preservation, written in a clear hieratic script, the characters resemble those of the earlier manuscript of the 18th dynasty; and its text presents few difficulties to the reader except those arising from the difficulty of ascertaining the precise diseases referred to, and the exact nature of the remedies prescribed. Unlike the Berlin papyrus, it is perfect at its beginning, and it consists of one hundred and ten pages, each of twenty-one or twenty-two lines. A *fac-simile* copy has been published by Professor Ebers, with a short synopsis of his reading of the contents. A brief notice of its contents has been published by Chabas, and it has partly been translated into Norwegian by Professor Lieblein, but no complete translation has as yet been made public.

The work is really a series of treatises on different branches of medicine, and from its introductory paragraph seems to be the embodiment of Heliopolitan medical lore, probably dating from about 1550 B.C.

The first page, and the first five lines of the second, consist of an introductory preface and prayer:—"Beginning of the treatise on the administration of medicine to all parts of a person. I have come from Heliopolis, from the authorities of the great temple, from the rulers of thought, the eternal governors of safety. I came from Sais with the mother goddesses as a protector to me; I speak for them; I do it from the Lord of the assembly conquering evil, the god slaying the slayers, whose several sections are from this my head, from this my neck, from these my arms, from these my limbs, from these my organs, to destroy the magical power of the ruler who influences my flesh, who sickens in these my limbs, and penetrates into my flesh, into my head, into my arms, into my body," etc.

After this prefatory abjuration follows a section on hygienic measures, cathartics, diuretics, and other remedies of the kind, which occupies the following sixteen pages. This is followed by a short section on the effects of the parasite *Bilharzia hæmatobia*, still a very common

cause of disease in the Nile valley, and the pages from this to the twenty-third are taken up with prescriptions for parasites. Three prescriptions follow for uχet and others for uhau, whose treatment takes up the following four pages. Diseases of the colon, rectum, and heart are next prescribed for, and diseases of the head follow; one prescription is given as a quotation from another medical treatise, described as "the Old Scripture of the Wisdom of Men." Renal and gastric diseases follow, and a long section on ophthalmology, beginning, "Treatise on the sufferings in the eye, means for the cure of inflammation, and determination of blood to the eye." Diseases of the eye appear to have been as rife in Egypt then as they are still, and the author names twenty-two distinct diseases, some of which are briefly and graphically characterized. We can recognize among these, conjunctival inflammation, choroiditis, amaurosis, cataract, opacities of the cornea, as well as fistula lachrymalis, and others not so easily identified. One ointment for the eye, whose formula he gives, was invented by Chui, the President of the College; another is a foreign prescription in use among the Phœnicians at Byblus.

Nor were serious maladies alone attended to, but those which interfere with the appearance also claimed the physician's care. Twenty-four prescriptions of hair-washes, oils, depilatories, and dyes, are given, and some of them are characterized as very good. One of these prescriptions, found on p. 66, line 15, is entitled, "Another prescription to stimulate the growth of hair, prepared for the Lady Sesh, the mother of His Majesty King of Upper and Lower Egypt, Teta the blessed." This paragraph carries us back to the beginning of time, for Teta was the second king of the first dynasty, about 4000 B.C. The Egyptian priest Manetho notes in regard to him that he wrote books on human anatomy, for he was a physician.

After several smaller sections concerning diseases of the liver, there begins on p. 70 a treatise on the surgery of wounds, ulcers, erysipelas, cutaneous diseases, and diseases of the ear, nose, etc.

The section of this papyrus, which begins on the ninety-ninth page, is a treatise on the vascular system, entitled "The beginning of the mystery of medicine, knowledge of the motions of the heart, and knowledge of the heart." "There are vessels from it to all parts, which the physician Nebseχt, priest and Lord of Healing, describes. All these he points out with his fingers to the head, to the neck, to the hand, to the epigastrium, to the arms, to the legs; all he enumerates from the heart, because the vessels are from it to all parts; as he describes, it is the beginning of the vessels to each organ."

The author then proceeds to enumerate the distribution of these vessels from the heart, and first gives those ascending to the head.

Digressing from the vessels to the animal spirits, Nebseχt tells us that these vital spirits enter one nostril, penetrate to the heart through the tube which carries them into the body-cavity. A little farther on he states another singular hypothesis concerning these vital spirits; for, speaking of the ears, he says, "There are four vessels going to the two ears together, two on the right side, two on the left side, carrying the vital spirit into the one right ear, the breath of death into the left ear, that is, it enters on the right-hand side, the breath of death enters on the left-hand side."

Nebseχt next describes the vessels of the upper and lower limbs, and the arteries of the viscera.

The anatomical description is followed by a series of aphorisms regarding the pathology of vascular disease, arranged in separate sentences; protasis and apodosis beginning respectively with *Ar* and *pu*, reminding us of the ην με of Hippocrates; indeed, there is such a Hippocratic aspect about these that one cannot resist the conviction that we have reached here the source of much of the Hippocratic learning. It is possible that the earlier phrase may be interrogative, and the latter an answer; but it is more likely that the protasis is conditional than interrogative. They relate to such conditions as syncope, cardiac disturbance from abdominal distension, enlargement of the heart, pericardiac adhesion and effusion, dilatation, and enlargement of the heart, etc. There are twenty-two such queries, and some of them point to careful pathological observation; thus there is an allusion to valvular stenosis in one, which says, "If the orifice of the heart be turned back, then constricted is the mouth of the heart."

Of the Berlin papyrus a *fac-simile* has been published, and it has been discussed by three eminent scholars, Brugsch, Renouf, and Chabas. It is also written in hieratic characters, which are clear and legible, and was executed in the reign of Rameses II., the Pharaoh of the oppression, who reigned about 1300 B.C. The document consists of twenty-one leaves, two of which are written on both sides. The text is for the most part easily read; the chief difficulty presented by it, as by the other, is that of understanding the names of diseases and of remedies, to which no cognate words in Coptic, nor derivative words in other languages have come down to us.

The other fragments are of literary rather than of medical interest. They abound in mystical formulæ, and seem to have been magical and occult rather than scientific. Of the Coptic MS. a transcript was published by Zoega, and it is evidently a fragment of a larger work; it deals chiefly with eruptive fevers and similar diseases.

Provincial Transactions.

HULL CHEMISTS' ASSOCIATION.

On Thursday, the 22nd inst., the members of the Hull Chemists' Association, accompanied by ladies and friends, held their annual picnic. This year the celebrated Nottinghamshire Dukeries were chosen for the excursion. Proceeding by an early train, Worksop was reached in time for breakfast, which was provided at the Lion Hotel. A start was made from here in waggonettes to Clumber, the seat of the Duke of Newcastle. After visiting the gardens, lake, etc., the party proceeded through Clumber and Thoresby Parks to Thoresby House, the seat of Earl Manvers, and from thence through avenues of fine old oak trees in Sherwood Forest to that monarch of the forest known as the Major Oak. Luncheon was partaken of at this spot, and the party were afterwards photographed by one of the members; after walking to the adjoining village of Edwinstowe the drive was resumed to Welbeck Park, in which is situated Welbeck Abbey, the seat of His Grace the Duke of Portland. The short time left allowed only a hurried visit, and the party were quickly soon on the road to Worksop, where an excellent dinner was done ample justice to. The usual loyal toasts were given from the chair by Mr. George Hoyles, the President, whose health was next proposed by Mr. Francis Earle, this being suitably acknowledged; the "Ladies and Visitors" was then ably given by Mr. C. B. Bell, and Mr. Wallis acknowledged the toast. A hearty vote of thanks was given to Mr. C. B. M. Stoakes, to whose arrangements much of the pleasure and enjoyment of the day was due.

Parliamentary and Law Proceedings.

Attempted Suicide by taking Laudanum.

At the Torquay Police Court on Friday last, a married woman named Hopkins was charged with having attempted to commit suicide. It appeared from the evidence that on the previous Tuesday she had purchased half an ounce of laudanum, which she had swallowed in the street, throwing away the bottle, a piece of which was produced with part of a poison label still upon it.

William Bathe, chemist, 10, Abbey Road, said:—On

the evening of the 20th inst. I sold a bottle of the description produced to the accused. She came into my shop at about a quarter to seven, and asked for some laudanum, to put in a poultice. This not being an unusual request, I supplied her to the extent of half an ounce, properly labelled "laudanum, poison." Shortly after a man, who I have since learned was her husband, came in and said she had taken it.

The prisoner was ordered to be discharged upon her husband becoming surety for her good behaviour.

Death through Chloroform.

On Monday an inquest was held in Liverpool touching the death of a man named M'Leod, aged 50, which had taken place whilst undergoing an operation for cancer in the Southern Hospital. The Jury, after a short deliberation, returned a verdict of "Death from misadventure in the administration of chloroform."

Obituary.

Notice has been received of the death of the following:—

On the 9th of July, Mr. George Morecroft, Chemist and Druggist, Norwood, London. Aged 23 years. Mr. Morecroft was an Associate of the Pharmaceutical Society.

Reviews.

Watts' Manual of Chemistry, Theoretical and Practical (based on Fownes' Manual). Vol. II. Organic Chemistry. Second Edition. By William A. Tilden, D.Sc., F.R.S., V.P.C.S., Professor of Chemistry in the Mason College, Birmingham.*

The progress of chemistry, and especially the additions to our knowledge of the chemistry of carbon compounds, has rendered desirable a new edition of this well-known work, and the task has been ably executed by Dr. Tilden, who, while preserving almost intact the arrangement followed in the last edition (Watts, 1877) has introduced new matter and modified the old when necessary so as to bring the volume well up to the present date. By a judicious cutting down and suppression of detail in the case of a few of the less important compounds, room has been made for these additions without greatly increasing the size of the work, and nothing of any importance has been omitted.

As before, the opening portion is devoted to a description of the ultimate analysis of organic bodies and the determination of their empirical and molecular formulæ, a slight alteration being made in the substitution of pumice moistened with sulphuric acid for the ordinary calcium chloride tubes in combustions. In the directions for testing for nitrogen sodium might with advantage have been substituted for potassium, as being generally more available and more commonly used for this purpose. In the following portion on classification no changes of any importance have been made, but in the distinction between isomerism and metamerism dextrose and lævulose are given as examples of strictly isomeric bodies; there is, however, an additional note at the end of the volume, describing the recent work of Kiliani, and Bernstein and Herzfeld, which shows lævulose to be of the nature of a ketone and not of an aldehyd like dextrose.

The sections on specific volume, refractive index, and other physical properties are clearly written and slightly amplified from the last edition, and are followed by the chapter on decompositions and transformations which was previously placed at the commencement. Coming to the descriptions of the fatty or paraffinoid group we find that the terpenes have been assigned a rather doubtful position at the end of the hydrocarbons of this class. Although this is supported by several arguments, it has the disadvantage of separating them to quite a different portion of the book from their allies, the camphenes, etc. They are treated of rather more fully than before, and the matter is the more valuable from Dr. Tilden's special knowledge of the subject.

Among the cyanogen compounds the recent developments of our views as to the structure of fulminates are introduced. The sugars have been carefully revised and some additions made to the starches and dextrins. Some space is devoted to hydroxylamine and its reactions with various aldehyds, ketones, etc., this being of interest as throwing much light on the constitution of nitroso-compounds. The structure of uric acid is developed from its recent synthesis by means of urea and glycocine.

Considerable additions have also been made in the portion devoted to the aromatic compounds, especially among the aniline colours, with which such advances are continually being made. The constitution of quinones is also further developed, as are those of tropic acid and indigo from their recent syntheses. Much new information about alizarin and the purpurins is introduced, and newer views of the constitution of anthracene and phenanthrene.

The final portion of the work treats of more complex substances of animal or vegetable origin whose exact constitutions have not yet been made out, such as alkaloids, glucosides, etc, and has been left almost untouched. Cupreine, for instance, is not even mentioned among the alkaloids, nor is any reference made to the synthesis of codeine from morphine; in the tests for brucine, sulphuric acid is again erroneously substituted for nitric.

The nomenclature has in many cases been altered so as to bring the terminations more into accordance with a regular system; for instance, selenium has been changed to selenion, and the alcohols and phenols are all made to have the same termination, *e.g.*, erythrol, dulcitol, resorcinol, quinol, etc.; we do not, however, see why two p's should be introduced into jalapin. As is inevitable in a work of this description there are a few printer's errors, but these are very few in proportion to some other works on organic chemistry. We also notice that Goulard water is stated to consist of $Pb(C_2H_3O_2)_2 2PbO$, that sumbul root is said *probably* to belong to the Umbelliferæ, and jalapis described as the root of *Convolvulus Schiedanus*.

The synonyms for such products as are common in commerce, such as hypnone, antipyrine, terebene, etc., might also have been given with advantage.

Taking the book as a whole, its excellent arrangement, its clear but concise method of treating each compound, giving all essential details without either ambiguity or waste of space, and its freedom from all but a few trivial clerical errors, render it one of the best existing works for the use of the student who desires more than a superficial knowledge of organic chemistry, while its containing notices of almost every organic compound of any importance makes it equally useful as a work of reference.

Outlines of Organic Chemistry. By H. Forster Morley, M.A., D.Sc., Fellow of, and Assistant Professor of Chemistry at, University College, London.*

Among the many elementary books on organic chemistry which the student has to choose from, the one before us presents some distinguishing features which make it well worthy of a place in his library. The first thing that strikes one on looking at the book is the peculiarity of the arrangement of the subject-matter and the order in which the compounds are taken, which differs considerably from that usually adopted in works on organic chemistry. The author's idea is that the student should first become acquainted individually with a considerable number of compounds and then learn to classify them into groups when he is familiar with their properties and points of resemblance. Accord-

* London: J. and A. Churchill, 1886. Crown 8vo. Pp. i.-xix., 1-662. 10*s*.

* London: J. and A. Churchill, 1886. Crown 8vo. Pp. i.-xx., 1-490. 7*s*. 6*d*.

ingly no classification is attempted at first; but after a preliminary chapter or two on analysis and determination of molecular formulæ, the author starts with a description of the preparation and properties of methane, and follows with a variety of its derivatives, passing on to other compounds in the order in which they may be prepared from those already treated of. It is not until a large number of compounds have been described that anything is said about homologous or isologous groups, and the classification of alcohols, etc. This method has many advantages for the student, although leading to some apparent confusion in the arrangement.

A considerable saving of space is effected by tabulating the physical constants of each compound in a condensed form directly under its name, but in some portions of the letterpress brevity has been obtained at the expense of clearness, and in many places the punctuation and the construction of the sentences is open to great improvement.

The directions for the preparation and testing of the compounds described are, as a rule, eminently practical; but here and there the omission of some detail renders them faulty. For instance, in testing for methylic alcohol in ethylic, we are directed merely to distil with $K_2Cr_2O_7$ and H_2SO_4, and test the distillate with nitrate of silver without taking any precautions to remove aldehyd.

The articles on alcohol and acetic acid are very full, and contain tables of specific gravities, specific heats, and freezing points of mixtures of these bodies with water in various proportions.

The author seems to favour the system of calling anhydrides anhydrous acids, speaking of sulphuric and acetic anhydrides, for instance, as dry sulphuric or acetic acid, and distinguishing the acids themselves as hydric salts; but later on the terms acid and hydric salt seem to be used indiscriminately.

We notice several loose statements, such as, for example, that tartaric acid is *developed* during fermentation of grape must, and that *collodion* is a nitrate of cellulose and soluble in a mixture of ether and alcohol. It is also stated that for making "Spiritus Ætheris Nitrosi," the Pharmacopœia directs a mixture of 4 fluid ounces of hydric sulphate with 2 parts of rectified spirit to be poured upon 5 ounces of sodic nitrite and distilled, the first 35 ounces (!) of distillate being kept. The tests given for estimating the amount of ethyl nitrite are also obsolete.

Apart from a few imperfections of the above description, and some printer's errors not mentioned in the list of errata at the commencement, we are very favourably impressed with this book. Among its good features are the graphic representations of reactions, which are perfectly clear without occupying much space, and the exposition of the reasons for or against assigning a particular formula to any substance, the tendency of the student being too frequently to take a formula for granted without reasoning what grounds there are for it.

There are many useful generalizations, such as a list of the methods in which zinc ethide acts on various bodies, and general rules for the position a substituted group will ocupy in a benzene ring with respect to other groups present. The explanation of the probable stages in the oxidation of alcohols into aldehyds, acids, etc., makes it very intelligible, and is calculated to give the student a clearer insight into many reactions. In treating of glycerine, mannite, etc., attention is directed to the difference between these ethereal nitrates and the nitro-substitution compounds like nitro-benzene, about which some confusion frequently arises.

The graphic formulæ proposed for benzene by Kékulé, Ladenburg and others are very fully discussed, and there is a very useful description of the methods employed for the determination of the positions of the substituted groups in ortho-, meta- and para-benzene derivatives, and also of their relative positions in tri- and tetra-substitution compounds. In fact the portion of the book which deals with the aromatic compounds is particularly useful, as it embodies so many results of very recent researches, which have resulted in the synthesis of so many new compounds in this class, and in throwing much new light on the constitution of others.

An excellent feature of the work consists of the numerous references to original papers which are given throughout the work, although it is to be feared that the average student will not avail himself of them so much as is intended.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Incompatible Prescriptions.

Sir,—To me it appears a great fault in our Pharmacopœia that it contains nothing relating to incompatibles.

Perhaps it is presumed the profession is too well acquainted with chemistry to need this refresher to their memories, but I am pained at times at the incongruities I am called upon to compound. Only yesterday I had to prepare the following:—

℞ Liqr. hydr. perchlor.	ʒss.
Liqr. arsenicalis	♏iij.
Potass. bicarb.	gr. v.
Aq.	ad ʒss.

M.

I think you will agree with me that there will speedily be decomposition set up with the deposition of mercuric oxide, and that the mixture will be something different to what was intended.

Again, it is a common practice to order liqr. hydr. perchlor. and tinctura cinchonæ, both simple and compound, together.

Chemists have not always an opportunity of referring to the writer of a prescription, to say nothing of the delay. This being so, and bound as we are to follow the prescriptions accurately, it seems to me that more care should be taken by the writers.

Birmingham. Joseph Lucas.

J. R. D. Barfoot.—Carnoux's 'Pottery' (Stanford), or see an article in Payen's 'Industrial Chemistry.'

Z.—We understand that the setting of the passage in question was the consequence of an oversight. The subject has been under consideration, and the result will appear probably in the report that will be presented to the Council at its meeting next week.

W. Tite Frost has forwarded us a letter from which it appears he thought that, because he had passed the Preliminary examination, he had become a "Registered Apprentice and Student of the Society," entitled to compete for the herbarium prize, and he seems to have remained under this false impression until too late to obtain qualification by election before the date prescribed for sending in the herbaria for the recent competition. It is certainly to be regretted that by such a mistake an intending competitor should be debarred, but it is evident that the published regulations cannot be deliberately departed from without affecting the position of the properly qualified competitors. As to the intimation our correspondent says he received upon passing the examination, he will see, if he refers to the circular, that it does not contain the most essential words in his supposed quotation.

Cleon.—The red stain is due to the acid of the salt of sorrel, and probably the original colour would be restored by the application of dilute ammonia.

Inquirer.—The General Index to the Year Book is now ready, and copies may be obtained from the publishers, Messrs. Churchill, or from the Hon. Secretaries to the Pharmaceutical Conference.

Communications, Letters, etc., have been received from Messrs. Fletcher, Lloyd Bros., Gerrard, Thompson, Studwick, Barclay, Cleon.

ULEXINE.

A NEW BASE FROM ULEX EUROPÆUS.

BY A. W. GERRARD, F.C.S.,

Teacher of Pharmacy, University College.

One of the most familiar plants in England is the leguminous shrub known to botanists as *Ulex Europæus*, and to country folk by the names furze, gorse, whin, etc. It is conspicuous on commons and roadsides, and is well known by its spiny branches and bright yellow flowers, either solitary or in pairs, situated on the spines.

The economic uses of the plant do not seem to be important. It is chiefly grown to provide shelter for young trees or cover for game ; in some parts of the country the young tops are gathered and bruised, as fodder for cattle. The seeds, which are an article of commerce, recently attracted my attention.

Twenty grams of the crushed seed was first exhausted with washed ether, to remove fat, and on evaporation 2·1 grams of greenish-yellow oil of bland taste was obtained. The seed was then exhausted with 84 per cent. alcohol, the tincture giving on evaporation 1 gram of brittle, pale greyish-green resin. On treating this residue with water and filtering, the filtrate was found to give precipitates with solutions of iodine in iodide of potassium and of the double iodide of potassium and mercury. The bulk of the liquid, after concentration, was shaken with ammonia and chloroform, and the residue obtained on evaporating the chloroform proved to be an organic base, for which I propose the name "ulexine."

To prepare a larger quantity of the base I operated upon 3 kilos of furze seed crushed to fine powder, moistened with 84 per cent. alcohol, closely packed in a percolator and slowly exhausted with a further quantity of alcohol. The percolate on distillation gave a residue of oily-looking green extract, having the appearance of extract of male fern, and like it giving a deposit ; the yield was 270 grams. This extract was repeatedly shaken with hot water until the oily matter seemed exhausted of alkaloid ; the insoluble portion was set aside for future examination. The watery solution, carefully evaporated to 250 c.c. and allowed to cool, was then mixed with excess of ammonia, and shaken with several portions of chloroform ; the chloroform solutions left on distillation a brown syrupy residue containing the base. For the purpose of purification, it was made neutral with hydrochloric acid ; the product almost immediately solidified to a mass of crystals, which were washed with absolute alcohol to remove colouring matter. A further treatment with ammonia and chloroform gave the pure base as a compact crystalline mass weighing 4·3 grams, being a yield of ·143 per cent. calculated on the seed. Since the above experiment was made, I have found that much alkaloid was left in the residue, and its complete removal will form the subject of another communication.

Ulexine forms colourless, odourless crystals, with a bitter and somewhat pungent taste ; it is freely soluble in water, forming a strongly alkaline solution. Heated, it fuses, darkens and decomposes, giving off vapour that burns with a yellow smoky flame, and leaves no residue. Small portions placed on watch glasses gave, with nitric, hydrochloric, hydrobromic, sulphuric and oxalic acids, in a few hours, well-crystallized salts. The salts appear to be freely soluble in water, very strong solutions of them giving precipitates with caustic potash and soda soluble in excess, but they give no precipitate with ammonia.

Ten per cent. solutions of the carbonates of potassium, sodium and ammonium, or of the iodide, chromate and ferrocyanide of potassium give no precipitates ; permanganate of potassium is almost immediately reduced by it. Picric acid gives a yellow precipitate ; chromic acid no precipitate. Brought into contact with strong nitric, sulphuric or hydrochloric acids no reaction is apparent.

The watery solution of the pure base gives a green precipitate with ferrous sulphate, a black precipitate with murcurous nitrate, and a white precipitate with mercuric chloride.

From a few experiments carried out in the physiological laboratory of University College, I am able to say that ulexine acts on frogs as a paralysing agent causing clonic spasms ; placed on the tongue the chloride produced a slight numbness similar to, but not nearly so powerful as cocaine. Knowing that many animals feed readily on the furze plant, it may be inferred that the alkaloid is not of a powerful or poisonous nature ; but this idea must not be too hastily accepted, until we obtain precise evidence as to its action, for we know that some poisonous plants are eaten by animals without ill effect. It must be remembered that my observations have been confined to the seed ; it yet remains to be proved whether other parts of the plant contain the same active principle, and I am continuing my work in that direction.

THE COLONIAL AND INDIAN EXHIBITION AT SOUTH KENSINGTON.

British Guiana.

This Court is so well arranged and so full of objects of general interest, that it is not surprising to find it generally crowded with visitors. One of the chief attractions apparently consists in the fine collection of articles of ethnological interest, each of which carries with it an explanation of the mode in which it is used, which is rendered still more clear by instructive engravings. These appear to be taken from a very interesting book entitled, 'Among the Indians of British Guiana,'* by Mr. Everard F. im Thurn, whose ethnological knowledge of the country is probably unequalled. Any one visiting this Court who may be able to peruse this volume, or will take the trouble to read the extracts from it appended to the exhibits, cannot fail to obtain an excellent idea of the country and its products. Our readers may be glad to know that a copy of this work has been presented to the Library of the Pharmaceutical Society by the learned author.

The more striking commercial products of the colony consistof timber, sugar, fibres, balata, copal, tapioca and various oil-seeds and oils. At the entrance to the Court are two imposing pillars of the timber of mora (*Mora excelsa*) and of greenheart (*Nectandra Rodiæi*). These are special products of the colony and form two out of the eight woods recognized by Lloyd's as of the first class for ship building. It may be easily understood therefore that nectandra bark can be produced at a cheap rate. The bark of the mora tree is used in tanning and also as an astringent medicine, and the seeds of

* London, 1883. Kegan, Paul, Trench and Co.

both trees are used to some extent by the Indians to make a kind of meal, which they mix with their cassava. Several of the native trees have a perfumed wood; of these may be mentioned "siruaballi," "keritee," "oolu," and "hiawa" (*Icica heptaphylla*, Aubl.). The last-named produces an oleoresin resembling elemi in odour and appearance. The beautiful "letter wood," consisting of the heart-wood of *Brosimum Aubletii*, seems to prove a great attraction to visitors, the highly-prized walking sticks made from it having been sold at an early date.

Probably one of the most important commercial products of the colony is balata. This substance has not received the attention it merits, but will doubtless in the future compete successfully with gutta-percha. It is obtained from the milky juice of *Mimusops Balata*, a large forest tree belonging to the natural order *Sapotaceæ*, and which in one or more forms ranges from Jamaica and Trinidad to Venezuela and French Guiana. In character balata is intermediate between india-rubber and gutta-percha, and combines the properties of both. Although it was brought under the notice of Messrs. Silver and Co. in 1859, and was exhibited and brought more prominently forward by Sir William Holmes at the International Exhibition of 1862, so that in 1865 as much as 20,000 lbs. were exported, the trade gradually decreased till the year 1874, when the amount sold realized only £111. Subsequently the trade again increased, so that in 1882 the quantity exported amounted to 105,112 lbs., valued at £5849 3*s.* 10½*d.* The cause of this fluctuation is not at first evident, since Dr. Hugo Müller, F.R.S., says that balata is considered by manufacturers as a superior kind of gutta-percha, being much less slowly acted on than gutta-percha when exposed to the air; at ordinary temperatures it is softer and is not so rigid in the cold. It has also been recently pronounced by an American firm of manufacturers to be "the best gum in the world." The fact that it has not hitherto been more extensively used appears to be due to the following causes:—(1). It is regarded in this country as a gutta-percha and its distinctive name disappears. (2). The supply has not hitherto been regular. (3). It has been prepared by different processes and has hence varied in quality. Thus, two specimens prepared by Mr. G. S. Jenman, the Government botanist, and submitted by Sir J. Hooker to the India-rubber, Gutta-percha and Telegraph Works Co. (Limited), were estimated as very different in quality, although prepared from the same sample of balata milk. One of the specimens was prepared by simple evaporation, and lost on washing and drying 25 per cent.; this was valued at 1*s.* 9*d.* per lb.; while the second, prepared by precipitation with spirits of wine, lost 38 per cent. on washing and drying, and yielded a softer product, which was valued at only 1*s.* 3*d.* per lb. Probably also the large amount of impurities often met with in block balata lessens its value. These are due in some degree to the fact that the majority of collectors of the juice do not strain it, simply clearing out the larger bits of bark with their hands. Water is sometimes added to dilute the milk, and lime added to restore its consistency, but this renders the balata brittle and unserviceable. The inferior milk of the bartaballi tree is also sometimes added. Possibly these difficulties might be met by a higher price being given for strained milk and by the balata being purchased only in thin sheets, in which adulteration could be easily detected. The process of collecting and drying the milk is probably also susceptible of improvement.

The mode of collecting the milky juice, like that followed in Eastern countries for obtaining gutta-percha, is wasteful in the extreme, only a trifling portion of the milk present in the tree being obtained, while the careless manner in which the incisions are made causes the tree to decay, and the valuable timber, which is worth much more than the small amount of balata obtainable from the bark, is lost. Even if the trees are incised with care, it takes three to five years or more before the bark heals and the milk flows freely. Attempts that were made on a commercial scale a few years ago to extract the balata remaining in the bark, and thus limit to some extent the destruction of the trees, failed on account of the large amount of impurities contained in the finished product. The mode adopted by Mr. Wray, in Perak, in his experiments on gutta-percha, seems, however, to indicate that, by the exercise of sufficient skill, the particles of balata floating in the hot water used to extract the rasped bark might be made to agglomerate into a tolerably pure article. Further experiments on the lines indicated by Mr. Wray, might be well undertaken by those interested in this industry. Mr. G. S. Jenman, the Government botanist, in his exhaustive report on balata, suggests that the collection of this valuable commodity should be placed under active Government control,* with a view to the development of this important colonial product. A well-administered forest conservancy would probably be the only means of preventing reckless destruction of the trees.

The method of drying the milk which has hitherto been found to give the most satisfactory results consists in allowing the juice to evaporate in shallow trays. The film that forms on the surface is lifted off and suspended over a horizontal bar stretched above the trays until it becomes dry on the side that was next to the milk. The method of drying the milk adopted by the natives who prepare india-rubber in Para would probably yield a still better product, since the experiments of Mr. Francis show that the matters present in the milk (about 8·05 p.c.)† beside pure gutta, and which are insoluble in bisulphide of carbon, give to it a greater commercial value and keep it flexible; the pure balata, which is entirely soluble in the bisulphide, being hard and tough. The method adapted in Para, and which affords the best rubber of commerce, consists in dipping a paddle-shaped piece of wood in the milk and drying it by constantly turning over the paddle in the smoke of burning palm nuts.

According to experiments that have been made by Mr. W. Thomson,‡ rubber so prepared is less liable to be acted on by the atmosphere, probably due to varnish-like film deposited on the rubber by the empyreumatic oil contained in the smoke. This simple mode of preparation could easily be carried on by the natives and would save the labour of carrying the balata milk for long distances to the agent.

Amongst the milky juices sometimes used by the natives to adulterate balata is that of the tree called touckpong, identified by Professor Oliver as

* 'Timehri,' vol. iv., p. 219.
† 'Timehri,' vol. iv., p. 209.
‡ *Journal of the Society of Technical Industry*, vol. iv., p. 714.

Sapium biglandulosum, M. Arg, or a species closely allied to it. The juice yields a true india-rubber of considerable value, since a specimen prepared by Mr. Jenman and sent to England for report was priced at 2*s.* 6*d.* per pound. The tree is of very rapid growth, and is recommended by Mr. Jenman as one of the best to cultivate for rubbers. It flowers in March and fruits in May. A twining plant, probably belonging to the natural order Apocynaceæ, also affords a milk that is mixed with the balata. A red colour is given to the balata by the milky juice of the bartaballi, which yields an inferior rubber, and probably damages the commercial value of the balata.*

Besides the balata there are shown specimens of india-rubber derived from *Hevea guianensis* and *Hancornia speciosa*. The former is in the form of spherical balls about three inches in diameter and, though occasionally slightly sticky on the surface, has been pronounced by Messrs. Lewis and Peat, of Mincing Lane (to whom samples were submitted), to be of very good quality. From their statement it would appear that this variety of rubber has never come into the London market before and that if well cured it would command a ready sale at about 2*s.* to 2*s.* 2*d.* per lb. The sample of hancornia or "Mangabeira" rubber was valued at 1*s.* 10*d.* to 2*s.* per lb., being much cleaner than the samples usually sent to the London market, which usually sell at 1*s.* 9*d.* per lb.

The locust gum, or as it is commonly termed, Brazilian copal (*Hymenæa Courbaril*), is shown in the curious oval packages of loose wicker work and palm leaves called a "wierie" and holding about 40 lbs. It appears to be of two qualities. The older or fossilized resin which is dug up is very hard, clear and of a yellowish tint like that of amber. The more recent resin is white and transparent. Until lately this copal does does not seem to have been in general favour with varnish makers. In some experiments made with regard to its solubility, it was found to dissolve freely and entirely in eucalyptus oil, forming an excellent varnish, and as it can be procured in unlimited quantities it appears to deserve more attention than it has hitherto received.

A very remarkable substance, of great tenacity, and presenting much the appearance of cobbler's wax, is exhibited under the native name of "karamanni." The exact mode of preparation of this substance does not appear to be known, some stating that it is the resin of a tree, and others that it is made of a mixture of resin, wax, etc. According to Mr. im Thurn (*l.c.*, p. 315) it is composed of the resin obtained by tapping, from *Siphonia bacculifera*,† mixed with beeswax to make it more pliable, and finely powdered charcoal to make it black. As the *Siphonia* genus (now *Hevea*) affords chiefly india-rubber, karamanni may perhaps be regarded as a kind of marine glue. It is used for filling crevices in woodwork, for fixing arrowheads into shafts, and other purposes where a strong cement is required. Mr. im Thurn gives as an illustration of its tenacity, the fact that on one occasion, when his men were sawing timber, the handle of the whipsaw parted from the blade, and the two parts were, on the suggestion of an Indian, stuck so firmly together by using the karamanni that the saw again became effective.

A kind of elemi, from which most of the volatile oil has evaporated, is shown under the name of "haiwa" and is probably the produce of *Icica heptaphylla*, Aubl.; it is used by the natives for torches, for rapidly lighting a fire and for perfuming the oils with which they anoint their bodies. The bark of the tree is used in decoction as an emetic in fevers. Mr. im Thurn (*l.c.*, p. 96), mentions a still more fragrant resin, the tauranero (*Humirium floribundum*) of the Indians, of which unfortunately no specimen is exhibited; its odour has been likened to vanilla and to balsam of peru. A decoction of the bark of this tree is used as a remedy for coughs.

One of the products that deserves a brief notice is the cassada or cassava, numerous specimens of the sliced and dried roots being exhibited, as well as the meal, starch, bread, and other articles of food, derived from it. This plant, according to Mr. im Thurn (*l.c.*, p. 260), affords the one staple vegetable food of the Indians. There are two varieties, one known as the sweet, and the other as the bitter cassava, which by some botanists have been considered different species under the respective names of *Janipha Lœfflingii*, H.B.K., and *Janipha Manihot*, H.B.K. The latter contains a poisonous juice, which is extracted from the grated or rasped root by means of lateral pressure exerted in a cylindrical bag, or matapie, made of the plaited leaves of the Œta palm (*Mauritia flexuosa*). The bag, when suspended, is elongated by means of a pole attached to a loop at its lower end. The pole is used as a lever by a woman sitting at the distant end, the shorter end of the pole being kept down by a heavy stone. Sometimes a heavy weight is used.* The poisonous juice which runs out is collected, and when boiled to a treacly consistence is called "cassareep." By boiling it loses its poisonous character. This liquid is stated to have remarkable antiseptic properties, and is largely used both by the natives and colonists in soups and stews, and especially to form the dish known as "pepper pot," in which chilies as well as cassareep form an important ingredient. The fresh juice of the bitter cassava appears to contain hydrocyanic acid and some other poisonous principle, since when it is administered to animals they are said to swell up to a great size and die in a few hours (*Pharm. Journ.*, [2], xi., p. 13). The nature of this principle and the cause of the antiseptic properties of the juice when evaporated into cassareep seem worthy of investigation, for it is said that meat boiled in cassareep will keep good for a considerable time. Cassareep would probably form a very useful basis for sauces.

The decorticated dried roots of the sweet cassava have a pleasant nutty flavour when cooked. Mr. G. H. Hawtayne, the Executive Commissioner, who evidently has at heart the interests of the colony, has submitted a sample of these roots to Mrs. E. Clarke, the Lady Superintendent of the National Training School for Cookery at South Kensington, and this lady reported to him as follows:—

"The sliced cassava you left with me a few days ago I have had pounded in a mortar. With the flour thus obtained we made a cup as of milk arrowroot. I think it is delicious. We put no sugar or flavouring agent of any kind, though both can be added to taste. I personally prefer the flavour of the cassava itself. I shall

* 'Timehri,' vol. iv., p. 225.

† Mani is said by Aublet to be the name given to the adhesive resin of *Moronobea coccinea*, Aubl.

* A representation of the matapie is given in the *Pharmaceutical Journal*, [2], xi., p. 249. A specimen exists in the Museum of the Society.

hope to hear from you shortly that we can obtain cassava as easily as arrowroot, as I think it would make a very nice variety in that kind of invalid and infant diet."

Mr. im Thurn (*l. c.*, p. 264) states that it is remarkable how rapidly the Indians put on fat when feeding freely on cassava bread. It is evidently, therefore, likely to prove valuable as a food for invalids or convalescents.

The more important of the drugs shown are those contributed by Mr. W. Fresson, of Demerara. They include very fine tonka beans, equal in size to those of Angostura and Para; vanilla, of good flavour, but wanting in givre; balsam of copaiba of a yellow colour, and judging from its fluidity containing a good proportion of volatile oil; bebeeruc, and simaruba barks. Isinglass, derived from the Gilbacker, *Silurus Parkerii*, Traill, is shown in the crude form, remarkable, like that of Brazil, for its peculiar torpedo shape; also ribbon isinglass and very fine white hand-cut isinglass, which seem equal in appearance to the best Russian kinds.

Several bottles of the "crab oil," an oil derived from the seeds of *Carapa guineensis*, are exhibited by Mr. Fresson and others. It is used by the natives for rubbing over the skin to keep off mosquitoes and also for skin diseases. It could be obtained in very large quantities, if it were found to be fit for use in soap making or other industry. At the ordinary temperature it forms a white semi-liquid substance. Mr. Fresson having with his usual liberality directed that his specimens should be handed to the Pharmaceutical Society at the close of the Exhibition, there will probably be sufficient duplicates of this oil for purposes of experiment and investigation. The bitter principle might be worthy of examination as to its insecticidal value. Castor oil seeds and castor oil are also represented, the former exhibited by M. Seon; also a very pure oil of a yellow colour and pleasant taste, known as acuyuri oil, obtained from the pulp of *Astrocaryon aculeatum*. A similar oil of a paler colour is also obtained from the fruits of the awarra (*A. tucumoides*) and the cokerite palms (*Maximiliana Martiana*) by crushing the seeds, boiling them in water and skimming the oil off the surface by means of small pads of cotton fibre.

The large number of medicinal barks, roots, etc., which are exhibited, are much better labelled than has been the case at previous exhibitions. One of the roots most largely used is a bitter tonic known as boiari, which has hitherto been attributed to *Mikania amara*; the root, however, has the structure and peculiar aromatic odour of an *Aristolochia*, to which genus it undoubtedly belongs. This root, as well as several of the medicinal barks of British Guiana, were experimented upon some years ago by Mr. Hunter, who administered them to numerous patients. In fourteen cases in which a decoction of boiari was given as a tonic, it proved to be very beneficial in removing a flatulent state of the bowels and in giving tone to the stomach. He believed that in certain cases of dyspepsia it would prove a very valuable medicine, since some of the patients described themselves as better after the use of this medicine than after any that they had ever taken. It can be given with iron, as neither black nor green precipitates are produced with salts of that metal.

"White cedar" bark is used in syphilis, and diseases of the urinary organs. In two cases in which it was given by Mr. Hunter, its effects appeared to be beneficial. The botanical name of the plant does not appear to be known, although it has been referred to a species of *Cedrela*. A bark bearing the name of "kuruballi," and described as an emetic, was given by Mr. Hunter in cases of bronchitis, in which the expectoration was excessive, and also in cough, and he remarks concerning this bark that no other remedy from British Guiana produced so uniform an effect in each case. His specimen was probably obtained from the Accawoi Indians, but it is not certain whether it is identical with the kuruballis bark in the Colonial Exhibition, where it is referred to *Pentaclethra filamentosa*. The chief diseases of the natives are dysentery, diarrhœa and ulcerated wounds, and the larger number of the remedies used are consequently astringents, aromatic or otherwise, and aromatic, balsamic or resinous barks. A few of the astringent barks have been examined as to their percentage of tannin by Mr. C. E. N. Francis, the Government Analytical Chemist, and the following is extracted from his report:—

Number and names.	Per cent. of leather.	Per cent. of tannin.	Reaction with iron perchloride.
1. Mora	20·7	8·28	Bluish-black.
2. Carrapa	26·2	10·48	Greenish-black.
3. Buck Wallaba . .	11·0	4·40	,, ,,
4. Eucaballi . . .	23·3	9·32	Bluish-black.
5. Kakaralli . . .	19·3	7·72	Greenish-black.
6. Eturey Wallaba .	6·9	2·76	,, ,,
7. Mapurakuni, or Maypaie . . .	15·5	6·20	,, ,,
8. Suradani. . . .	5·5	2·20	,, ,,
9. Caracura. . . .	4·3	1·72	,, ,,
10. Darkuma. . . .	28·3	11·32	,, ,,
11. Baboreybador (rope)	5·1	2·04	,, ,,
12. Determa. . . .	5·6	2·24	,, ,,
13. Mora bouquet . .	23·6	9·44	Bluish-black.
14. Crab wood . . .	2·8	1·12	Greenish-black.
15. Blood wood. . .	0·4	0·16	,, ,,

"Judged by the amount of tannin they contain, the samples numbered 1, 2, 4, 5, 10, and 13 are chiefly worthy of notice. Sample 1 contains a fair quantity of tannin, but yields a dark and ill-coloured leather, while the chief objection to sample 5 is the moderate amount of tannin present. The remaining samples, 10 and 13, appear to be excellent in every respect, and deserve a strong recommendation for trial."

A bark not mentioned by Mr. Francis, viz., kokiterie, is said to be used in H.M. penal settlement for tanning. It is very astringent and is used also for dysentery.

Of the other barks the following seem worthy of notice:—Awati, a decoction of which is used as a wash for healing the pustules of small pox; bakahie, used in dropsy; and ekanna bush rope, given for whooping cough.

Several remedies are used for skin diseases, of which arisaroo (*Vatairea guianensis*, Aubl.) seems worthy of notice. The seeds of this tree are used for ringworm, and the inner bark is also scraped and used both for ringworm and itch. The wood is of a dark yellow colour and very bitter taste, and is not touched by worms or ants. It would be interesting to know whether it contains chrysophanic

acid, as it belongs to the *Leguminosæ*, and to the same section of the order as the araroba tree.

Two barks, bearing the names of "aramata" and "coroocoroo," are said to be poisonous, and to be used for snake-bites. Hoorooasha bark is employed, in the form of decoction, for destroying pediculi, and kerekowa as an antidote for poisons. Several plants are used as fish poisons; of these moraballi bark, haiari root (*Lonchocarpus densiflorus*), and connami seeds (*Clibadium asperum*, Dec.) are the most common, the haiari-balli of the Arawaks (*Mullera moniliformis*, L.f.), and the yarro conalli of the Macusis (*Tephrosia toxicaria*, Pers.) being less frequently employed. All of these plants, and especially the *Clibadium*, which belongs to the *Compositæ*, seem worthy of investigation.

A root named debreedwa, devildora or devildoer is said to possess remarkable aphrodisiac properties. A root under this name was examined chemically some time since by Mr. F. Mason,* who formerly resided in British Guiana. He found in it two resins and an alkaloid soluble in water, but he threw doubt on its assigned physiological action, believing that it acts only as a tonic. Besides this root a second, bearing the same name, is contributed by M. Seon, who compares its action to cantharides. This differs very much in external appearance and may deserve examination, as the Creoles have a firm belief in the effects of the drug, which is confirmed by the statements of the colonists. A small sensitive plant, probably *Mimosa pudica*, is credited with an exactly opposite effect.

Several very ornamental seeds are shown. Of these *Mucuna urens*, used in the West Indies as a diuretic, presents when split in half and polished an appearance like the pretty operculum of some marine shells; these have been since the opening of the Exhibition sold as studs, etc. The beautifully veined fruits of *Astrocaryum Tucuma* have been made into bowls for tobacco pipes. One seed, unnamed, resembles amber so exactly in colour and translucency that it might easily be mistaken for a piece of that resin. The pretty seeds of *Ormosia coccinea* are scarlet and black, like those of *Abrus precatorius*, but are about three times their size. In the collection of seeds and fruits may be seen the curious angular fruits of *Cacoucia coccinea* (Combretaceæ), which are used by the natives to keep off vampire bats. For this purpose the crushed kernels are rubbed over the feet, and M. Seon assures the writer that the vampire will immediately fall off when it perceives the taste of the seed, and that the seed proves fatal if it is used as poison to them. The seed certainly seems to deserve examination, since a narcotic or other principle is evidently present in the genus *Quisqualis* and other plants of this family.

For the above information the writer is largely indebted to the Executive Commissioner, Mr. G. H. Hawtayne, who has spared neither time nor trouble to render available all the details in his power concerning the little-known products of the colony, and has taken every possible means to interest the public in them. Mr. im Thurn, Mr. J. Rodway and M. Seon have also most obligingly supplied a good deal of information concerning the exhibits, and all these gentlemen contributed freely either to the Museum or Library of the Pharmaceutical Society.

* Christy 'New Commercial Plants,' No. 8, p. 44.

EXAMINATION OF THE LEAVES OF PODOPHYLLUM PELTATUM, LIN.*

BY BENJAMIN F. CARTER.

The only chemical investigation of the leaves of podophyllum which has been recorded appears to be that of Mr. Thos. J. Husband, Jr.,† and this was made nearly twenty years since. Mr. Husband's experiments were confined chiefly to the resin obtained from the leaves, which he stated to be "similar in its chemical relations to podophyllin (the name given to the resinous principle of the rhizome), but without its cathartic properties, and that the bitterness is caused by the presence of berberine." Although it has since been conclusively proved that the rhizome of podophyllum contains no berberine or other alkaloid,‡ it has seemed desirable that the leaves of the plant should be subjected to a somewhat closer chemical examination,§ especially as several works still contain the statement that poisonous properties have been ascribed to them. Mr. Husband had, however, already concluded from his investigation that no poisonous properties exist in the dried leaves, and found the purified resin therefrom to be inactive in amounts of as much as 8 grains.

The leaves employed in this investigation were collected by myself soon after the period of flowering of the plant, and were carefully dried without artificial heat. After being thoroughly dried the stems and coarsely fibrous portions were removed, and the remainder used for the following experiments:—

I. Fifty grams of the leaves were distilled with caustic alkali, but without affording indications of any volatile alkaloid; the distillate, however, possessed a slight odour, probably due to traces of volatile oil.

II. Another portion of 50 grams of the leaves was distilled with water strongly acidulated with sulphuric acid. This distillate possessed about the same odour as the preceding, but had a strongly acid reaction, due to the presence of a volatile acid. The distillate was accordingly treated with barium carbonate in order to form the barium salt of the acid, which subsequently proved to be acetic.

III. In order to determine the other constituents of the leaves, and more especially to examine the resin, 500 grams of the leaves were percolated with strong alcohol until exhausted. The percolate was of a dark greenish-brown colour and had an extremely bitter taste. The alcohol was subsequently removed for the most part by distillation, and the concentrated liquid slowly poured into a large volume of water acidulated with sulphuric acid. The resin, which was thus precipitated in a flocculent form, was collected, washed, and purified by again dissolving in alcohol and precipitating with acidulated water. The aqueous acid liquid remaining after the precipitation of the resin was of a deep reddish-brown colour, had a rather pleasant odour, a sweet and somewhat bitterish taste, and gave a greenish-black coloration with ferric chloride. It was concentrated by evaporation and then tested for alkaloids, but with perfectly negative results. This liquid was subsequently digested with barium carbonate to remove the free sulphuric acid, filtered, and the colouring matter precipitated by basic lead acetate. The latter precipitate, which was of a bright yellow colour, was collected, thoroughly washed, suspended in water, and decomposed by hydrogen sul-

* From 'Contributions from the Department of Pharmacy of the University of Wisconsin,' No. 2.

† *Amer. Journ. Pharm.*, May 1869, p. 200.

‡ Power. in 'Proc. Amer. Pharm. Assoc.', 1877, pp. 420—433.

§ While engaged in an investigation of the rhizome of podophyllum in the laboratory of Professor Flückiger at Strassburg, in 1878, it was my intention to also examine the leaves, and a quantity of the latter was very kindly provided and forwarded to me by Professor J. M. Maisch, but time did not subsequently admit of accomplishing that purpose. The investigation of Mr. Carter may therefore now serve to complete what could then only be anticipated. —*F. B. Power.*

phide and filtered. The filtrate from the lead sulphide was of a light greenish-yellow colour, and was coloured more intensely yellow by alkalies and greenish-black by ferric chloride; it frothed somewhat upon agitation, but not to such a degree as to render the presence of saponin probable. Upon evaporation to dryness it formed a dark amorphous mass, which was incapable of crystallizing, and was not further examined.

Tne filtrate from the precipitate produced by basic lead acetate was freed from the excess of lead by hydrogen sulphide, filtered, and evaporated to a small volume. This liquid contained chiefly uncrystallizable sugar, and no other substance could be separated from it.

The original resin, of which 6 per cent. was obtained from the leaves, after being thoroughly washed, was exposed for a considerable time to a gentle heat. All efforts to thoroughly dry it proved, however, ineffectual, as it still retained an oily appearance and imparted an oily stain to paper, indicating the presence of a soft resin or small amounts of a fixed oil. It differed, moreover, in appearance from the officinal resin by having a very dark greenish-black colour, probably due to chlorophyll. It is nearly odourless, has a bitter taste, is completely soluble in solutions of the caustic alkalies, and is again precipitated on adding hydrochloric acid in excess. It is completely soluble in alcohol, and was found to be soluble to the extent of 90 per cent. in ether, 86 per cent. in chloroform, 72 per cent. in carbon disulphide, 67 per cent. in benzole, and 40 per cent. in petroleum benzin; it also dissolves to a considerable extent in boiling water by repeated treatment therewith, as has previously been shown to be the case with the resin from the rhizome. Ether separates the resin into a hard and a soft portion, the latter being soluble therein, and resists all efforts to dry it, while the hard resin or insoluble portion may be perfectly dried. The efforts to decolorize the resin by digesting its alcoholic solution for several days with animal charcoal were unsuccessful.

Upon fusing the resin with caustic potassa, a very small amount of protocatechuic acid appears to be formed.

In its physiological action the resin of the leaves of podophyllum is very much milder than that of the rhizome, and in consequence of the soft resin which it contains is a very much less elegant preparation than the officinal product. The bitterness of the resin is evidently an inherent property, since the leaves of this plant, like the rhizome, contain no berberine, and no distinct bitter principle could be found by the application of the usual method for the separation of this class of bodies by precipitation with tannin.

FLAME CONTACT: A NEW DEPARTURE IN WATER HEATING.*

BY THOMAS FLETCHER, F.C.S.

It is my intention to prove to you on theoretical grounds and also by experimental demonstration in such a manner as will admit of no possible doubt, that the present accepted system of water heating, by gaseous or other fuel, is a very imperfect means for an end, and is, both in theory and practice, essentially faulty. My statements may appear bold, but I come prepared to prove them in a manner which I think none of you will question, as the matter admits of the simplest demonstration. I will in the first place boil a specified quantity of water in a flat-bottomed vessel of copper; the time required to boil this you will be able to take for yourselves, as the result will be visible by the discharge of a strong jet of steam from the boiler. I will then take another copper boiler of the same form, but with only one-half the surface to give up its heat to the water, and will in this vessel boil the same quantity of water with the same burner in a little over one-half the time, thus about doubling the efficiency of the burner, and increasing the effective duty of the heating surface nearly four-fold, by getting almost double the work from one-half the surface.

The subject is a comparatively new one, and my experiments are far from complete on all points, but they are sufficiently so to prove my case fully. As no doubt you are all aware it is not possible to obtain flame contact with any cold, or comparatively cold, surface. This is readily proved by placing a vessel of water with a perfectly flat bottom over an atmospheric gas burner; if the eye is placed on a level with the bottom of the vessel a clear space will be seen between it and the flame. I cannot show this space on a lecture table to an audience, but I can prove its existence by pasting a paper label on the bottom of one of the boilers, and exposing this to the direct impact of a powerful burner during the time the water is being boiled and you will see that it comes out perfectly clean and uncoloured. Now it is well known that paper becomes charred at a temperature of about 400° F., and the fact that my test paper is not charred proves that it has not been exposed to this temperature, the flame being in fact extinguished by the cooling power of the water in the vessel. I need hardly remind you that the speed with which convected or conducted heat is absorbed by any body is in direct ratio to the difference between its own temperature and that of the source of heat in absolute contact with it; and, therefore, as the source of the heat taken up by the vessel is nothing but unburnt gases, at a temperature below 400° F., the rate of absorption cannot, under any circumstances, be great, and the usual practice is to compensate for this inefficiency by an enormous extension of surface in contact with the water, which extension I will prove to you is quite unnecessary. You will see I have here a copper vessel with a number of solid copper rods depending from the lower surface; each rod passes through into the water space and is flattened into a broad head, which gives up its heat rapidly to the water. My theory can be stated in a few words: The lower ends of the rods, not being in close communication with the water, can, and do attain a temperature sufficiently high to admit of direct flame contact, and as their efficiency, like that of the water surface, depends on the difference between their own temperature and that of the source of heat in absolute contact with them, we must, if my theory is correct, obtain a far greater duty from them. I do not wish you to take anythng for granted, and although the surface of the rods, being vertical, can only be calculated for evaporating power at one-half that of a horizontal surface, as is usual in boiler practice, my margin of increased duty is so great, that I can afford to ignore this, and to take the whole at what its value would be as horizontal surface, and still obtain a duty 50 per cent. greater from a surface which is the same in area as the flat-bottomed vessel on the fire side, but having only one-third the surface area in contact with the water. I do not, of course, profess to obtain more heat from the fuel than it contains, but simply to utilize that heat to the fullest possible extent by the use of heating surfaces beyond comparison smaller than what have been considered necessary, and to prove not only that the heating surface can be concentrated in a very small area, but also that its efficiency can be greatly increased by preventing close water contact, and so permitting combustion in complete contact with a part of the heating surface. I will now boil 40 ounces of water in this flat-bottomed copper vessel, and, as you will see, sharp boiling begins in three minutes fifteen seconds from the time the gas is lighted. The small quantity of steam evolved before this time is of no importance, being caused partly by the air driven off from the water and partly from local boiling at the edges of the vessel owing to imperfect circulation. On the bottom of this vessel is pasted a paper label which you will see is untouched by the

* Read at a Meeting of the Gas Institute, London, June 9. Communicated by the Author.

flame owing to the fact that no flame can exist in contact with a cold surface.

It may be thought that, owing to the rapid conducting power of copper, the paper cannot get hot enough to char. This is quite a mistake, as I will show you by a very curious experiment. I will hold a small plate of copper in the flame for a few seconds, and will then hold it against the paper. You will see that, although the copper must of necessity be at a temperature not exceeding that of the flame, it readily chars the paper. We can, by a modification of this experiment, measure the depth of the flameless space, as the copper if placed against the paper before it has time to be previously heated, will, if not thicker than $\frac{1}{40}$ inch, never become hot enough to discolour the paper, showing that the flame and source of heat must be below the level of a plate of metal this thickness.

In repeating this experiment I must caution you to use flour paste, not gum, which is liable to swell and force the paper past the limit of the flameless space, and also to allow the paste to dry before applying the flame. as the steam formed by the wet paste is liable also to lift the paper away and force it into the flame. I will now take this vessel, which has only one-half the surface in contact with the water, the lower part being covered with copper rods, $\frac{3}{16}$ inch diameter, $\frac{1}{2}$ inch centres apart, and $1\frac{1}{2}$ inch long, and you will see that with the same burner as before, under precisely the same conditions, sharp boiling takes place in 1 minute 50 seconds, being only 13 seconds more than half the time required to produce the same result with the same quantity of water as in the previous experiment. Although the water surface in contact with the source of heat is only one-half that of the first vessel and the burner is the same, we can see the difference not only in the time required to boil the 40oz. of water, but also in the much greater force and volume of steam evolved when boiling does occur. With reference to the form and proportions of the conducting rods, these can only be obtained by direct experiment in each case for each distinct pnrpose. The conducting power of a metallic rod is limited, and the higher the temperature of the source of heat, the shorter will the rods need to be, so as to ensure the free ends being below a red heat, and so prevent oxidation and wasting. There are also other reasons which limit the proportions of the rods, such as liability to choke with dirt and difficulty of cleaning, and also risk of mechanical injury in such cases as ordinary kettles or pans ; all these requirements need to be met by different forms and strengths of rods to ensure permanent service, and, as you will see further on, by substituting in some cases a different form and type of heat conductor. To prove my theory as to the greater efficiency of the surface of the rods in contact with the flame as against that in direct contact with the water, I have another smaller vessel, which, including the rods, has the same total surface in contact with the flame, but only one-third the water surface as compared with the first experiment. Using again the same quantity of water and the same burner we get sharp boiling in two minutes ten seconds, being an increase of duty of 50 per cent., with the same surface exposed to the flame. The rods in the last experiment form two-thirds of the total-heating surface, and if we take, as I think for some careful experiments we may safely do, one-half the length of the rods to be at a temperature which will admit of direct flame contact, we have here the extraordinary result that flame contact with one-third of the heating surface increases the total fuel duty on a limited area 50 per cent. This really means that the area in contact with flame is something like six times as efficient as the other. In laboratory experiments it is necessary not only to get your result, but to prove your result is correct, and the proof of the theory admits of ready demonstration in your own laboratories although it is unfit for a lecture experiment, at all events in the only form I have tested it. If you will take two ordinary metal ladles for melting lead, cover the lower part of one of these with the projecting rods or studs and leave the other plain, you will find on melting a specified quantity of metal in each that the difference in duty between the two is very small. The slight increase may be fully accounted for by the difference in the available heating surface reducing the amount of waste heat passing away, and this proves that flame contact, and therefore quick absorption of heat, takes place on plain surfaces as soon as these are above a certain temperature which, in a metal ladle, very soon occurs. What the temperature is which admits of flame contact I have, as yet, not been able to test thoroughly, and it will need some consideration how the determination of this is to be correctly made ; at the same time it is a question in physics which should be capable of being answered.

Let us now take the other side of the question. If the efficiency of a surface depends on flame contact there must of course be flame, or at least gases of an extremely high temperature, and we therefore cannot expect this extraordinary increase of efficiency in any part of our boiler except where flame exists, and if these projectors are placed in a boiler, anywhere except in contact with flame, their efficiency must be reduced to that of any ordinary heating surface. They are, of course, useful but only in the same way as ordinary flue surface. When we come to boilers for raising steam, which have to stand high pressures, we come to other difficulties of a very serious nature, which require special provision to overcome them. To put such rods as I have referred to in a boiler plate necessitates the plate being drilled all over holes, causing a dangerous source of weakness, as the rods cannot be used as stays ; further than this, they would render really efficient examination a matter of extreme difficulty, and would be liable to give rise to frequent and almost incurable leakages ; but there is, fortunately, a very simple way to overcome this difficulty. I have found that rods or points, such as I have described, are not necessary, and that the same results can be obtained by webs or angle-ribs rolled in the plates. My experiments in this direction are not complete, and at present they tend to the conclusion that circular webs, which would be of the greatest efficiency in strengthening the flues, are not so efficient for heating as webs running lengthways with the flue, and in a line with the direction of the flame. This point is one which I am at present engaged in testing with experimental boilers of the Cornish and Lancashire type, and, as with gas we have a fuel which renders every assistance to the experimenter, it will not take long to prove the comparative results obtained by the two different forms of web. Those of you who have steam boilers will, no doubt, know the great liability to cracking at the rivet holes in those parts where the plates are double. This cracking, so far as my own limited experience goes, being usually, if not always, on the fire side, where the end of the plate is not in direct contact with the water,—where it is, in fact, under the conditions of one of the proposed webs,—I think we may safely come to the conclusion that this cracking is caused by the great comparative expansion and contraction of the edge of the plate in contact with the fire, and it will probably be found that if the plates are covered with webs, the whole of the surface of the plates will be kept at a higher and more uniform temperature, and the tendency to crack at the rivet-holes will be reduced. This is a question not entirely of theory, but needs to be tested in actual practice.

There is another point of importance in boilers of the locomotive class, and those in which a very high temperature is kept in the fire-box, and this is the necessity of determining by direct experiment the speed with which heat can be safely conducted to the water without causing the evolution of steam to be so rapid as to prevent the water remaining in contact with the plates, and also whether the steam will or will not carry mechanically

with it so much water as to make it objectionably wet, and cause priming and loss of work by water being carried into the cylinders. I have observed in the open boilers I use that when sufficient heat is applied to evaporate one cubic foot of water per hour from one square foot of boiler surface, the bulk of the water in the vessel is about doubled, and that the water holds permanently in suspension a bulk of steam equal to itself. I have as yet not had sufficient experience to say anything positively as to the formation or adhesion of scale on such surfaces as I refer to, but the whole of my experimental boilers have up to the present remained bright and clean on the water surface, being distinctly cleaner than the boiler used with ordinary flat surfaces. It is, I believe, generally acknowledged that quick heating and rapid circulation prevent, to some extent, the formation of hard scale, and this is in perfect accord with the results of my experiments. The experiments which I have shown you, I think, demonstrate beyond all question that the steaming power of boilers in limited spaces, such as our sea-going ships, can be greatly increased; and when we consider how valuable space is on board ship the matter is one worthy of serious study and experiment. It may be well to mention that some applications of this theory are already patented.

I will now show you as a matter of interest in the application of coal gas as a fuel, how quickly a small quantity of water can be boiled by a kettle constructed on the principle I have described, and to make the experiment a practical one I will use a heavy and strongly made copper kettle which weighs 6½ lbs., and will hold when full one gallon. In this kettle I will boil a pint of water, and, as you see, rapid boiling takes place in fifty seconds. The same result could be attained in a light and specially made kettle in thirty seconds, but the experiment would not be a fair practical one, as the vessel used would not be fit for hard daily service, and I have therefore limited myself to what can be done in actual daily work rather than laboratory results, which, however interesting they may be, would not be a fair example of the apparatus in actual use at present.

EXAMINATION OF THE LEAVES OF ÆSCULUS HIPPOCASTANUM, LIN. (HORSE-CHESTNUT.)*

BY FREDERICK O. RAY.

The extended consideration which for some months past has been accorded to the alkaloid cocaine, and its acknowledged importance and intrinsic value, has led to the expression of the hope that in the order of Sapindaceæ, which is botanically so closely related to the Erythroxylaceæ, the same alkaloid, or at least one having analogous properties, might possibly be found.†

Some experiments in this direction had already been begun when the observations of Messrs. Gehe and Co. in Dresden were brought to notice,‡ whereby it had been demonstrated that the leaves of the horse-chestnut contain no cocaine, although traces of a liquid volatile alkaloid were found, which was coloured red by sulphuric acid, and considered to be identical with a substance accompanying cocaine in the leaves of the *Erythroxylon Coca*. The experiments here to be recorded may therefore at least serve to supplement and complete the investigation just referred to.

The young leaves of the horse-chestnut were collected early in June, and were very carefully dried without the aid of artificial heat and afterwards preserved in a dry place. Portions of the finely powdered leaves were treated according to the improved process of Dr. Squibb for the assay of coca leaves,* and also according to the process recommended by Dr. A. B. Lyons,† but without obtaining any decided reactions for an alkaloid. A portion of the fresh leaves was distilled with water made alkaline with caustic potassa; the liquid frothed strongly upon heating, but a small amount of distillate was obtained which was colourless and possessed a strong odour, but afforded no indications of the presence of a volatile alkaloid. Another portion of the leaves distilled with dilute sulphuric acid afforded a distillate possessing a peculiar odour, probably due to traces of a volatile oil, but no volatile acid was obtained. A portion of the leaves was now extracted successively by petroleum benzin and alcohol, but only oily and resinous matters containing much chlorophyll, together with tannin and sugar, were found, without establishing the presence of any special principle of further interest.

Since at least one product of the natural order Sapindaceæ, namely, the seeds of *Paullinia sorbilis*, is known to afford considerable amounts of the alkaloid caffeine, it was considered of interest to determine whether the same or an analogous principle might not also be contained in the leaves of the horse-chestnut. For this purpose 200 grams of the leaves were digested with water, with the aid of a gentle heat. The filtrate, which was of a deep brown colour and very mucilaginous, was precipitated by a solution of lead acetate and again filtered. The latter filtrate showed no fluorescence, indicating the total absence of *æsculin*. It was now made slightly alkaline with ammonia water, again filtered and tested with basic lead acetate, which, however, produced no further precipitate. The lead salt was now completely removed by hydrogen sulphide, the liquid filtered and evaporated to a small volume on a water-bath, but no crystalline product was formed. The aqueous solution was subsequently shaken with chloroform, which upon spontaneous evaporation, left a small amount of oily residue, having a strong, peculiar and rather unpleasant odour. This residue, when taken up with acidulated water, afforded slight reactions with alkaloidal reagents, but did not give the characteristic reaction for caffeine.

From the results of these experiments it will be seen that the leaves of the horse-chestnut contain neither cocaine nor caffeine, or other principles of special interest; also that æsculin, which is so abundantly contained in the bark of the horse-chestnut, is apparently entirely wanting in the leaves.

[NOTE.—Since the natural order of Sapindaceæ is represented by another genus widely distributed through North America, namely, the different species of maple, which likewise stand in equally close botanical relationship to the Erythroxylaceæ, it was considered of interest to make an examination also of these leaves. For this purpose the young and freshly collected leaves of *Acer dasycarpum*, Ehrhart (the white or silver maple), were selected, and the examination carefully conducted at my request by Mr. Emil Weschcke. The process of analysis adopted was very similar to that above intimated for the leaves of the *Æsculus Hippocastanum*, and, without describing the details of the experiments, it may be stated that the results were quite analogous to the foregoing. Indications of very slight traces of an alkaloid were observed, or at least of a substance affording similar reactions, and very small amounts of a neutral, crystallizable principle obtained, which was extracted from alkaline solutions by means of ether, but was not further examined. It may, however, be conclusively stated that neither cocaine, caffeine nor any analogous alkaloid is present in these leaves.—*F. B. Power.*]

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* From 'Contributions from the Department of Pharmacy of the University of Wisconsin,' No. 2.

† See Gehe's *Bericht.* in *Pharm. Rundschau*, N.Y., 1885, p. 137.

‡ *Ibid.* in *Pharm. Zeitung*, 1885, No. 78. *Handelsblatt*, No. 20.

* *Ephemeris*, 1885, No. 9, p. 784.

† *Amer. Journ Pharm.*, 1885, p. 466.

The Pharmaceutical Journal.

SATURDAY, AUGUST 7, 1886.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

PHARMACEUTICAL EDUCATION IN JAPAN.

THE receipt of a copy of the Calendar of the Medical Faculty of the University of Tokio (*Tokio Daigaku*), enables us to place before our readers a few details as to the elaborate arrangements that have been made in connection with that institution for the education of the future pharmacists of Japan. The university had its origin in a sort of high school founded in 1869, and obtained its present title upon the Tokio medical school being added to it in 1877. The University of Tokio now includes four faculties, those of law, mathematics and the natural sciences, letters, and medicine, to the last of which only do we propose to refer. There is also a high school in connection with the university, in which the training preliminary to matriculation can be obtained. The faculty of medicine provides for the education of three different classes of students, the medical student, the "bekkaigaku" student, who goes through a more limited medical curriculum, and the pharmaceutical student.

The attendance of a pharmaceutical student at the university extends over a period of three years, and as he must have attained the age of eighteen before entry he will be at least twenty-one on obtaining the diploma which it is intended shall constitute the qualification for practising as a pharmacist. The university year is divided into two terms, and commences on the 1st of December with the Winter term, which terminates on the 31st of May, the Summer term commencing on the 1st of June and ending on the 30th of November. In the course of these there is a winter holiday of two weeks as well as a summer holiday of two months. During the winter term teaching commences at eight o'clock in the morning and during the summer term at seven o'clock, and its duration varies, according to the year and term, from eighteen to twenty-seven hours weekly. The progress of the students is tested at the end of each term by examinations lasting over a fortnight, and the move from one class to another is dependent upon passing the examination at the end of the year. Although it is announced that eventually the teaching will be imparted in the Japanese language, it is significant that for the present the German language is to be used. Many of the text-books, as well as the Calendar, are also in German, and the examining board is chosen from the medical professors of the German side of the university.

The subjects for study are distributed in the syllabus under twelve heads. Physics, as dealing with the elements of pharmaceutical science, comes in the first term and is allotted six hours weekly. Botany occupies three hours weekly in this term, and the time is increased to six hours weekly in the second. Inorganic Chemistry is the other subject that occupies the student's attention in the first term, and to this he devotes nine hours weekly. In the second term, besides the time mentioned for Botany, three hours weekly are given to the allied subject of Zoology. Mineralogy, which is described as among the sciences most important to pharmacists, takes up another three hours weekly. Organic Chemistry now occupies the nine hours weekly previously devoted to Inorganic Chemistry. In the third term, which commences the second year, the student takes up the study of Materia Medica, which is extended to Japanese drugs as well as to those used by other countries; this important subject is allotted six hours weekly throughout this term and half as much time during the next. The chemical studies now take the special form of "Pharmaceutical Chemistry" and still occupy nine hours weekly, in addition to which twelve hours weekly are given up to general practical work in the chemical laboratory. In the fourth term the same amount of time is given up to General Practical Chemistry, in addition to which and the continuation of study in Materia Medica there is a course in Microscopy of three hours weekly. In the fifth term the practical work in the laboratory takes a more specially pharmaceutical direction, apparently covering the subject of galenical preparations, and the time is extended to eighteen hours weekly. Another six hours weekly is devoted to the art of Dispensing. The last term is divided equally between Practical Pharmaceutical Chemistry and the Testing of Medicines.

It will be seen from the foregoing sketch that the curriculum for the pharmaceutical student in Japan is an inclusive one and decidedly more ambitious than any that obtains in this country. Take for instance the course on Microscopy, a subject too often neglected in England. In the Calendar it is laid down that pharmacists must have a certain amount of experience in the use of the microscope in order to enable them to recognize the internal structure of plants and parts of plants. Moreover, attendance at lectures or classes is not all that is required. The student has to prove that he has profited by his opportunities by satisfying the examiners in one subject before passing on to another. Failure to do so involves remission to his studies for another term, and repeated failures are followed by dismissal from the university as being mentally incompetent or wilfully negligent.

There can be little doubt that the proper place for acquiring a knowledge of pharmaceutical operations is in the pharmacy and during the period of pupilage. It is equally certain, however, that many young men pass through this period without adequate opportunities of becoming practically experienced in these operations. From the report on another page it will be seen that the Council of the Pharmaceutical Society, recognizing this fact, has decided to institute in connection with the School of Pharmacy a separate course of instruction in pharmacy by lectures and demonstrations. We have pleasure in adding that the conduct of this class is to be offered to Mr. Joseph Ince.

* * *

The number of patent medicine vendors who took out licences during the year ending 31st March, 1886, is given in the Report of the Commissioners of Inland Revenue as 20,279, nearly twice as many as in 1866 and about one-third more than in 1876. The amount of licence duty charged during the past year was £5070 as against £6386 in 1866, and £3798 in 1876, the reduction of the duty to one uniform rate of five shillings having been productive of a sudden fall in the revenue from this source. But it appears that the increase in the sale of patent medicines is so large that the reduction on this account is being far more than made up by the increased revenue from stamps. Thus, for instance, the number of labels issued in 1886 was 21,468,718 as against 7,569,033 in 1866, and 15,873,934 in 1876, the respective amounts of duty during the three years being—

	Stamps.	Licences.	Total.
In 1866.....	£59,894	£6386	£66,280
„ 1876.....123,136		3798	126,934
„ 1886.....179,071		5070	184,141

These are facts to be considered by those who speculate on the future of pharmacy, for the enterprising efforts of patent medicine proprietors who propose to promote and extend the sale of their preparations by the gratuitous supply of medical advice might introduce a new feature in the practice of dispensing which would simplify that art still more than is already done by the supply of ready-made articles.

* * *

We are informed by Mr. Haydon, the Secretary to the Chemists and Druggists' Trade Association, that it has been decided to abandon the project of holding a special conference of that body to commemorate its tenth anniversary during the forthcoming session of the British Pharmaceutical Conference at Birmingham, and that in place of it there is to be a dinner on Tuesday, the 31st inst., to which all members of the trade will be invited.

* * *

By an ordinance issued by the Austrian Minister of the Interior and Board of Trade, dated the 17th of July, the sale of "hopein" or any of its preparations, including "hopein beer," is strictly forbidden; neither is it to be kept in stock in the pharmacy, or even supplied upon the order of a medical man. The ground of this order is stated to be the demonstration by French and German chemists, and more especially by the Austrian Superior Board of Health, that "hopein," said to be prepared from wild American "Arizona hops," consists of a mixture of morphine, which does not exist in either American or European hops, with a smaller proportion of another organic base. The statement here made is not quite correct. Samples of "hopein" were ascertained by French chemists to consist chiefly of morphine, and Professor Ladenburg recognized in another sample the presence of a second alkaloid, which he was unable to define on account of insufficient supply of material. The fact that this second alkaloid was cocaine was ascertained subsequently in England, and an account of it was given in a paper read before the Pharmaceutical Society, and published in this Journal on the 10th of April last.

* * *

There seems to be some delay at the Antipodes in displacing the old edition of the British Pharmacopœia by the new one. At the June meeting of the Pharmaceutical Society of Australasia it was announced that communications had been addressed to the Medical Society of Victoria and the Victoria Branch of the British Medical Association, asking that some action should be taken by the medical profession as to the adoption of the new official work, and replies had been received saying that the subject would be considered at the next meeting of the societies.

* * *

A few weeks since the daily papers reported a case in which a boy had died after eating some sorrel and drinking some soapy water, and stated that the medical evidence was to the effect that death had been caused by oxalic acid set free by the action of the alkali of the soap upon the salt of sorrel. The theory seemed hardly sufficiently reconcilable with chemical probabilities to be worthy of notice and it is not surprising to learn from a communication to the *Lancet* (p. 227) that the county analyst has failed to detect any oxalic acid in the vomit or anything poisonous in the soapy water. Dr. Suckling, however, who performed the *post-mortem* examination, still clings to the opinion that the case was one of poisoning by sorrel, and appears to think now that the effect of the liquid was to quicken the absorption of the poison.

* * *

The assistance given during the past week by the public press throughout Great Britain in making known the warning of the Registrar as to the sale by unregistered persons of insect-killing bottles containing cyanide of potassium has been very general, and denotes a gratifying appreciation of the value of the provisions of the Pharmacy Act as to the sale of poisons. But the difficulty experienced by public writers in dealing with technical subjects is well illustrated by a northern editor, who, after expanding the warning to sellers of "insect powders," informs his readers in a leader that "these preparations are necessarily made up of the most subtle and deadly ingredients, arsenic or strychnine being their active ingredient." To this or some similar statement is probably to be attributed some inquiries addressed to the Registrar as to conditions under which certain insect powders may be sold.

* * *

The Principal of the Inland Revenue Laboratory reports that the number of samples referred to that department by magistrates under the Food and Drugs Act has been 37, and it is satisfactory to note that in 33 of those cases the results of the local analyst have been confirmed. The samples appear to have been only milk, butter, pepper and ginger.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, August 4, 1886.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT.

MR. THOMAS PRESTON GOSTLING, VICE-PRESIDENT.

Messrs. Allen, Atkins, Baildon, Bottle, Butt, Cross, Greenish, Hampson, Hills, Radley, Robbins, Savage, Schacht, Symes, Williams and Woolley.

The minutes of the previous meeting were read and confirmed.

Diplomas.

The following, being duly registered as pharmaceutical chemists, were respectively granted a diploma stamped with the seal of the Society :—

Baker, Edmund Gilbert.
Bostock, John William.
Buck, William Henry.
Ellerington, John Parker.
Hawkins, Lewis Walter.
Jack, James.
Kirby, Herbert Edward.
Lawrence, George Richard.
Liverseege, James Francis.
Morrall, Edward Ernest.
Nurse, James Aldis.
Pinder, Robert.
Shacklock, James Harvey.
Skryme, Charles George.
Smith, John Henry.
Williams, William.
Wilson, Richard.

Elections.

MEMBERS.

Pharmaceutical Chemists.

The following, having passed the Major examination and tendered their subscriptions for the current year, were elected "Members" of the Society :—

Baker, Edmund Gilbert .....Kew.
Bostock, John William .....Ashton-under-Lyne.
Buck, William Henry .....Goole.
Ellerington, John Parker .....London.
Kirby, Herbert Edward .....London.
Lawrence, George Richard.....Boston.
Morrall, Edward Ernest .....Bridgnorth.
Shacklock, James Harvey .....London.
Skyrme, Charles George .....St. Arvans.
Williams, William .....Abergavenny.
Wilson, Richard .....London.

ASSOCIATES.

The following, having passed the Minor examination and tendered (or paid as "Apprentices or Students") their subscriptions for the current year, were elected "Associates" of the Society :—

Blinkhorn, William Steeper ...Wellingborough.
Bowie, George .....Aberdeen.
Bradley, Frederick William ...Wisbeach.
Charles, William Frederic .....Loughborough.
Cooper, George Thomas .....Market Bosworth.
Davey, Harry Doidge .....Stonehouse.
Delarue, Edward Ludlow .....London.
Elliott, Alfred .....Stowmarket.
Fisher, George Robert.....Scarborough.
Fleetcroft, John Frederick.....Chester.
Foulds, Robert.....Liverpool.
Gant, Robert Richard.....Norwich.
Gasson, William .....Crawley.
Goodman, Frederick William...Newport Pagnell.
Gould, Charles William .....London.
Hodder, George William.....Frome.
Hope, John .....Wigton.
Jones, Tom Young .....Carmarthen.
Judkins, William Edward .....Bedford.
Kelly, Philip Alfred .....London.
Leech, Frederick Samuel .....Gateshead.
Lees, James Nall .....Rochdale,
Long, Herbert Henry .....London.
Martin, William .....Exeter.
Minchin, William.....Bedford.
Morris, Daniel .....Portmadoc.
Mussellwhite, William.....Basingstoke.
Oliver, John Robert.....Lynn.
Pottage, John Wm. Dick .....Edinburgh.
Procter, Henry Raithby .....Boston.
Robb, David .....Ossett.
Sewell, Thos. Arthur Williams...Lee.
Siggers, George William .....Colchester.
Skewes, Josiah .....Penryn.
Skirrow, William .....Bingley.
Southall, Wilfred Francis .....Birmingham.
Street, Albert Ernest .....London.
Symonds, James Alfred .....Leamington.
Thomas, Edward .....Garstang.
Ward, Thomas Armistead .....Wigan.
Warner, William .....Bath.
Watts, Robert .....Sheffield.
Wilkinson, Jno. Edw. Beaumont.Manchester.
Williams, Alfred .....London.
Williamson, Leonard Wright...Darlington.
Wood, Arthur William .....London.

APPRENTICES OR STUDENTS.

The following, having passed the Preliminary examination, and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society :—

Barstow, William.....Marple.
Booth, George Henry W. .....Alfreton.
Edwards, Edward .....Cardiff.
Park, Frederick .....Tynemouth.
Thomas, Isaac Jenkin.....Aberavon.
Waddell, William .....Belfast.

Addition to the Register.

The Registrar reported that—

Thomas Williams, Knowle Road, Bristol,

having made a statutory declaration that he was in business before the passing of the Pharmacy Act, 1868, and this declaration having been duly supported, his name had been placed on the Register.

Local Secretary at Wolverhampton.

The President said he regretted to announce that Mr. Brevitt, of Wolverhampton, had found it necessary to resign his position as Local Secretary. Before proposing a resolution appointing another gentleman to fill his place, it was only right to say that the Society and the Council were much indebted to Mr. Brevitt for his services during the twenty-five years he had been Local Secretary. Mr. Brevitt was an examined pharmaceutical chemist, and he had always found him during the time he had known him, about twenty years, a most zealous adherent of the Society, and very active in promoting its objects. He then proposed that Mr. Frederic John Gibson be appointed Local Secretary for Wolverhampton.

The motion was carried unanimously.

Superintendents and Deputy-Superintendents of Written Examinations.

The following gentlemen were elected Superintendents and Deputy Superintendents of written examinations for the ensuing year.

Superintendents.

Aberdeen .....Strachan, Alexander.
Birmingham ....Southall, Alfred.
Brighton .....Gwatkin, James Ross.

Bristol .....Stroud, John.
Cambridge.....Deck, Arthur.
Canterbury .....Bing, Edwin.
Cardiff .....Munday, John.
Carlisle .....Thompson, Andrew.
Carmarthen .....Davies, Richard Morgan.
Carnarvon.....Lloyd, William.
Cheltenham .....Barron, William.
Darlington .....Robinson, James.
Douglas, Isle of Man ...Brearey, William A.
Dundee .....Hardie, James.
Edinburgh.....Stephenson, John B.
Exeter .....Broom, William Willey.
Glasgow.....Kinninmont, Alexander.
Guernsey .....Collenette, Adolphus.
Hull .....Bell, Charles Bains.
Inverness .....Galloway, George Ross.
Jersey .....Ereaut, John.
Lancaster .....Vince, James.
Leeds.....Reynolds, Richard.
Lincoln .....Maltby, Joseph.
Liverpool .....Symes, Charles.
London .....Taylor, George Spratt.
Manchester .....Wilkinson, William.
Newcastle-on-Tyne ..... Martin, Nicholas Henry.
Northampton ... .Bingley, John.
Norwich.....Sutton, Francis.
Nottingham .....Parker, William Henry.
Oxford .....Prior, George Thomas.
Peterborough .....Heanley, Marshall.
Sheffield.....Ward, William.
Shrewsbury .....Cross, William Gowen.
Southampton..... .....Dawson, Oliver Robert.
Truro .....Percy, Thomas Bickle.
Worcester .....Virgo, Charles.
York .....Sowray, Joseph.

Deputy-Superintendents.

Aberdeen .....Adamson, William S.
Birmingham .....Churchill, Walter John.
Brighton .....Savage, William Wallace.
Bristol .....Pitman, John.
Cambridge .....Hoare, William Parker.
Canterbury .....Amos, Daniel.
Cardiff .....Coleman, Alfred.
Carlisle .....Hallaway, John.
Carmarthen .....Davies, R. Morgan, jun.
Carnarvon..... .....Francis, James.
Cheltenham .....Fletcher, John.
Darlington .....Hutchinson, Rev. E.
Douglas, Isle of Man ...Brearey, Arthur W.
Dundee .....Hardie, James Miller.
Edinburgh.....Ainslie, William.
Exeter .....Harris, Henry William.
Glasgow.....Davison, Thomas.
Guernsey .....Dupuy, Edgar.
Hull .....Stoakes, Benjamin M.
Inverness .....Galloway, George.
Jersey .....Ereaut, H.
Lancaster .....Arkle, William.
Leeds.....Smeeton, William.
Lincoln .... Battle, John Scoley.
Liverpool .....Parkinson, Richard.
London .... { Allen, Charles Bowen. / Moon, Harry.
Manchester .....Wilkinson, George.
Newcastle-on-Tyne .....Stuart, Charles Edward.
Northampton .....Mayger, William D.
Norwich.....Corder, Octavius.
Nottingham .....Beilby, A. E.
Oxford .....Thurland, Henry.
Peterborough .....Saunders, James Edwin.
Sheffield.....Newsholme, G. T. W.
Shrewsbury .....Blunt, Thomas Porter.
Southampton..... .....Spearing, James.
Truro.....Anstey, John Upham.
Worcester .....George, Henry.
York .....Wilson, Thomas William.

Reports of Committees.

FINANCE.

The report of this Committee was received and adopted on the motion of the President, and various accounts were ordered to be paid.

BENEVOLENT FUND.

The report of this Committee included a recommendation of the following grants :—

£5 to the widow (aged 56) of an associate from 1842 to 1845. Applicant has had nine previous grants and is in very bad health. (Middlesex.)

£10 to the widow (aged 50) of a registered chemist and druggist and annuitant, in weak health. Has had five previous grants. (Somerset.)

£10 to the widow (aged 51) of a registered chemist and druggist. Applicant has had five previous grants and was an unsuccessful candidate at the last election. (Middlesex.)

£10 to the widow (aged 46) of a registered chemist and druggist, having four children wholly and three children partly dependent on her. (Middlesex.)

£10 to the widow (aged 65) of a registered chemist and druggist, in delicate health. (Devon.)

£10 to a registered chemist and druggist (aged 64) in bad health and able to do very little. (Lancashire.)

One case had been deferred for further information and four had not been entertained.

The Vice-President, as Chairman of this Committee, moved the adoption of the report, saying that the Committee had taken every possible care in investigating the cases which came before it. He also mentioned particulars of one or two of the cases.

Mr. Woolley drew attention to the case of an orphan, Maria Alice Taylor, of Manchester (not referred to in the list) whose friends were trying to secure her election into the Commercial Travellers' Schools. She had been unsuccessful at the last election, but he hoped anyone who could influence votes for the next election in December would bear the case in mind.

Mr. Savage reminded the Council that he drew attention last month to the fact that only one of the applicants on that occasion had ever subscribed to the Benevolent Fund. On this occasion, out of ten applicants, he found that only one had ever subscribed. Mr. Elias Bremridge, who had always taken a great deal of interest in the Fund, had recently called upon him with reference to this subject, and impressed upon him that something ought to be done to improve the state of things. Of course any action could not be retrospective, but he thought something ought to be done in future to prevent the Fund being given away entirely to those who had never contributed a farthing towards it. He thought after a sufficient notice had been given, say five or ten years, the Committee should have power to say that the Fund should only be devoted to those who had contributed something to it. This was Mr. Bremridge's view. After his visit, he (Mr. Savage) took up three application papers at random, and found they represented seventeen persons, eleven females and six males, who had received no less than £540, and only one out of the number had ever given anything. Seeing that as little as 2*s.* 6*d.* a year was received as a subscription, it did seem very strange that every one did not subscribe. The applicants became more numerous every month, and were likely to do so as the benefits of the Fund became more generally known. There were now thirty-nine annuitants receiving £35 a year each, which was a very nice thing, but it would be very much better if they could all have £1 a week. If only half of the chemists and druggists on the Register contributed this might be done. He did not propose to move a resolution at present, but thought it only right to call attention to the subject.

Mr. ROBBINS said he had before called attention to this matter, for he had always felt that the annuities bestowed were quite inadequate for men who had formerly held a respectable position in life. For those who had never been connected with the Society or contributed to the Fund, £30 or £35 a year might be sufficient, but for those who had subscribed to the Society for twenty or thirty years and had occupied a respectable position, it was very hard if they fell into misfortune to be put on exactly the same level as those who had never taken any interest in the Society. He thought such a mode of administration injured the Fund, and that if some additional consideration were given to those who had been subscribers much good would be done in every way. The matter could not be discussed in Council, but he should like it to be considered by a committee.

Mr. WILLIAMS remarked that there was a Benevolent Fund Committee already existing.

Mr. ROBBINS said he was quite content to refer the question to that Committee to draft a plan. He had taken a great deal of interest in benevolent societies generally, and always watched their annual reports. He noticed that nearly all of them were established on the principle that those who did not subscribe did not get the benefit of the fund. It was not necessary to go so far as that, but he thought those who had subscribed should receive larger annuities.

Mr. SYMES said it no doubt did good to call attention from time to time to the small number of subscribers compared with the number of chemists and druggists on the Register, but he was not at all in favour of limiting the benefits to subscribers. It had been stated over and over again that this Fund did not partake of the character of an insurance fund, but relief was given to all who were really in want, so far as the means allowed. The thing complained of explained itself to a great extent, for a large number of those who applied for relief had never been in a position to subscribe. Then it was proposed to give larger annuities to former subscribers, but for his part he would rather give a larger number of annuities. His principal object in rising was to prevent the mischief which he feared might arise from Mr. Robbins's statement. They all knew that that gentlemen took a warm interest in the Fund, and had for a long time advocated the idea that those who had subscribed should receive more than those who had not, and that might or might not be a good thing; but when he went on to say that there was no consideration shown to those who had subscribed over and above those who had not, he feared that would go far to undo the effect of the appeal which Mr. Savage had made. The desire of the Council was to obtain as many subscribers as possible, but he did not see the utility of telling persons that they would not receive any more consideration if they subscribed. It was a well-known fact that one of the chief factors—not by any means the only one, but one of the chief factors—taken into consideration was whether the applicant had been a subscriber, and if so, it was always a strong point in his favour.

Mr. ROBBINS said it was not proposed to restrict the Fund to subscribers, but simply to enlarge the benefits given to subscribers. They had always been trying to get the annuities up to £1 a week, but he should be adverse to giving so much to those who had never subscribed.

Mr. RADLEY said he should be prepared to second Mr. Robbins's motion if he moved it. The matter was of extreme importance to the Fund.

Mr. ATKINS said this question was very fully considered by the Committee some time ago.

Mr. ROBBINS said the Committee then considered that the amount of annuity given was quite sufficient.

Mr. WILLIAMS thought the decision of the Committee was rather that it was better to give to a larger number than a larger amount to a smaller number.

Mr. HAMPSON said all must regret that the Benevolent Fund was not better supported, but it was as well to remember a fact which had been frequently stated, that every case which came before the Committee, if it were a suitable case, received help. Some of the statements which had been made might lead people to think that they had not been able to accomplish the very desirable end that every deserving applicant should receive relief. He thought it only damaged the Fund to cry "wolf" too often; it was doing very excellent work, and he saw no necessity for any change at present.

The PRESIDENT thought Mr. Robbins had been a little misunderstood; he (Mr. Robbins) had often given it as his opinion that it would be well if the Fund were a kind of insurance fund, but that point had been considered, and his colleagues were decidedly against him. He now thought it would be a good plan and would encourage subscriptions if annuitants who had subscribed to the Fund received £50 instead of £30 or £35. This was a question which could very fairly be discussed by the Benevolent Fund Committee, of which Mr. Robbins was an active member. For his own part he should hesitate very much to detract from the catholicity of the Fund. Mr. Symes said that when a man applied for relief the fact of his having formerly subscribed formed an item in considering his application, and this was no doubt the case to some extent; for instance, it almost followed that a man who had subscribed was known to the Council or officers, whereas a chemist and druggist who had never allied himself to the Society might never have been heard of before. But, broadly speaking, the Committee dealt with each case on its merits, and if the applicant appeared to be deserving he was relieved as freely as the Fund would permit. He thought this was a good position to take, and was a justification for asking those connected with the trade, though not with the Society, to contribute to the Fund. Many of the benefactors were persons who would probably have hesitated to benefit any particular section. He hoped it would not be necessary to reconsider the question, but there might be statistics now available which the Committee might usefully look into.

The motion was then agreed to.

LIBRARY, MUSEUM, LABORATORY AND HOUSE COMMITTEE.

Library.

The report of the Librarian had been received, including the following particulars :—

Attendance.		Total.	Highest	Lowest.	Average.
June	Day . .	530	31	12	21
	Evening .	191	15	3	9

Circulation of books.	Town.	Country.	Total.
June	123	145	263

Carriage paid, £1 11*s.* 11½*d.*

The undermentioned donations to the Library had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors :—

For the Library in London—

Abbott (H. C. De S), Preliminary analysis of the bark of Fouquieria splendens, 1884.
— Yucca angustifolia, a chemical study, 1886.
From the AUTHOR.

Cleve (P. T.), Carl Wilhelm Scheele, ett minnesblad på hundrade årsdagen af hans död, 1886.
From H:r WILHELM SEBARDT.

Maisch (J. M.), Gotthilf Heinrich Ernst Mühlenberg als Botaniker, 1886. From the AUTHOR.

Serrant (E.), L'acide sozolique ou acide orthoxyphénylsulfureux, 1886. From the AUTHOR.

General Index to the Year-book of Pharmacy, 1864-85. 2 copies.
From the BRITISH PHARMACEUTICAL CONFERENCE.

Smithsonian Report, 1884.
From the SMITHSONIAN INSTITUTION.

Martius (C. F. P. v:), Flora Brasiliensis, 1859–62. The volume containing Papilionaceæ, bequeathed by the late Daniel Hanbury.

— L. tabulæ vegetationis in Brasilia physiognomiam illustrantes, 1856. From THOMAS HANBURY, Esq.

Marçon (E.), De l'huile de Chaulmoogra, 1886.

Tambon (J.), Des Illicium en général, de la Badiane en particulier, 1886.

From Professor J. LÉON SOUBEIRAN.

Wise (T. A.), History of Paganism in Caledonia, 1884. From the AUTHOR.

For the Library in Edinburgh—

General Index to the Year-book of Pharmacy, 1864-85.

From the BRITISH PHARMACEUTICAL CONFERENCE.

Smithsonian Report, 1884.

From the SMITHSONIAN INSTITUTION.

Lavoisier, Elements of Chemistry, 1790.

From Mr. T. ROWLAND.

The Committee recommended the purchase of the following works:—

For the Library in London—

Remsen (I.), Inorganic Chemistry, 1886.

Vines (S. H.), Physiology of Plants, 1886.

For the Library in Edinburgh—

Vines (S. H.), Physiology of Plants, 1886.

The Committee ordered that the Library and Museum be closed in the Evening during August and September.

The Librarian reported that the annual meeting of the Library Association would be held in London on September 28–30, and he was requested to attend the same.

Museum.

The Curator's report had been received, and included the following particulars:—

Attendance during June.	Total.	Highest.	Lowest.	Average.
Morning .	577	50	10	23
Evening .	162	17	2	8

The following donations had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

A jar of preserved limes.

From Mr. J. C. SHENSTONE, Colchester.

Specimens of the following barks from the Straits Settlements Court, Colonial and Indian Exhibition:—Tebanoh, Satak, Kulit Kayu, Poko kulim, Poko samak palut, and Poko klat.

From Mr. N. P. TREVENEN, Assistant Executive Commissioner.

Specimens of the following barks from the British Guiana Court, Colonial and Indian Exhibition:—Arra arra, arramata, bullet tree, bush noyeau, cashew, dacama, devildora, etaballi, harrawia, hiawa, hoorihie, hoarooasha, ituri wallaba, Souari, trysil, white mora, white cedar, yarri yarri, *Quassia amara* and *Simaruba amara.*

From Mr. W. RODWAY, through Mr. G. H. Hawtayne, Executive Commissioner for British Guiana.

Specimen of *Solanum auriculatum* from the Mauritius, and a specimen of nicotine; also of waras from Aden. From Messrs. T. CHRISTY AND CO.

Specimen of Zanzibar animi, showing the incrustation by which the pitted appearance of the surface is caused. From Messrs. HALE AND SON.

The Assistant Secretary had reported the following donations to the Society's Museum in Edinburgh:—

Specimens of the flower-heads of *Pyrethrum cinerariæfolium* and of flower-heads and powdered flower-heads of *P. roseum.*

From Mr. D. N. WYLIE, Edinburgh.

Specimens of wood oil obtained from *Dipterocarpus turbinatus* and *D. alatus* from the Andaman and Nicobar Islands.

From Mr. W. C. BAKER, Edinburgh.

An application for the loan of Myrtle wax, and a candle made from it, had been received from Mr. Leopold Field, and complied with.

A letter had been received from the Hon. J. E. Mason, the Executive Commissioner for Fiji at the Colonial and Indian Exhibition, according permission to select samples of medicinal products from the Fiji Court for the Museum of this Society.

The Professors had attended and reported favourably of their respective classes.

Leicester and Leicestershire Chemists' Association.

An application from the Leicester and Leicestershire Chemists' Association had been considered, and a grant of £25 was recommended.

Pharmacy and Practical Pharmacy.

The Committee had considered the best way of carrying out a separate course of instruction in pharmacy by lectures and class demonstration, and recommended that such lectures and demonstrations be given, consisting of one lecture and two demonstrations per week, for which a fee of £2 2*s.* for a five months' course, and £3 3*s.* for the session be charged; that a salary of £50 and the students' fees be offered for the work; and that the Society provide the necessary materials. At a subsequent meeting it was agreed to recommend that Mr. Joseph Ince be requested to undertake the duties for the ensuing year.

New Premises.

The Committee had considered sketch and plans submitted by the architect, and recommended their general approval, subject to further consideration in detail; also that the approval of them by the Duke of Bedford's agent be obtained; and that the Sub-Committee be empowered to take steps for commencing such works as can be put in hand at the rear of the premises, 15 and 16, Bloomsbury Square.

The Council went into Committee to examine the sketch plans, and discuss the proposed arrangements with regard to the new building, which occupied a considerable time.

On resuming,

The PRESIDENT moved the adoption of the report. He drew attention to the grant of £25 to the Leicester Association, and also to the donation of two books for the Library from Mr. Thomas Hanbury. One of the volumes in question was valuable historically, having been sent by Dr. Martius to Mr. George Bentham, by whom it was presented to Mr. Daniel Hanbury. Mr. Hanbury had made a note in it, stating where it came from, and his desire that after his death it should find a place in the Library of the Pharmaceutical Society, and Mr. Thomas Hanbury, his executor, having, recently, accidentally seen this note, had immediately forwarded the book.

Mr. SYMES remarked that he was glad to see the Committee had recommended the systematic teaching of practical pharmacy, for though no doubt students obtained some knowledge on this subject during their apprenticeship, he was quite sure that the systematic manner in which it would be carried out here would be an advantage to them. If this motion passed, it would involve the building of new premises, and though he could not ask if any provision had been made for a pharmaceutical laboratory, inasmuch as such a thing had not yet been sanctioned by the Council, still he thought he might ask whether any of the rooms proposed to be provided would be available for such a purpose, in case the Council should hereafter agree to a resolution for carrying on such work.

The PRESIDENT said the Committee had considered the possibility of such a laboratory being established, and there would be no difficulty about space if that course were determined upon.

The motion was then put and agreed to unanimously.

A resolution was also passed for affixing the seal of the Society to the proposal for a lease from the Duke of Bedford of the adjoining premises.

GENERAL PURPOSES.

This report included the reports of the Professors and others on the Prize Examinations, the results of which are subjoined.

Botany and Materia Medica.

Professor Bentley had reported that seven candidates had competed for the second course prizes, being above the average, of whom the first two obtained 83 and 78 marks per cent. respectively. For the sessional prizes there were 12 candidates, the general average being high. He had reported very favourably of the conduct and progress of the class generally.

Practical Chemistry.

Professor Attfield had reported that there had been 70 students in his class, as against 67 in the previous session, the average period of work being 5·83 months. He had devoted two hours weekly to examinations, at which the attendance had been good and the results very satisfactory. The conduct, attention and diligence of the class throughout the session had been satisfactory.

Chemistry.

Professor Dunstan had reported on the competition in his class at the end of the second course of five months, and also on the competition for the whole session. The Professor stated that the candidate whom he recommended for the silver medal had sent in one of the best papers he had ever seen in the Society's school.

Herbarium.

For this prize three collections had been sent in, the first of which, containing 532 specimens, was deserving of much commendation. Another, containing 260, was recommended for the bronze medal. The third, though it contained more specimens, was not so satisfactory in other respects.

Council Examination Prizes.

Messrs. Corder and Gale reported on the competitors for these prizes, for which there were 11 candidates.

Peter Squire Prize.

Mr. Corder had reported that there were 14 competitors for this prize, and that he had never examined a better paper than that of the competitor whom he had placed first in order of merit.

Solicitor's Report.

The report of the General Purposes Committee also included the usual letter from the Solicitor, reporting the progress made with cases placed in his hands.

William Webster, 102, Canal Street, Nottingham, had paid £6 8*s.* penalty and costs.

Two cases of alleged infringement of the Pharmacy Acts had been considered by the Committee, and it was recommended that proceedings be instituted. The consideration of another case had been deferred.

An appeal from a person claiming to be registered, and who had made a similar appeal in 1884, when the Registrar refused to put his name on the Register, was recommended to be refused.

The memorial presented to the Council by the Scotch deputation had been considered, and its further consideration had been adjourned until the next meeting of the Committee.

The PRESIDENT, in moving the adoption of the report and recommendations, said there was nothing special to remark upon, the memorial from Scotland, which had been discussed, having been adjourned for further consideration.

Mr. ALLEN seconded the motion, which was put and unanimously agreed to.

Votes of thanks were passed unanimously to the Professors and others who had conducted the various prize examinations.

PRIZE AWARDS.

The following awards were made on the recommendations of the General Purposes Committee:—

Chemistry.

[Five months' course.]

Bronze Medal .....Richard Wilson.

Certificates of Merit ..... { Leonard Wright Williamson. / Albert Paul Ridley.

[Ten months' course.]

Silver Medal .....Joseph Grantley Tingle.

Certificates of Honour ..... { William Phillip Want. / Edmund Gilbert Baker. / Lewis Walter Hawkins. / Richard Wilson.

Certificate of Merit .....John William Bostock.

Botany and Materia Medica.

[Five months' course.]

Bronze Medal ....James John Davies.

Certificate of Merit .....Richard Wilson.

[Ten months' course.]

Silver Medal ..... { Equal. } { Edmund Gilbert Baker. / Lewis Walter Hawkins.

Certificates of Honour ..... { William Phillip Want. / James John Davies.

Certificates of Merit ..... { Richard Wilson. / Joseph Grantley Tingle. / Margaret E. Buchanan. / George William Hodder. / John Birkett.

Practical Chemistry.

Silver Medal .....Lewis Walter Hawkins.

Bronze Medals ..... { Edmund Gilbert Baker. / Richard Wilson.

Certificate of Honour .....Joseph Grantley Tingle.

Certificates of Merit ..... { Charles Ernest Johnson. / Peter Lugton. / Edward Norton Grimwade.

Herbarium Prize.

Silver Medal .....Cuthbert Henry Jones Lockyer.

Bronze Medal .....Charles Gartside.

Council Examination Prizes.

Pereira Medal (silver); and Books value £5, presented by Mr. T. H. Hills.

Edmund Gilbert Baker.

Pharmaceutical Society's Medal (silver); and Books value £3, presented by Mr. T. H. Hills.

Edward Ernest Morrall.

Pharmaceutical Society's Medal (bronze); and Books value £2, presented by Mr. T. H. Hills.

Alan Douglas Markham.

Peter Squire Prize.

Edmund Gilbert Baker.

JACOB BELL MEMORIAL SCHOLARSHIPS.

The Committee appointed to make the award of the Jacob Bell Memorial Scholarships for the ensuing session, subject to the approval of the Council, had reported that thirty candidates had presented themselves at the following centres:—Birmingham, 3; Leeds, 1; Liverpool, 1; London, 11; Manchester, 1; Newcastle, 1; Northampton, 2; Nottingham, 3; Peterborough, 1; Sheffield, 1; Southampton, 3; Shrewsbury, 1; and York, 1.

Through an inadvertence the passage from Virgil, set for translation, was taken from a book not specified in the syllabus, and under these circumstances the Committee thought it best to deduct the marks allotted to this portion of the subject. It happened, however, that this deduction did not affect the result of the competition.

The envelopes bearing the mottoes of the successful candidates had been opened, and found to contain the following names:—

Edmund White, of Chatham,
and
Arthur Smith, of Tring.

The PRESIDENT, in moving the adoption of the report, referred to the mistake which had been made in setting the passage for translation, and said it was thought best under the circumstances to leave out entirely all marks for classical Latin. As mentioned in the report, the two candidates who stood first on the list would also have been first if this subject had been considered. It would seem, therefore, that they were extremely good men, and that their knowledge of Latin was such as enabled them to translate a part from an author without having specially got it up. Nevertheless, he had to express his regret on the part of the Examiners that the mistake should have occurred, as some of the candidates might feel that a portion of their time had been taken up unduly in trying to master it. But when a little slip of that sort occurred all that the Council could do was to adjudicate as equitably as the circumstances permitted. He should therefore ask the Council to accept the report and recommendations. Besides these two there were other gentlemen who obtained a sufficient number of marks to qualify them for the scholarship.

The motion was put and carried unanimously.

Mr. RADLEY asked if the names of the gentlemen who had obtained the requisite number of marks for a scholarship would be published.

The PRESIDENT said the Committee did not know the names. They only opened the envelopes of the successful candidates.

THE BRITISH PHARMACEUTICAL CONFERENCE.

The President, Vice-President, Messrs. Atkins, Cross, Hampson, Savage, Schacht, Symes and Williams were appointed a deputation to attend the Conference in Birmingham, and the Editor, Sub-Editor and Secretary were also requested to attend.

A letter had been received from Mr. Branson, of Leeds, thanking the Council for the grant of £25 in aid of the library of the Association there.

A letter had also been received from the Privy Council office approving the appointment of Mr. Dott as a member of the Board of Examiners in Scotland.

REPORT OF EXAMINATIONS.

July, 1886.

ENGLAND AND WALES.

	Candidates. Examined.	Passed.	Failed.
Major (8th)	7	4	3
„ (9th)	6	4	2
„ (15th)	7	4	3
„ (16th)	6	4	2
	—26	—16	—10
Minor (8th)	24	5	19
„ (9th)	24	7	17
„ (15th)	22	11	11
„ (16th)	26	8	18
„ (19th)	31	10	21
„ (20th)	29	12	17
„ (21st)	30	12	18
	—186	—65	—121
Modified (20th)	1	0	1
	213	81	132

SCOTLAND.

	Candidates. Examined.	Passed.	Failed.
Major (14th)	2	1	1
Minor (14th)	13	6	7
„ (15th)	15	5	10
„ (16th)	13	6	7
„ (20th)	15	8	7
„ (21st)	13	4	9
	—69	—29	—40
	71	30	41

Preliminary Examination.

	Candidates. Examined.	Passed.	Failed.
(13th)	358	162	196

Ten Certificates received in lieu of Society's Examination.

3 College of Preceptors.
6 University of Cambridge.
1 Royal College of Surgeons of England.

RETIREMENT OF MR. BENGER.

The PRESIDENT read a letter from Mr. Benger stating that he was compelled reluctantly to resign his position as an Examiner. He begged to move:—

"That this Council desires to place on record its high appreciation of the services rendered to the Society by Mr. F. Baden Benger from 1874 to July, 1886, during which time he has been a member of the Board of Examiners for England and Wales, and regrets that Mr. Benger's other engagements necessitate his withdrawal from the Board."

The President said officers who had served so long and so well deserved the grateful thanks of the Society, and he was very glad of the opportunity of expressing his sense personally of the loss which the Board had sustained. It was extremely difficult to find a man who possessed so many points of attraction as Mr. Benger did; he possessed not only all the intellectual qualifications for an Examiner, but a manner and demeanour which were particularly fortunate in such a position. Many of his colleagues must have often envied his excellent manner and wished they could imitate it. In addition to his intellectual qualifications Mr. Benger possessed a wide knowledge of all appertaining to pharmacy and the sciences connected with it, and this was an additional reason for regret at losing him. Nevertheless, all would be glad to congratulate him on the fact that while a successful pharmacist and Examiner, he appeared to be equally successful in his own business, and it was to be hoped that he would not cease to be an active worker on behalf of the Society.

Mr. WOOLLEY, as a fellow-townsman of Mr. Benger, begged to say how much he regretted that he had been compelled to retire; but the long services he had rendered as an Examiner sufficiently showed his self-denial. As the President had said, he was eminently qualified for the post of Examiner, and his pleasant manner was not the least of his qualifications. They would, in Manchester, have been very proud to have him retain his position, but considering the sacrifices he had already made, and the great calls upon his time, he could not be expected to occupy that position any longer.

The VICE-PRESIDENT seconded the motion, and bore his testimony, so far as his short experience enabled him to give it, to Mr. Benger's qualifications, but his predecessor, Mr. Atkins, would be better qualified to say a word on the motion.

Mr. ATKINS said he most gladly embraced the opportunity to endorse what had been said by the President, but did not know that he could add anything thereto. He felt a strong personal attachment to Mr. Benger, and could only sum up his opinion of him by saying that he looked upon him as a typical Examiner, and he hoped the Council would be able to find a successor as much like him as possible.

Mr. HAMPSON said he knew Mr. Benger when he resided in Manchester, and was very gratified to hear the expressions which had been let fall with reference to him and his work as an examiner. He was sure that what had been said would be appreciated not only by Mr. Benger, but by the pharmacists of Manchester as a compliment to themselves.

The motion was then put and carried unanimously.

The appointment of a successor to Mr. Benger was deferred till the next meeting.

The Inaugural Address.

The President announced that Sir Henry Acland, K.C.B., M.D., F.R.S., President of the Medical Council, had undertaken to deliver the address to the students in October next.

A letter from Mr. Stroud, of Bristol (Local Secretary) was read, accompanying a photographic group of some of the principal members of the Bristol Association.

The September Council Meeting.

The President stated that as usual there would be no meeting of the Council in September.

PRELIMINARY EXAMINATION.

A meeting of the Board of Examiners for England and Wales was held on Tuesday, August 3, 1886.

The undermentioned certificates were received in lieu of the Society's examination:—

Certificate of the College of Preceptors.

Philp, Wm. John Ignatius.....London.

Certificate of the Royal College of Surgeons of England.

Allen, William Percival .....London.

The report of the College of Preceptors on the examination held on July 13th was received.

Three hundred and fifty-eight candidates had presented themselves for examination, of whom *one hundred and ninety-six* had failed. The following *one hundred and sixty-two* passed, and the Registrar was authorized to place their names upon the Register of Apprentices and Students:—

Ainsworth, Benjamin .....Blackburn.
Aitcheson, John Tait .....Berwick-on-Tweed.
Alexander, David Alfred .....Birkenhead.
Anderson, James .....Forres.
Antcliffe, Herbert .....Sheffield.
Atkins, Edmund Cooke .....Luton.
Atkins, John Thornton RowdenPenryn.
Atkinson, Adam Proctor, junr.Edinburgh.
Bayliff, John Thompson .....Kirkby Lonsdale.
Bindloss, Herbert Meynell.....London.
Blabey, John Robert .....Woolton.
Blackie, Robert .....Dufftown.
Blakeley, Samuel Fitzgerald ...Holbeach.
Boorne, Herbert Edward .....Frome.
Brooke, Edward .....Barking.
Brooks, Joseph, junr. .....Manchester.
Brown, Harry Walter.....London.
Bruce, Harvey .....Edinburgh.
Bunn, John Edwin James .....Newent.
Burrow, Edward John ... .Wellington,Somerset
Bushnell, Walter James .....Llandudno.
Cameron, Alexander .....Montrose.
Clarke, George Henry KnightLondon.
Cocker, Horace Edward .....Ripponden.
Cogswell, Philip Dare.....Frome.
Coltman, Thomas Arthur .....Thirsk.
Cook, Harry .....Doncaster.
Corder, John Tulwin .....Norwich.
Coulton, Reginald Hilton .....Darlington.
Cran, Newell Burnett .....Aberdeen.
Crewdson, William .....Glasgow.
Cunliffe, John ..... Accrington.
Davidson, William ....Perth.
Davies, William John.....Pontypridd.
Davison, William John .....Ashford.
Day, James Alfred ....St. Albans.
Dean, Henry James.....Chesham.
Downing, James .....Penzance.
Drabble, Thomas Lambe.....Holbeach.
Dunbar, John .....Broughty Ferry.
Dupont, John Munro .....Grantham.
Edwards, Evan David.....Rhayader.
Edwards, Henry ....Pontardulais.
Edgson, Hugh .....Nottingham.
Eunson, James Henry.....Sunderland.
Evans, Evan.....Llanelly.
Eynon, Chas. Edwd. Jenkins...Leamington.
Fallows, Herbert .....Birmingham.
Fawcett, Henry Oxendale .....Coventry.
Fitt, Cyril Herbert Christian...Norwich.
Foden, Thomas Henry.....Birmingham.
Gardiner, William Francis.....Scarborough.
Geary, Edgar Wall .....Bristol.
Gill, William Sharp.....Boston Spa.
Gillespie, James .....Preston.
Gregory, William Joseph .....Boston.
Hague, John.....Lincoln.
Hall, John Gilbert .....Cheltenham.
Hames, Harry Munkman .....Cambridge.
Hancock, Fred .....Oldham.
Harris, Charles Henry .....Leighton Buzzard.
Harrison, Joseph .....Keighley.
Hollings, Harold Thomas .....Leeds.
Holt, Robert Dickinson .....Bowdon.
Hughes, John .....Birmingham.
Inglis, James .....Biggar.
Innes, James.....Turriff.
James, Edwin Henry .....St. Clears.
James, William Thomas .....Cardigan.
Jewell, Alfred Furniss .....Grantham.
Jones, John ....Aberystwith.
Jones, Robert Haselwood .....Bury St. Edmunds
Keir, Charles .....Stirling.
Keith, Albert William .....Methlick.
Keith, Alfred George .....Methlick.
Ker, William .....Stranraer.
Keys, Sydney H. .....Boston.
Leach, Albert Henry .....Darwen.
Le Bosquet, Charles Henry ...Ramsgate.
Lees, Herbert Tom .....Birmingham.
Leighton, William Nicholls ...West Kirby.
Lengden, Alfred .....Cheltenham.
Lewis, David Evan .....Cardigan.
Livesey, Alfred.....Glasgow.
Lucas, Isaac .....Southampton.
McCutcheon, David.....Maybole.
Manners, Samuel..... .....Montrose.
Marks, Frederic .....Swindon.
Marris, Frederick Lake .....Grimsby.
Marshallsay, Henry Reynold ...Wareham.
Maynard, Frank Ede .....Brandon.
Melhuish, Andrew Ralph .....Windsor.
Meynell, Henry .....Northallerton.
Mills, William Henry .....Wellington, Salop.
Millward, Frederick.....Cardiff.
Morgan, Frank.....Twickenham.
Moss, Frank .....Bristol.
Newby, Walter Irving.....Truro.
Newton, Thomas Hill.....Hull.
Owen, William John .....Carnarvon.
Page, Richard Pearce ..... London.
Paley, John .....Newcastle-on-Tyne.
Parkinson, Robert Holroyd..... Blackburn.
Pennington, James Arthur.....Walkden.
Pepper, Frederick William.....Mexborough.
Ponsford, Alfred .....Newton Abbot.
Powell, Frederick William.....Margate.
Purdy, Amy Elizabeth .....York.
Rae, William Murdoch .....Airdrie.
Rankin, George.....Edinburgh.
Reilly, Alfred .....Bracknell.
Reynolds, Joseph .....Trecynon.
Richards, Emrys .....Pontypridd.
Richardson, Harold .....Bradford.
Riddell, William .....Aberdeen.
Ridge, Herbert William .....Towcester
Ringer, Frank Arthur... .....Norwich.
Roberts, Walter .....Stroud.

Robinson, Edward Beaumont...Richmond, Yorks.
Rose, Thomas .....Thirsk.
Rowcroft, Charles Edward.....Maidstone.
Rowe, Frank.....Ilfracombe.
Rowlands, Robert .....Tamworth.
Sage, Charles Edward.....Frome.
Savill, William A. .....Clavering.
Seccombe, Clovis Leopold .....Whitchurch, Devon.
Sharp, Charles Armstrong .....Musselburgh.
Simpson, James Wilson .....Perth.
Smith, Alexander.....Elgin.
Smith, Richard Theodore .....Ruabon.
Stephens, Albert F. Hambly ...Falmouth.
Stevenson, Andrew .....Kilmarnock.
Surfleet, Arthur Frederic .....Louth.
Tavener, William Sidney .. ...Sherborne.
Thomas, Hugh Wolseley.....Blaenavon.
Thompson, George Ernest .....Melton Mowbray.
Thomson, Thomas .....Elie.
Tillman, Ernest Augustus .....Truro.
Tothill, Mortimer A. Legett ...London.
Tottle, Samuel Harpham .....London.
Type, Henry G. .....Birmingham.
Venning, William .....Pyworthy.
Vincent, Fredk. H. Strugnell...Derby.
Walkington, Richard .....Church Fenton.
Waldron, William Thomas.....Birmingham.
Walters, Edwin .....Ashton-under-Lyne.
Ward, Charles .....Milnthorpe.
Wardropper, Ernest.....Gosforth.
Watling, Alice Maria .....Bristol.
Weston, William Arthur.....Sleaford.
Wharton, Anthony James .....Richmond, Yorks.
Whittle, James.....Bedlington.
Wilkinson, John Lawson .....Newcastle-on-Tyne.
Williams, John Henry.....Pwll Pembrey.
Williams, John Owen .....Clynnog.
Wilson, Alexander Stewart.....Carlisle.
Wilson, Archibald Ralph .....Bishop Stortford.
Wilson, William Oliver .....Royston.
Wilton, Walter Ernest .....Birmingham.
Winstanley, Thos. Harrison ...Wigan,
Wood, Godfrey Charles .....Newport, Mon.
Wylson, Frederick Charles .....Hastings.

The questions set for examination were as follows :—

LATIN.

(*Time allowed—from* 11 *a.m. to* 12.30 *p.m.*)

I. Translate into English either A. (Cæsar) or B.

(Virgil).

(*Candidates must not attempt both.*)

A. CÆSAR.

1. His rebus adducti, et auctoritate Orgetorigis permoti, *constituerunt*, ea, quæ ad proficiscendum pertinerent, comparare; jumentorum et carrorum quam maximum numerum coëmere; sementes quam maximas facere, ut in itinere copia frumenti *suppeteret*; cum proximis civitatibus pacem et amicitiam confirmare. Ad eas res conficiendas biennium sibi satis esse duxerunt; in tertium annum profectionem lege confirmant. Ad eas res conficiendas Orgetorix *deligitur*.

2. Ariovistus ad postulata Cæsaris pauca respondit, de suis virtutibus multa prædicavit; transisse Rhenum sese non sua sponte, sed rogatum et arcessitum a Gallis, non sine magna spe magnisque præmiis domum propinquosque reliquisse; sedes habere in Gallia ab ipsis concessas, obsides ipsorum voluntate datos; stipendium capere jure belli, quod victores victis imponere consuerint. Non sese Gallis, sed Gallos sibi bellum intulisse; omnes Galliæ civitates ad se oppugnandum venisse, ac contra se castra habuisse; eas omnes copias a se uno prœlio pulsas ac superatas esse.

II. *Grammatical Questions.*

(For those Candidates who take Cæsar.)

1. Decline in full (singular and plural) *sua sponte*, *magna spe* (Par. 2).

2. Write in full the indicative imperfect and subjunctive pluperfect of the verbs in italics (Par. 1).

3. Parse fully *pauca*, *rogatum*, *concessas*, *quod* (Par. 2.)

4. In what case is (*a*) the *manner*, (*b*) the *time*, (*c*) the *place* of an action put? Give *one* example of each.

B. VIRGIL.

1. Sic ait, et dicto citius tumida æquora placat,
Collectasque fugat nubes, solemque *reducit*.
Cymothoë, simul et Triton adnixus, acuto
Detrudunt naves scopulo : levat ipse tridenti ;
Et vastas aperit syrtes, et temperat æquor,
Atque rotis summas levibus *perlabitur* undas.
Ac veluti magno in populo quum sæpe coorta est
Seditio, *sævitque* animis ignobile vulgus ;
Jamque faces et saxa volant ; furor arma ministrat.

2. Qualis in Eurotæ ripis, aut per juga Cynthi
Exercet Diana choros, quam mille secutæ
Hinc atque hinc glomerantur Oreades : illa pharetram
Fert humero, gradiensque deas supereminet omnes;
Latonæ tacitum pertentant gaudia pectus ;
Talis erat Dido, talem se læta ferebat
Per medios, instans operi regnisque futuris.
Tum foribus divæ, media testudine templi,
Septa armis solioque alte subnixa resedit.

II. *Grammatical Questions.*

(For those Candidates who take Virgil.)

1. Decline in full (singular and plural) *vastas syrtes*, *ignobile vulgus* (Par. 1.)

2. Write in full the indicative imperfect and subjunctive pluperfect of the verbs in italics (Par. 1.)

3. Parse fully *quam*, *pectus*, *operi*, *alte* (Par. 2.)

4. In what case is (*a*) the *manner*, (*b*) the *time*, (*c*) the *place* of an action put? Give *one* example of each.

III. (*For all Candidates.*) *Translate into Latin* :—

1. They had done Cæsar great injury.
2. Give Balbus the book, that he may read it.
3. I have no doubt he will prove to be a great general.
4. He had been carefully taught by all his masters.
5. Having said many things, he went out from the city.

ARITHMETIC.

(*Time allowed—from* 12.30 *p.m. to* 2 *p.m.*

(N.B.—The working of the examples, as well as the answers, must be written out in full.)

1. If a person gives £46 10*s.* for 107 gallons, how much water must he add to it in order to reduce its value to 7*s.* 9*d.* per gallon?

2. If I purchase 17 hogsheads, weighing 14 cwt. each, at £24 per cwt., and am allowed 3 lbs. in every cwt. for waste, for what price must I sell the whole in order to gain $2\frac{1}{2}d.$ per lb.?

3. Simplify $\left\{ 4\frac{1}{1\frac{1}{2}} - (5\frac{1}{7} - 2\frac{1}{3}) + \frac{1}{2\frac{1}{1}} \right\} \times (\frac{3}{3\frac{5}{7}} + 3\frac{1}{2}) + \frac{1}{8}$.

4. If ·15 of an estate is worth £560, find the value of ·215 of it.

5. Write down the Metric Table of Weights. A parcel weighs 9 kilog. 40 décag.; what is the value of 125 such parcels, at 1 fr. 75 c. a kilog.? (*Answer in francs.*)

6. Find the cost of papering a room 20 ft. long, 16 ft. broad, 10 ft. 9 in. high, allowing 120 sq. ft. for doors, windows, etc., with paper $\frac{4}{5}$ yd. wide, at $4\frac{1}{2}d.$ a yd.

7. Bought 236 lbs. at 7*s.* $10\frac{1}{2}d.$ per lb., and sold one-fourth at 10*s.* 3*d.*, one-third at 8*s.* 6*d*, and the remainder at 7*s.* per lb.; what was the gain or loss upon the whole outlay?

ENGLISH.

(*Time allowed—from* 3 *p.m. to* 4.30 *p.m.*)

1. Explain the following terms :—*declension*, *conjugation*, *prefix*, *root*. Show how a root may be modified by prefixes.

2. Analyse the following sentence :—

"Around the adjoining brook, that purls along
The vocal grove, now fretting o'er a rock,
Now scarcely moving through a reedy pool,
Now starting to a sudden stream, and now
Gently diffused into a limped plain,
A various group the herds and flocks compose."

3. Parse the following sentence :—"England is safe if true within itself."

4. In the following passage supply the necessary capital letters, and put in the stops and inverted commas where requisite :—fletcher the divine had a dream which shadowed out his impending dissolution and believing it to be the merciful warning of heaven he sent for a sculptor and ordered his tomb begin your work forthwith he said at parting there is no time to lose and unless the artist had obeyed the admonition death would have proved the quicker workman of the two mozart wrote his requiem under the conviction that the monument he was raising to his genius would by the power of association prove a universal monument to his remains when life was fleeting very fast he called for the score and musing over it said did i not tell you truly that it was for myself that I composed this death chant.

*5. Write a short biography of any one distinguished writer or soldier of the present century ; *or*, Describe the leading incidents in the life of one of the Stuart sovereigns.

The following is a list of the centres at which the examination was held, showing the number of candidates at each centre and the result:—

	Candidates.				Candidates.		
	Examined.	Passed.	Failed.		Examined.	Passed.	Failed.
Aberdeen	12	6	6	Lancaster	4	2	2
Birmingham	25	10	15	Leeds	14	7	7
Brighton	4	0	4	Lincoln	15	7	8
Bristol	17	9	8	Liverpool	17	6	11
Cambridge	6	4	2	London	43	14	29
Canterbury	4	3	1	Manchester	22	9	13
Cardiff	8	6	2	Newcastle	9	5	4
Carlisle	8	3	5	Northampton	5	2	3
Carmarthen	15	8	7	Norwich	10	6	4
Carnarvon	7	3	4	Nottingham	9	3	6
Cheltenham	2	2	0	Oxford	1	0	1
Darlington	9	4	5	Peterborough	4	2	2
Douglas	1	0	1	Sheffield	6	2	4
Dundee	7	5	2	Shrewsbury	6	1	5
Edinburgh	20	8	12	Southampton	5	2	3
Exeter	8	5	3	Truro	6	5	1
Glasgow	14	5	9	Worcester	2	0	2
Hull	3	2	1	York	6	4	2
Inverness	4	2	2				

T. F. Walker.—(1) *Achillea ptarmica*. (2) *Artemisia vulgaris*. (3) *Calamintha Clinopodium*. (4) *Epilobium hirsutum*. (5) *Alchemilla arvensis*.

Student.—(2) *Cornus sanguinea*. (4) *Acer campestre*. (7) Probably *Salix Caprœa*. (8) Probably *Betula alba*. (9) *Spiræa Ulmaria*. In future please to send your name, and limit the specimens to six.

W. G. T.—Apply to the Clerk of the Apothecaries' Company.

* This must be attempted by every Candidate.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE SOCIETY'S JOURNAL.

Sir,—The Council debate on the Journal question as reported is somewhat bewildering, and reminds one of the old house described by Gray "full of long windy passages that lead to nothing." I see statements attributed to me that are not quite correct, and shall be glad if you will allow me to repeat some of the words I said at the Annual Meeting, and also point out what I did not say. I would also ask your readers to bear in mind that I am not responsible for what others said, and not being a practised speaker, it is very likely that my words were not spoken with exact precision and clearness (though I tried to make them so), and hence the misapprehension.

I advocated that the Journal should be made more interesting and useful, because I wish to enlarge the influence of the Society, and secure if possible the goodwill and hearty adhesion of a great many of our brethren who at present do not subscribe to the Society, and are, I fear, rather hostile. I also think it will be wise policy to secure this general goodwill, because I know when a new Pharmacy Act is wanted, it is of the first importance that we should have no internal dissension. Surely these are desirable objects, yet the Council, by its action, apparently does not think much of them.

I did not ask that the Journal should be lowered in tone and influence, or its scientific aspect obliterated; on the contrary, I asked for useful articles on original research and matters of trade interest, and am the last person to wish the insertion of such doggerel verse as my friend Mr. Schacht quoted. By the way, does that gentleman not know that this profane verse having been printed in our good Journal, at his instance, may now be read by the various literary and scientific societies to whom it is distributed? I need not reply to Mr. Schacht when he asks if this is the kind of thing I had in mind, as he was evidently in a jocose vein, and must not be taken too seriously. The President also misquotes me by making me appear to say "that a valuable paper had been read, etc.," when I did not use the word valuable, but only took the report in the Journal, knowing nothing of the value of the lecture, where, on the face of it, it appeared as though the readers of the Journal had missed the opportunity of reading an interesting lecture. But this is a small error, no doubt unwittingly incurred, and I do not think that it entirely disposes of the argument that reports of interesting and useful articles in our Journal are too few and far between. The fact is, Sir, as I humbly submit, no good reason has been given why some effort should not be made to carry out the spirit of the resolution passed at the Annual Meeting. I might hesitate to say this, and am too busy to write fully on the subject, were it not that several leading men in our business and on the Council have told me in conversation that some change would be very desirable. I also notice strong confirmation of this in the debate, yet apparently the matter is too difficult to deal with in a practical and sensible manner by the Council, though I feel sure that any one of that representative body, in his individual capacity as a good business man, could carry out the alteration that is required. Perhaps it is not so much to be wondered at when the accomplished President now confesses he does not know what the words "more interesting" mean when applied to the production of a journal, though he used them himself at the Annual Meeting only two months ago. And with every desire to maintain the most cordial relations with members of Council, who kindly take up the work of the Society, I cannot forbear adding that a Council which is baffled by such a small matter can hardly expect success when dealing with more intricate interests in communications with the Privy Council.

195, *Brompton Road, S.W.* R. A. ROBINSON.

*** As this subject had been considered and decided upon by the Council the publication of this letter was deferred in consequence of grave doubts as to the desirability

of its appearance in the Journal; for though criticism of the recent discussion at the Council may have been the primary object of the writer, possible detriment of a valuable property of the Society might also be a result. This was represented to Mr. Robinson, but without removing his desire for publication. We therefore think it advisable to add the following passages from the letter written to him on the subject :—

"Dear Sir,—I have read your letter relating to the Council discussion on the Journal, and think you attach too much significance to any apparent misrepresentation of your remarks at the Annual Meeting. So far as you went then, I think that you made your meaning quite clear to everyone. What you said was, I think, quite free from any objection, fair and well intentioned in a general way. So far as you went into detail at all, I think, however, you were unfortunate. I refer now to the suggestions that the Journal should be enlarged, that its contents should be made similar to those of the *Grocer*, and that the "paper of absorbing interest" should have been published in the Journal. These suggestions conveyed the idea that the points referred to had not been considered or that they had been neglected. But without laying too much stress upon this view of the matter, I readily acknowledge that it is satisfactory to find someone taking an active part in regard to the Journal, and seeking to achieve the objects which you mentioned at the meeting as seeming to you desirable. So long as the conduct of the Journal is in my hands, I shall always be glad to co-operate with anyone who is desirous of exerting himself in that direction; it has indeed been often a cause of disappointment to me to find such a very general absence of the disposition by which you have been led to move in this matter. But at the same time I have had the opportunity of learning that the realization of what may very well be regarded as a reasonable aspiration in regard to the Journal is in reality a very difficult thing. The very efforts made to arrive at it may prove detrimental in their consequences, either indirectly or directly. In your case I think some harm has been done, for I cannot suppose that you, any more than I, look upon the discussion at the last Council meeting otherwise than as a misfortune.

"It is from regard to this view of the matter that I have always deprecated discussion of journal matters in public. I fully agree with you that it is the business of the Council and of the officials who are directly responsible for the conduct of the Journal to consider well any opinions that may be entertained by members of the Society as to possible or desirable amendment. But I am decidedly of opinion, as the result of many years of observation and experience, that the way to do this is not by public discussion, but by private and personal conference with the Council and with the Editor, and more especially by taking that active part in the work of the Journal which it is open to anyone connected with the Society, or even with the trade, to do independently and usefully. If you, or those leading men in the business and on the Council to whom you refer as being of opinion "that some change would be very desirable," were to place before me their views on the subject specifically and with an adequate basis of practical detail, I can assure you that the fullest consideration would be given to such representations, and that, whether they be practicable or not after examination, I should at least be very thankful for the evidence of active interest thus afforded.

"I will not take up your time by any longer disquisition on this subject; but what I have said will I think serve to explain to you why I think that it is undesirable for your letter to be published. I shall, however, submit it to the Council for consideration and at the same time I must remind you that the decision of the Committee to which the question has been referred may have fallen short of your expectations by reason of the vague nature of the statements put forward as reasons for desiring alteration in the Journal. The suggestions you have sent with your letter illustrate this deficiency. You recommend that affairs should not be treated of only from the most advanced aspect, and thus imply that this has been the case as well as assume that it should not be. In the same way you say that "by due attention to the wishes and suggestions of friendly critics, etc., etc.," and thus imply that such due attention has not been given, without even showing that the expression of wishes or suggestions has been made. You propose the starting of an educational page and ignore the question whether that is a proper line for the Society to take. You suggest keeping abreast of all new remedies and processes and thus imply that this has not been done, without offering one instance of defect in this particular. In fact all your suggestions fall short of that substantial reality which would admit of their being dealt with practically or otherwise than as varied expressions of the sentiment which you put forward at the Annual Meeting. There are many who would agree with you in that sentiment; but the misfortune is that there are so few who will take the trouble to put it into concrete form, and contribute their earnest assistance towards the realization of so much of it as may be from time to time attainable."—Ed. Ph. J.

British Pharmaceutical Conference and the Trade Association.

Sir,—It will interest many of your readers to know that a meeting of the Urgency Committee of the Chemists and Druggists' Trade Association of Great Britain has just been held to consider the resolution passed at the Annual General Meeting in reference to a meeting or conference being held here during the forthcoming session of the British Pharmaceutical Conference, to commemorate the tenth anniversary of the formation of the Association.

At this meeting Mr. Barclay, Chairman of the Local Committee appointed to make arrangements for the forthcoming meeting of the British Pharmaceutical Conference, stated that the only available time for such meeting of the Trade Association, consistent with arrangements already made by the Conference Committee, would be Tuesday, August 31 next, at 7.30 p.m. It was decided under these circumstances that a Trade Association Conference would be out of the question, and the following resolution was unanimously passed :—

"That this Committee, having considered the resolution passed at the Annual General Meeting in reference to a commemorative meeting or conference being held to celebrate the tenth anniversary of the formation of the Association, resolves that a dinner be held in Birmingham on Tuesday, August 31 next, at 7.30 p.m., to which all members of the trade be invited; tickets to be five shillings per head, exclusive of wine (which will be optional), and that the Secretary be instructed to make all necessary arrangements for the same."

W. F. Haydon,
Secretary to the Chemists and Druggists' Trade Association of Great Britain.
Office of the Association, 23, Burlington Chambers, New Street, Birmingham.

Dispensing Query.

Sir,—Can any readers of the Journal give any information with regard to the following prescription?

1st. The intention of ths prescriber as to the medicine.

2nd. The chemical relations of the ingredients and the result of their mixture.

3rd. Is it possible to prepare a mixture so as to appear presentable?

4th. If so, how?

℞ Quininæ sulphatis	℈j.
Potassii iodidi	ʒj.
Spirit. ammon. arom.	ʒiij.
Syrupi simplicis.	ʒiv.
Aquam.	ad ʒiv.

Bolton. Pharmakos.

Fungus on Opium.

Sir,—Some of your readers may be interested to know that the finding of *Eurotium herbariorum* in Turkey opium, noticed in the "Month" in last week's issue of the Journal (p. 85), is not a solitary instance, as I have met with it myself within the last fortnight. The cake was a little over two pounds in weight, and was found to have the fungus distributed in all directions. As none of the colonies, of which there were two or three, extended to the exterior of the cake it would appear that the spores must have been introduced when the cake was made up.

36, *Meadow Street, Sheffield,* William Kirkby.

Communications, Letters, etc., have been received from Messrs. Brunnengraeber, Brown, Mee, Llewellyn, Christy, Forward.

THE INTERNATIONAL EXHIBITION AT LIVERPOOL.

Exhibitions—international and local—follow one another so incessantly now-a-days, and in many cases approximate so closely to the nature of purely trading show-rooms and bazaars, that it has become almost impossible to deal with them in detail without involving the suspicion of an advertisement on the one hand, or the danger of a reclamation on the other. The size and importance of the exhibition now open at Liverpool, however, rather than the presence of much that is specially important to pharmacists, almost require that some notice should be taken of it, and may constitute the justification of the publication of a few notes made during a recent visit.

Perhaps the dominant character of the exhibition can hardly be more concisely indicated than in the word "shipperies," framed after the approved model, and applied to it recently by Sir Henry Roscoe. At any rate it certainly contains very few pharmaceutical exhibits, about half a dozen being the extreme number to which the term can be extended; two of these, however, furnish an opportunity of seeing a number of substances that have been put forward in recent years as remedies, but which have not yet been sufficiently tested either to have been abandoned or to have come within the experience of the ordinary chemist and druggist. These few exhibits are grouped together in a court that is best reached by the visitor turning off from the main avenue after advancing from the principal entrance about sixty or eighty yards, and then doubling back towards the front of the building.

Of the two cases especially referred to the first to be described is that of Messrs. T. Christy and Co., of London, containing a number of little-known drugs from both hemispheres. Here may be seen the bright orange-coloured doundaké wood and bark (*Sarcocephalus esculentus*), from West Africa, where it is used by the natives and has acquired some reputation among Europeans as an antiperiodic. It was examined about a year ago by Messrs. Heckel and Schlagdenhauffen (*Pharm. Journ.*, [3], xvi., 49), who came to the conclusion that the therapeutic action of the bark is due to two nitrogenous resinoid colouring principles, one soluble in water and the other in alcohol, which could be best extracted for medicinal purposes by proof spirit. Another cinchonaceous product shown is a cuprea bark erroneously labelled "*Cinchona Remijia*," but whether it is from *Remijia pedunculata* or *R. Purdieana* could not be ascertained. Close by, also, are some red shavings labelled "Calisaya verde-morada." Grey and yellow bonduc seeds (*Guilandina Bonducella* and *G. Bonduc*), some particulars as to the active principles of which have been given recently (before, p. 81), are shown; also some seeds marked "black bonduc," concerning the botanical origin of which no information is given. There are also some "mucuna seeds," presumably from *Mucuna urens*, said to possess diuretic properties. Near to this is the bark of another leguminous plant, *Andira inermis*, which is known as "cabbage tree bark." It is said to be a powerful anthelmintic and a somewhat drastic purgative, and has recently been the subject of inquiry in connection with a recipe for corpulence that has been met with by dispensers. Another bark, from *Erythrina Corallodendron*, belonging to the same order, is used in the north of Brazil, under the name "mulungu bark," as a sedative and hypnotic. It was examined in 1880 by M. Bochefontaine (*Pharm. Journ.*, xi., 895). The bark of *Rhus tetlatin* is from a plant that, like others of the genus, is said to exhale a principle capable of seriously affecting the human body. The seeds of *Hydnocarpus Wightiana* yield a fatty oil used by the natives of India in cutaneous diseases, which has been suggested as worthy of trial as a substitute for chaulmoogra oil. There are also in this case several other unusual drugs worthy of inspection, besides a series of fluid extracts.

The next case to be referred to is that of Messrs. Symes and Co., of Liverpool, in which are shown a considerable number of crude drugs, principally from South America, many of which are also represented by pharmaceutical preparations embodying, it may be supposed, the views of the exhibitors as to the best forms for their administration. Thus the newly recognized cascara sagrada is not accompanied by the official solid or fluid extract, but by an "aromatic syrup. "Quebracho blanco" (*Aspidosperma Quebracho*), the bark which acquired some notoriety about six years ago as a remedy in dyspnœa, is represented by a tincture. "Pao-pereiro," another apocynaceous bark (*Geissospermum lœve*), used in Brazil as a febrifuge, is also properly represented by a tincture, the alkaloid geissospermine, which is the active principle, being freely soluble in alcohol (*Pharm. Journ.*, [3], viii., 182, 648). The name "pereirine" was originally applied to a crude alkaloidal product from this bark, but at the suggestion of Hesse the principal definite crystallizable alkaloid has been called "geissospermine." It has recently been stated (*Journ. de Pharm.*, July 1, p. 22) that salts of "pereirine" are now being used very successfully in the treatment of intermittent fever, the hydrochlorate being administered in doses of 20 grams. It may be presumed that salts of geissospermine are here referred to, notwithstanding that the name "pereirine" has been retained for a second and less abundant alkaloid. Coto bark, which has now a continental reputation in the treatment of diarrhœa and similar complaints, is also shown, the preparation by which it is accompanied being a fluid extract. Among other articles noticed was baycuru (*Statice Brasiliensis*), used in Brazil as an astringent and discutient remedy; "tayuya," one of the numerous Brazilian alteratives, credited as a remedy for syphilis (*Pharm. Journ.*, [3], vi., 401); "caroba" leaves (*Jacaranda procera*), which have a similar reputation, accompanied by a fine specimen of the fruit, probably now seen for the first time in a commercial sample in this country; *Mikania Guaco*, also reputed to be effective in secondary syphilitic disorders and rheumatism, and highly spoken of by Humboldt as a cure for snake bites (with fluid extract and syrup); "guassatunga" bark, another alterative, a tincture of which is used in Brazil for snake bites (*Pharm. Journ.*, [3], xiii., 213); "pichi," the twigs and leaves of a Chilian solanaceous plant (*Fabiana imbricata*), recently introduced as efficacious in certain diseases of the liver and urinary organs, and especially in vesical catarrh (with tincture); "guarana" in roll and powder, together with a liquid extract and a quantity of crystalline alkaloid, which, though here labelled "guaranine," has been shown to be identical with theine or caffeine; boldo leaves, with a tincture and a wine; mate, or Paraguay tea; the scimitar-shaped leaves of *Euca-*

lyptus globulus, with a tincture; coca leaves, with fluid extract and wine, cocaine tablets for sea-sickness, and cocaine pastilles; and damiana, with a fluid extract. The carnauba palm (*Corypha cerifera*) is represented not only by its wax, but by its less well-known roots, which have been alleged to possess properties resembling those of sarsaparilla (*Pharm. Journ.*, [3], v., 661). The official araroba, the yellow-brown medullary substance and chrysophanic acid derived from it are both shown. Then there is a sample of "angico gum," the product of *Acacia Angico*, yielding a mucilage of a tragacanth character, which is credited with being specially useful in chest diseases. In addition, there is a specimen of Brazilian vanilla, and an exception to the rule in respect to locality, in a beautiful sample of the delicately tufted seeds of the West African *Strophanthus*. From the foregoing lists it will be apparent therefore that the cases of Messrs. Christy and Messrs. Symes present to pharmacists visiting the Liverpool exhibition an opportunity of seeing many rare and unusual drugs.

In an adjoining case, exhibited by Messrs. Clay and Abraham, of Liverpool, may be seen a series of fluid extracts, which are described as having been prepared by maceration and hydraulic pressure. It is claimed that by this means the injurious action of heat on the various principles in the drugs is avoided, and it is probable that within certain limits the method has its advantages. In this case also are a series of "milks," a class of preparation apparently in favour in Liverpool. However suitable they may be for administering certain substances in suspension, they are not seen to advantage after standing at rest in an exhibition for any length of time. At the time of our visit the "lac calcis phosphatis" had separated into two layers, the upper of which was quite clear, and a similar separation was progressing with the "mistura bismuthi oxydi." It was noticed that in another case a similar preparation was more judiciously shown in a bottle wrapped in paper.

At the end of this row Messrs. Savory and Moore are represented by a handsome case containing their infants' food and peptonized foods. At a little distance, Mr. Hocking, of Liverpool, has an exhibit of medicine chests, and strange as it may seem, considering that the exhibition is centred in one of the most important ports in the world, there was only one other show of the kind noticed, and that a small one. Messrs. Bush and Co., of London, exhibit a considerable number of essential oils and flavouring essences, as well as a series of harmless" confectionery pigments.

Not far from this, but in a by no means prominent position, is a case well filled and arranged with chemical apparatus, among which is a fine display of platinum goods, shown by Messrs. J. H. and S. Johnson, of Liverpool. The case is a double one and at night it is illuminated in an effective manner by two incandescent electric lamps worked by battery power.

As might be expected the alkali and chemical manufacturers are in good force, all putting forward claims on behalf of their products that could hardly be tested by casual observation. Special mention may be made however of some magnificent soda crystals in the case of Messrs. Gaskell, Deacon and Co., which are at least two feet in length. There is also near the centre of the building, a "trophy" of crystallized borax, the framework of which must be nearly 20 feet high; it is exhibited by Messrs. Coghill and Son, of Liverpool.

Near this case is another very tastefully arranged, containing similar preparations, exhibited by Mr. C. W. Field, of Liverpool.

In the French section there are two cases of interest to pharmacists, one belonging to M. Chassaing, of Paris, in which is shown pepsine in the moist and dry conditions, diastase, peptone in granules, jequerity, etc. Both in this and the exhibit mentioned below, bromide of potassium was observed in small uniform crystals, having much the appearance of granulated sugar. In this form it is doubtless more convenient for dispensing and other purposes than in the large crystalline masses in which it usually occurs.

The other case, which is handsomely got up, and elaborately and tastefully fitted, is that of the Pharmacie Central of Paris. Above the tablet which bears this title and the name of E. Genevoix as Director, is another which announces that the capital is ten million francs; why this is stated we can scarcely see, except it is with a view of impressing the beholder with an idea of the vast importance of the company. In the centre of the case is a handsome cut-glass vase, containing about 7 lbs. of strychnine in fine white crystals, accompanied by others of a smaller size, containing the phosphate and sulphate of this alkaloid, hydrate and alcoholate of chloral in cakes and crystals, nitrate of pilocarpine, biniodide of mercury in fine crystalline scales, some fine crystals of valerianate of quinine, terpene and its hydrate, lactate of manganese, terpinol, hypnone, pyridine, true citrate of magnesia, caffeine, monobromide of camphor, and medicated lozenges and granules. A prominent feature in this case are some of the dry spongy extracts, having the appearance of masses of dry froth. These were largely exhibited in the Paris Exhibition of 1878, but do not appear to have come into general use. Any special advantage in this form does not seem apparent, as it can easily be conceived that the emetine in the fine specimen of extractum ipecacuanhæ exhibited would more readily become oxidized than if it existed in a more compact form. The exhibit well represents French pharmacy.

Messrs. Burroughs, Wellcome and Co. show compressed tablets, peptonizing powders, malt extract, and a variety of their specialties tastefully arrayed in a handsome case.

There are also some interesting exhibits of petroleum products, which may form the subject of another notice.

ALETRIS FARINOSA.

The rhizome and rootlets of this South American plant have recently been brought before the medical profession of this country as a sort of panacea against the ills that the flesh (especially of woman) is heir to. Amongst the other names by which the drug is known may be mentioned true unicorn, cordial, colic root, star grass, blazing star, mealy star-wort, etc. It belongs to the natural order Hæmodoraceæ, although it has been ascribed by others to the N.O. Liliaceæ (the former order has, however, an inferior ovary, while the ovary of the latter is superior). It was formerly placed in the secondary list of the U.S.P. (1870).

General Characters of the Plant.—A perennial, with radical leaves arranged in a star-like manner, which contributes to one or more of its many names. Being a monocotyledonous plant the leaves have parallel venation, with margins entire, a non-articulated stalk, and are about four inches long. The flower stalk is about eighteen to twenty-four inches high, and is, except for a few scales, naked. The inflorescence is a spiked raceme composed of mealy white flowers, each having a six-partite perianth. Flowers appear in June and July.

The rhizome and rootlets are chiefly used.

Characters.—A horizontal rhizome one to two or three inches long, and about one-eighth to two-fifths of an inch thick, being flattish or concave on the upper surface, and densely tufted with light grey fibrous or scaly remnants of leaves. From the under surface, which is convex, there are given off numerous simple rootlets from two to three inches long, some (the older) being wiry, and of a glossy black colour externally, and if more recent brown or whitish and soft. Internally the rhizome is white, and has a mealy fracture with scattered wood bundles protruding. It has no odour and the taste is amylaceous, followed by much bitterness.

Chemistry.—The bitter principle is not very soluble in water (a decoction is therefore not very bitter), but is removed by proof or stronger spirit. Tannin is not indicated in this tincture by the usual tests, such as persalts of iron, etc. There is much starch present, hence its specific name.

Uses.—Expressed in terms of the friends of this remedy, we should require to enumerate a long list of words ending in *rhœa*, but which are comprehended by the words "uterine disorders," but less enthusiastic admirers content themselves by describing it as a "simple tonic bitter." It is, however, in large doses, an emetic and cathartic.

Dose and Mode of Administration.—A decoction 1 oz. to 1 pint prepared, *secundum artem*, dose ½ an ounce; a tincture 2½ ozs. to 1 pint, S.V.T., dose 1–2 fluid drachms; in powder, 10 grains. A cordial is also sold.

TURMERIC ROOT, AND ITS COLOURING MATTER.

BY C. J. S. THOMPSON.

Turmeric root is still of interest to us, as it appears in the appendix of the last edition of the British Pharmacopœia, for the preparation of the tincture, and paper, of turmeric.

Of the different varieties of the plant, which grow largely in moist districts of the East Indies, the *Curcuma longa* and *Curcuma rotunda* are perhaps the most useful. These are both the production of the same plant, the latter being the central rhizomes, and the former the elongated lateral ones.

The first is more especially used in the East, for its medicinal and aromatic properties; the latter being mostly employed for its colouring properties as a dye. They differ, however, very little in their composition.

The official rhizome, the *Curcuma longa*, is bent and knotty, being in pieces about the size of the little finger, and covered with a thin grey bark, on which there are slight rings; though that met with in commerce has usually a yellowish appearance, owing to the pieces of the root becoming rubbed one against the other.

Under the bark, is a hard, heavy, and compact substance of a deep orange-yellow colour, the fracture resembling that of wax.

The root has the odour of ginger, and a warm, bitter, and somewhat acrid taste, owing to its oil; it imparts to the saliva a yellow colour.

The powdered root was formerly given medicinally as an excitant, and was reputed to act as a diuretic, the dose given in old Pharmacopœias being from twenty to forty grains. It is largely used in India and China in the arts as a dye, and also as an aromatic condiment, it being one of the ingredients in curry powder.

The root contains a small percentage of volatile oil, resin, brown extractive matter, starch, and gum. The following represents the results of an analysis:—

Yellow volatile oil	1
Brown extractive matter	12
Resin	10
Gummy matter	13
Soluble matter in alkaline solution	57
Moisture, etc.	7
	100

The root also contains from two to three per cent. of curcumin, $C_{14}H_{14}O_4$, a yellow colouring matter, which is soluble in oils, alcohol, and fatty liquids, but very slightly so in cold water. It is easily dissolved in an alkaline solution, and turns a deep brown. Jackson and Menke, who investigated curcumin very exhaustively, found it to be a diatomic monobasic acid. When treated with weak oxidizing agents it was found to yield vanillin. They succeeded in producing the following products from curcumin, by the action of nascent hydrogen, and of bromine:—Curcumin dihydride, an anhydride of curcumin dihydride, tetrabromo curcumin, curcumin tetrabromide, and pentabromocurcumin dibromide.

The brown colour given to turmeric paper by alkalies depends considerably on the strength of the alkaline solution employed.

Dilute acids will restore the paper to its original colour.

The powdered root when treated with cold water yields to it a little of the colouring matter, enough to impart a dark yellow tint.

Hot water takes up a little more, although it does not dissolve the whole of the colouring principle.

Cold alcohol acquires a yellow colour, and dissolves a quantity of the resinous matter, but hot alcohol dissolves out much more, and assumes a dark reddish brown colour.

If this alcoholic solution be evaporated, and the residue again acted on by ether, the ether will dissolve out the whole of the yellow colouring matter.

If the solutions are evaporated, and dried, a resinous matter of a deep brown colour will remain.

The simplest method of extracting curcumin is to macerate the powdered root in boiling water, until the liquid ceases to acquire any further tint. Then boil the residue in alcohol. The root is thus nearly exhausted, although the powder always remains more or less coloured.

Mix the solutions, which should be of a reddish brown colour, and filter. The filtrate, on evaporation, yields a brown mass, which should be dissolved in ether, and again slowly evaporated, when the curcumin will remain in thin transparent layers.

When carefully dried, and reduced to a fine powder, it is of a rich yellow colour, having the odour of vanilla. It melts at a temperature of 40° C., and even at ordinary temperature the powder, if fine, becomes soft and forms into a mass.

On exposure to sunlight it gradually loses its colour and becomes nearly white. It burns with a bright flame. Curcumin is insoluble in water, but soluble in ether, chloroform and alcohol. Insoluble in dilute acids, but soluble in strong. With strong sulphuric acid it forms a solution of a crimson colour, which disappears if water is added, and the curcumin is precipitated in yellow flakes. When treated with hydrochloric and phosphoric acid it acts in the same manner, but with acetic acid no change in colour is produced.

On adding some boracic acid to an alcoholic solution and evaporating it gives a beautiful crimson powder.

With acetate of lead the solution gives a dark red precipitate, and with nitrate of lead a yellow precipitate. Nitric acid has a peculiar action on curcumin.

If 1 part of curcumin is mixed with 2 parts of nitric acid and same quantity of water, on the application of heat a rapid action takes place accompanied by a brisk ebullition. If still kept at a gentle heat till the ebullition ceases a resinous mass separates out which subsides, and a yellow soluble substance remains in the water.

The resinous substance when dried forms a fine yellow powder which is quite different from curcumin in composition and odour.

The yellow substance, which is soluble in water, crystallizes in transparent needles.

PHARMACY OF TEREBENE.*

Medical authority has fixed the dose of terebene at from five to twenty drops, and it is prescribed to be given as a vapour, and also to be exhibited in inhaling apparatus. As much stress is placed upon its topical effect, no pharmaceutical form for administration would be admissible that would interfere with this desired end. Two reasons then exist for excluding the pill form. First, the dose is too large to admit of making pills from it of convenient size, even 5 drops requiring an astonishing quantity of absorptive substance—powdered marshmallow, liquorice-root, elm, and tragacanth, etc.—to take it up. Second, the pill form would prevent, obviously, all local effect.

The lozenge form suggests itself as applicable, and likely to meet all requirements. A lozenge, however, to contain a maximum dose of terebene, twenty drops, must be very large if made simply like the U. S. Pharmacopœial peppermint lozenges. To contain even five drops, a lozenge twice the size of those just mentioned is required. This difficulty is caused by the non-absorptive qualities of terebene, it seeming to have no affinity of contact with any pill or lozenge-forming substances. This repellant quality, so far as making into lozenges is concerned, can be overcome by making a heavy emulsion of the terebene, and thus introducing it into the mixture of sugar and powdered tragacanth.

The following formula works perfectly, giving a lozenge of good size, holding the terebene satisfactorily, and possessing a taste far from unpleasant.

Take of—

Terebene	℥iiiss.
Acacia	℥iii.
Water	℥ii.
Powdered sugar	℥vi.
Powdered tragacanth	℥ii.

Make 100 lozenges.

With the terebene, acacia, and water make, according to article, an emulsion, which add to the powdered sugar and tragacanth, previously mixed together. Beat into a mass, and make into lozenges. The emulsion form, for administration, meets every requirement save one.

The taste of terebene is pretty generally considered bad, and in emulsion its peculiar pungency most successfully salutes and thrusts itself upon the gustatory nerve. Pharmaceutically, however, the emulsion is a success, the following proportions, if observed, furnishing as fine a representative of that class as can be desired :—

Terebene	℥iv.
Powdered acacia	℥iii.
Water, to make	℥ii.
Syrup of ginger	℥i.

First rub thoroughly together the acacia and terebene in a dry mortar, add all at once the water, rubbing rapidly until the crackling sound appears, then add the remaining water and the syrup of ginger. This emulsion is not perfectly white, owing to the syrup of ginger, which is added preferably to simple syrup because of its flavour and pungency, which somewhat mitigate the taste of the terebene.

Oil of peppermint might be added to this emulsion with the effect of almost entirely covering up the terebene taste, but unfortunately there are many who dislike peppermint intensely, and hence it cannot be generally used. Oil of lemon improves this emulsion little, if at all, and hence cannot be recommended.

* From the *Therapeutic Gazette*, July 15.

THE DELICACY OF THE SENSE OF SMELL.*

The sense of smell is probably the leading sensorial endowment in most insects, and it does for them what sight and hearing do for man. Its potency in helping along intelligence is very great, since we know that, mentally, insects stand at the head of the invertebrate, as man stands at the head of the vertebrate, world. The sense of smell is probably acute in some fishes, as, for example, the shark ; this is the most active, if not the most intelligent of fishes, and it has an olfactory mucous membrane which, if spread out, would cover some twelve square feet. The sense falls in value in the amphibia, reptiles, and birds, but rises again in the mammalia, though not in proportion to intelligence. Its extreme acuteness in the dog, the most intelligent of animals short of quadrumana, is well known. In man, the sense of smell is subordinate, and even rudimentary. Olfaction adds to man's enjoyment, preserves him from some dangers, but does not very much extend his knowledge of his environment.

Yet, despite the comparative insignificance of this sense in man, its delicacy is most marvellous, and by it we can appreciate more minute subdivisions of matter or the impact of more infinitesimal molecular vibrations than by any other of the avenues to the brain.

Professor Valentine has made some interesting and striking experiments in proof of this. He found that a current of air containing 1-30,000 milligramme of bromine, or 1-500,000 milligramme of sulphuretted hydrogen, or 1-2,000,000 milligramme of oil of roses, could be perceived by the sense of smell. He also determined that the amount of odoriferous air which must pass over the olfactory membrane in order to excite the sense of smell, was from fifty to one hundred cubic centimetres (one-tenth to one-fifth of a pint). He calculated, therefore, that the actual amount of bromine necessary to excite a sense of smell was 1-600 milligramme, of sulphuretted hydrogen 1-5,000 milligramme, of oil of roses 1-20,000 milligramme (about 1-120,000 of a grain).

Two recent experimenters, E. Fischer and F. Pentzoldt, of Erlangen, have found two other substances which far exceed the foregoing in their capaclty for affecting the olfactory nerves. These were mercaptan (sulphuretted alcohol) and chlorphenol. They found that in air containing 1-230,000,000 milligramme to the cubic centimetre of chlorphenol, and 1-23,000,000,000 milligramme of mercaptan, these substances could be appreciated, and it was estimated that only 1-4,600,000 milligramme of chlorphenol, and 1-460,000,000 milligramme of mercaptan, is necessary to excite a sensation of smell. There exists, therefore, a substance which in so small a subdivision as 1-2,760,000,000 grain, or not quite one three-billionth of a grain, is capable of calling out a nerve impulse. This subdivision of matter is quite beyond comprehension, yet the nose alone can appreciate it. The smallest subdivision appreciable by the eye through the spectroscope is 1-1,400,000 milligramme of sodium, which is a two hundred and fifty times coarser division of matter than the minimum of odour-exciting mercaptan.

On account of the extraordinary power of mercaptan it is proposed to put it to some practical use in testing currents of air, ventilation, etc.

* From the *Medical Record*. Reprinted from the *Scientific American*, July 17.

WORK DONE IN THE INLAND REVENUE LABORATORY.

Last week a brief reference was made to one or two items contained in the newly published report of the Inland Revenue Commissioners. Amongst the Appendices to this report is the annual report of the Principal of the Laboratory, and this, as in former years, includes many interesting items. We extract from it the following paragraphs.

The total number of samples analysed during the year has been 26,175, or 148 less than that of the previous year.

A large number of experiments have been made upon the effect on the strength of spirits by dilution and distillation, in connection with an inquiry into the cause of deficiencies which frequently arise in the stocks of rectifiers and compounders, and the results obtained, which have been laid before the Board, throw considerable light on the subject, and will be of great assistance in dealing with claims in cases for remission of duty. These results, it may be hoped, will be allowed to be published.

At the cost, and by the request of the colonial authorities, eight samples comprising tallow, turpentine, linseed oil, white lead and malt, have been analysed. The samples of malt were from the Cape Government, and involved the carrying out of a series of experiments for the purpose of determining their respective values for brewing purposes. It appears that this Government had passed an Act for charging duty upon beer on the lines of our Beer Act of 1880; but the brewers complained that owing to the inferiority of Cape malt they were unable to obtain a barrel of wort of 57° from two standard bushels of 42 lbs., and they claimed that this weight should be increased to 50 lbs. At the suggestion of the Chief Revenue Officer at the Cape the subject was referred to this department for investigation, and four samples of malt from various maltsters were sent to have their brewing values determined. These samples were found to contain more husk and less starch and sugar than ordinary English malt, and though the grains were generally as well grown they were harder and less friable. Their brewing value was found to range from 44 lbs. to 50 lbs. as the equivalent of a bushel, the mean being 46 lbs., a result which accorded with the conclusion arrived at by the Chief Revenue Officer of the Cape Government.

The number of samples referred under the "Sale of Food and Drugs" Act by magistrates during the year has been thirty-seven, and it is satisfactory to note that in thirty-three of the cases the department was able to confirm the results of the local analyst. The range of articles submitted has been much narrower than in any previous year, as the samples consisted only of milk, butter, pepper and ginger.

Milk again formed more than half the number of samples submitted, and in only one case out of twenty was the department unable to support the certificate of the local analyst. The samples were nearly all for added water, and it was noticeable in the results of the analyses that the fat seldom fell low, and in nearly every case was above the limit which has been adopted by the Society of Public Analysts since the passing of the Act.

The samples of butter were alleged to contain foreign fat, but in two cases out of five no evidence could be found of such admixture. In the samples which were adulterated the foreign fat amounted to 15, 55, and 75 per cent. respectively. There appears to prevail a greater disposition now to add small percentages of foreign fat to genuine butter for purposes of adulteration than was the case when butter substitutes first came generally into use. This practice will evidently entail greater vigilance on the part of the local authorities who adminster the Food and Drugs Act, and also a clear understanding between analysts as to the data which will warrant the conclusion whether a butter is mixed with foreign fat or not.

Of eleven samples of pepper, six were reported to contain an admixture of ground rice, and five as containing an excessive amount of sandy and clayey matter, and in each case the results supported the previous analysis.

The only other sample was one of ginger, in which the presence of 10 per cent. of foreign starch was confirmed.

One hundred and sixty-three samples have been analysed for the Admiralty department, consisting of bread, butter, condensed milk, beer, wine, brandy, vinegar, treacle, dyed woollen goods, enamelled ware, electro-plate, etc. The samples consisted partly of articles submitted for the consideration of the Director of Contracts, and partly of goods supplied under contracts already made.

The bread consisted of two samples of whole-meal bread and one of ordinary household bread, but none of them could be reported on favourably.

Of thirty-one samples of butter, twenty-six were reported as of good quality, two as inferior to pattern; while of the remaining three, one consisted partially, and two wholly, of foreign fat, known in the trade as "butterine."

The condensed milks were all either inferior to pattern or such as could not be recommended. One sample tendered as "essence of cream" was simply "condensed milk," containing more than double the amount of water, and somewhat less sugar than is ordinarily found in such preparations.

The beer was all for hospital use, and of seventeen samples tendered for contract, the department reported against four and favourably of thirteen. One other sample was sent to ascertain if it complied with the conditions of contract, and was approved.

Three samples of port wine and two of brandy were found to be of good quality.

Of twenty-six samples of vinegar the department approved of eighteen, and of twenty-eight samples of treacle it could only recommend sixteen as suitable for human food.

Eleven samples of enamelled ware have been analysed, and in four cases arsenic or lead was present in the enamel in sufficient quantity to render the articles undesirable for cooking purposes.

Of twenty-one samples of worsted materials tendered as having been dyed with indigo of best commercial quality, only five were found to fully comply with that condition, all the rest showed indications of having been more or less dyed with other colouring matters.

Of five specimens of electro-plate only one contained the amount of silver stipulated in the contract, the others being 10, 23, 41, and 77 per cent. deficient respectively.

The following table gives the particulars of the samples of lime and lemon juice, and spirits analysed for the Board of Trade.

Description of samples.	Number of samples.		Number of gallons.	
	Passed.	Rejected.	Passed.	Rejected.
Lime juice . .	153	2	16,736	255
Lemon juice .	387	38	48,522	4153
Spirits . . .	39	2	6,146	220
Fortified juice.	88	17	—	—

The juice submitted for approval has again been of good quality, although not quite equal to that of last year. It has only been necessary to reject forty samples out of a total of 580, and the majority of these were of good quality but had not been sufficiently freed from pulpy matter to bring the juice into a condition suitable for fortifying and bottling. Of seventeen samples rejected for other reasons, eleven did not fulfil the requirements of quality, and to six had been added either bisulphite of soda or common salt for the purpose of preservation.

Of the two samples of spirits not passed, one was beyond the limit of strength laid down by the Board of Trade, and the other was very inferior in quality.

A much larger number of samples than usual of fortified juice has been presented for examination, but some of it was evidently very old and deteriorated in quality, and consequently such as could not be approved. It was subsequently found that with the exception of one sample, all the rejected juice formed part of surplus stores sold by the Admiralty.

Six other samples have been analysed for this department. Of these, two were of boiler scale and mineral oil respectively, examined in connection with an inquiry into the causes of a boiler explosion, and four consisted of disinfectants of low antiseptic properties, and which were called by such names as "sanitary lime," "ozone fluid," and "porous disinfector."

During the year the authorities of the India Office deemed it desirable to have a special and extensive investigation into the character of the tinned meats supplied to that department for the troops; 708 tins were examined as to the quality of the meat, its state of preservation, and its freedom from any deleterious ingredient, and the results were highly satisfactory.

Of general samples 627 have been analysed, and of these 84 or 13 per cent. have been reported as of low quality, or as inferior to the pattern sample. This percentage is practically the same as that of last year. Amongst the samples reported against were two of lamp black and zinc white, both ostensibly pure, but which contained 31 and 29 per cent. respectively of foreign ingredients.

Besides the above, there have been analysed 182 samples of malt liquor in various stages of manufacture, in connection with the control which is exercised over the beer brewed in this country for the use of the troops in India.

Forty-five cases of prosecution under the Customs and Inland Revenue Act have been attended by the analysts of the department. In two of these no conviction ensued, but in neither of them was any attempt made to contest the chemical evidence. In the remainder, penalties amounting to £361 were imposed, and very frequently the costs of the court in addition. Two of the cases in which a conviction was obtained were strongly contested, several chemists in both cases being engaged for the defendants. One related to the illegal addition of sugar to wort, and the other to the presence of methylated spirit in two large vats of presumably duty-paid spirit on the premises of a rectifier. In the latter case, the tests upon which officers of the laboratory relied for the detection of methylic alcohol were very severely criticized by the opposing chemists, but without shaking the soundness of the conclusions. Fortunately, the results of some of the tests were of such a nature that they could be produced in court, and the wide difference in those yielded by ordinary alcohol and methylated spirit respectively afforded ocular demonstration of the presence of the latter. As the samples contained only about 3 per cent. of methylated spirit or $\frac{3}{10}$ of 1 per cent. of wood spirit, the decision in the case affords conclusive evidence of the efficiency of the chemical tests at command for the protection of the revenue, and will have a deterrent effect upon others who may have contemplated frauds of the same kind.

One hundred and sixty-seven samples of tobacco have been analysed during the year, of which 50 were more or less adulterated. Of the adulterated samples, 39 were specially selected, and consisted of foreign smuggled cavendish, which had been purchased or seized from retail dealers, and which contained liquorice or sugar to the extent of from 1 to 14 per cent. The 11 other samples were of a minor character, and related chiefly to an illegal use of flavouring matters. No case has occurred during the year of a material amount of adulteration of home manufactured tobacco, and there is every reason to believe that, from a revenue point of view, the trade is in a healthy condition. This shows an increase as compared with previous years, the number in 1884 being 105, of which 35 were adulterated, and in 1885, only 73, of which 47 were adulterated.

The quantity of tobacco cleared for consumption was slightly less than that of the preceding year, owing to the extra clearances made in the last month of that year in anticipation of an increase in the duty. Taking the two years together, the progress in the consumption is highly satisfactory. It amounted in the United Kingdom to 52,752,728 lbs., being an average of 1 lb. 7 oz. per head of the population.

Ninety-five samples of snuff have been examined, of which 73 were genuine and 22 were found to contain an illegal percentage of alkaline salts. The latter, though variously obtained, were all made by two manufacturers, each of whom has paid a penalty for the offence.

Seven thousand six hundred samples of beer and wort have been analysed for the purpose of checking the operations of brewers. In 1250 cases the analyses were duplicated, a course always adopted when the result imposes an extra charge on the brewer, or otherwise differs widely from the declaration. An average increase of over two degrees had to be made in 605 instances. Included in the above total are 705 samples analysed for evidence of the illegal use of sugar, and 425 botanic beers and other temperance beverages, more than half of which contained over the legal 2 per cent. of proof spirit, the range extending from a mere trace up to 25 per cent. In 19 of the latter cases the samples, although represented as non-intoxicating, contained as much spirit as, or more than, ordinary ale and porter. It was stated on the label of a professedly non-alcoholic beverage, which was analysed a short time ago, that total abstainers who consumed it were both pleased and surprised at its comforting and exhilarating effects, and, as it contained 23 per cent. of proof spirit the reason was obvious.

Six hundred and thirty-nine samples of naphtha, representing 170,334 gallons, intended for methylation, have been examined, and of these, six samples, relating to 717 gallons, were rejected as unfit for the purpose.

Two hundred and fifty-nine samples of ethylic alcohol for the same object were also examined, and the spirit in each case was found satisfactory.

Two very important frauds in the use of methylated spirit have been discovered; one of which occurred in Scotland, and has already been referred to in a previous paragraph; the other was in Ireland, where the owner of an illicit still, not having the apparatus for producing a spirit of the strength of ordinary whisky, was using methylated spirit for the purpose of fortifying his illicit product. Besides these, there have been several cases of a minor character, in which methylated spirit has been used in the preparation of tinctures for internal use, or has been flavoured with peppermint for use as a beverage, thus showing the necessity of incessant watchfulness on the part of the surveying officers, in order to prevent the abuse of the privilege of using methylated spirit for trade purposes.

At the request of the Dutch Government, and with the sanction of the Board and of the Treasury, the Principal attended at Amsterdam in December last for the purpose of conferring with the chemical advisers of the Dutch and French Governments upon the regulations adopted in the respective countries for the use of spirit duty-free in the arts and manufactures, and to mutually consider the present scientific means which exist for the effective prevention and detection of fraud. It is gratifying to be able to state that, as the result of the deliberations, the experts were unanimously of opinion that the chemical tests available for the detection of methylic alcohol in the various compounds in which the methylated spirit might be used, are such as enable them to adequately perform the important duties which devolve upon them in this branch of their work. The respective chemists have

agreed to continue in correspondence for the purpose of informing each other of novel attempts at fraud, and of any improved methods for the detection of wood spirit which may be devised.

Under the head of miscellaneous samples may be mentioned 445 samples of compounds, liqueurs, and wines, 145 of spirits for the determination of obscuration, 23 of water and milk for rural sanitary authorities, 39 of water, meal, flour, soap, and pigments for the Home Office, and 1019 of a general nature, comprising acetic acid, cider cordials, essences, finish, glucose, herb tobacco, methylated spirit, molasses, oil, pigments, pepper, spirits, tinctures, wash, whisky, wines, etc., etc.

CANTHARIDIN.*

BY B. HOMOLKA.

Although this substance has been the subject of very many investigations, and the determination of its vapour-density by Piccard proved its molecule to have the formula $C_{10}H_{12}O_4$, little is known as to its constitution. Dragendorff and Masing showed that when boiled with alkalies it gradually dissolved and formed a salt, $C_{10}H_{12}O_5M_2$, but stated that on the addition of acids cantharidin was reprecipitated unchanged in the form of needles. The author finds that, although this latter statement is true when an acid is added to the *hot* alkaline solution, no precipitate is formed in a *cold* weak solution. When this clear solution is heated to 60–70°, however, cantharidin is at once precipitated. There is thus little doubt that the free *cantharidic acid*, $C_{10}H_{12}O_5$, was present in the cold solution, but, owing to the readiness with which it gives up water and forms its anhydride, cantharidin, the author was unable to isolate the acid. *Silver cantharidate* forms a precipitate, $C_{10}H_{12}O_5Ag_2+H_2O$. *Methyl cantharidate*, $C_{10}H_{12}O_5Me_2$, prepared from the silver salt, crystallizes in flat prisms easily soluble in alcohol, boiling ether, and water; it melts at 91°. With hydroxylamine, cantharidin yields *cantharidoxime*, $C_{10}H_{12}O_3(N{\cdot}OH)$, crystallizing in stellate needles or prisms, soluble in ether, alcohol, and warm water; it melts at 166°. When heated with hydrochloric acid at 150° it is resolved into its constituents. The author also, by the action of free hydroxylamine on sodium cantharidate, obtained the *sodium* and *lead* salts of a *cantharidoximic acid*, but was unable to obtain the free acid, as this is at once converted into its anhydride, cantharidoxime. Cantharidoxime dissolves unchanged in soda, but on boiling the solution ammonia is evolved. The *silver-derivative*, $C_{10}H_{12}O_4NAg$, crystallizes in quadratic prisms; the *methyl ether* forms large, colourless prisms melting at 134°.

Cantharic acid yields a white *silver salt*, and a *methyl salt* boiling at 210–220° under 50 mm. pressure. With hydroxylamine, this acid forms *cantharoximic acid*, $C_{10}H_{13}O_4N$ (isomeric with cantharidoxime), crystallizing in colourless, quadratic scales, which melt with decomposition between 175 and 180°. When heated with hydrochloric acid at 150°, cantharic acid and hydroxylamine are re-formed, together with a small quantity of an oily product having the properties of an aldehyde.

When cantharic acid is heated at 140–150° with dimethylaniline and zinc chloride, carbonic anhydride is evolved, and a leuco-base obtained which forms a colourless crystalline mass having basic properties, and becoming green on contact with the air. Its *platinochloride*, $C_{22}H_{32}ON_2,H_2PtCl_6$, forms orange crystals. When oxidized, the base forms colouring matters, the colour varying with the oxidizing agent employed. Thus braunite and dilute sulphuric acid produce a green, chloranil or arsenic acid in acid solutions a violet colour. Such a condensation of an aromatic carboxylic acid with dimethylaniline, accompanied by the evolution of carbonic anhydride, only takes place when the acid contains the α-ketone-group, CO·COOH.

From the results of his experiments, the author concludes that both cantharidic and cantharic acids must contain this group, and their formulæ must therefore be $C_8H_{13}O_2{\cdot}CO{\cdot}COOH$ and $C_8H_{11}O{\cdot}CO{\cdot}COOH$ respectively.

* From *Ber.*, xix., 1082–1089. Reprinted from the *Journal of the Chemical Society*, August.

SIAM GINGER.

Mr. Watson, of Kew, writing to the *Gardeners' Chronicle* (July 31), says:—"Amongst the collection of fruits, etc., shown by the Siam Commission at the International Health Exhibition, held at South Kensington in 1884, were some roots labelled 'Ginger.' These were obtained for the Kew Museum, but one of them being alive was planted to grow, and it is now bearing stems five feet high, and is in flower. On comparing it with the drawings and specimens in the herbarium, Mr. Baker has identified it with a specimen labelled 'Alpinia sp., Bangkok,' which was collected by Sir R. Schomburgk in 1864, and which is very near to *A. allughas*, also a native of Siam, where, according to Schomburgk, it is cultivated for its cardamomum-like fruits, and is known as *Luk-Reu*, or bastard cardamom. Under the name of galangal, *A. officinarum*, a Chinese species, is cultivated for the sake of its aromatic rhizomes, and this unnamed species now in flower at Kew is apparently largely cultivated by the Siamese as a substitute for ginger. The rhizome is very thick, slightly flattened, and not so freely branched as in common ginger; it has the pungent aromatic properties of ginger, so far at least as could be told by tasting it. There is some reason for believing that the Chinese ginger of commerce is not obtained from *Zingiber officinale*, the source of Jamaica ginger, but from a species of *Alpinia*, and possibly this unnamed one at Kew. Plants of true Chinese ginger are now growing at Kew, and these may soon flower; at present they have the same habit, broad leaf and rhizome, of the Siam plant. In *Zingiber officinale* the inflorescence is borne on a separate short stem without leaves, the barren stems being about three feet high, and clothed with narrow spear-shaped foliage; in *Alpinia* the flowers are borne in panicles on the ends of the stout leaf-stems, the well-known *A. natans* and the newer *A. mutica*, both beautiful garden plants, being familiar examples."

PIPERONAL.*

This is an aldehyde, corresponding to piperonilic acid, obtained as a product in the oxidation of piperine. It occurs in the form of small, white, prismatic scales, possessing a strong odour resembling that of vanilla. A small quantity placed upon the tongue produces a sensation analogous to, but more persistent than, that caused by mint, and it is more irritating to the mucous surfaces than is the latter. It melts at about 125° F., and at a higher temperature volatilizes without leaving any residue. When ignited, the flame and smoke resemble the appearance of burning camphor. It is insoluble in cold water, but in hot water it melts, and looks like drops of oil; it dissolves readily in alcohol and ether. Dr. Riccardo Frignani has made a number of experiments with this substance (*Giornale Internazionale delle Scienze Mediche*, No. 2, 1886), as a result of which he states that it possesses both antipyretic and antiseptic properties. The antipyretic action is not of the most active or energetic kind, yet is sufficient in many cases. It is best given in 15-grain doses, repeated every two hours for three or four times a day, but much larger and more frequent doses are well borne. The most noteworthy disagreeable effects are nausea, eructations, and dryness of the throat. Its antiseptic action, however, the author states, is much more marked, and, since it is innocuous to the system, even when given in doses of ½ to 1 drachm, he believes that it is deserving of a high rank among drugs of this class.

* From *New York Med. Rec.*, May 15. Reprinted from the *Therapeutic Gazette*, June 15.

The Pharmaceutical Journal.

SATURDAY, AUGUST 14, 1886.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W.. Envelopes indorsed "Pharm. Journ."*

THE BRITISH MEDICAL ASSOCIATION.

ON Tuesday last the British Medical Association for a second time commenced an Annual Meeting in Brighton. Thirty-five years that have elapsed since the previous visit have been marked by a development of the Association comparable with even the marvellous growth of London-super-mare during the same time. Twelve hundred members, which constituted the strength of the Association in 1851, have been multiplied to nearly twelve thousand, and the organization is now stretching out its arms towards the colonies and India. Notwithstanding the prevailing depression the Council was able to report a balance of income over expenditure exceeding three thousand pounds. The circulation of the Journal of the Association still continues to increase and the Council bestows some well-deserved words of commendation upon its editor, Mr. ERNEST HART, on completing his twentieth year of office. It is worthy of notice that it appears from the accounts that the Journal costs the Association about two thousand pounds a year in excess of the receipts on account of advertisements and sales. Of the other expenditure about three hundred pounds were devoted during the year to grants in aid of scientific research, and about twice that amount was spent on the collective investigation of disease, but the Council appears to consider that the time has come for careful consideration of this latter form of expenditure from a financial point of view.

The address of the incoming President, Dr. WITHERS MOORE, was delivered on Tuesday evening in the Dome of the architectural curiosity of Brighton famous as the Pavilion. The principal passages of the address are reported in another part of this Journal, and it will be found eminently worthy of perusal. It consisted essentially of a series of protests uttered with no uncertain sound. Gratuitous medical relief, as at present dispensed, was deprecated as a demoralizer of the poor and an incubus upon the profession. The stationary position of medical fees was contrasted with the advance in legal and other professional fees since the time of Queen ANNE, as well as the improved equipment of the medical man for his work. But the principal portion of the address was devoted to a consideration of the question "Is it for the good of the human race, "considered as progressive, that women should be "trained and admitted to compete with men in the "ways and walks of life from which heretofore they "have been excluded by feeling and usuage, as being "unsuited to their sex?" This question Dr. MOORE answered emphatically in the negative, on the ground that the influence of the preliminary training for such competitive work, and the subsequent practice of it, cannot fail to have upon women the effect of indisposing them towards, and incapacitating them for, their own especial function, assigned to them by nature, in the maintenance and progressive improvement of the human race. This position will no doubt be the subject of vigorous attack by advocates of the opposite view; but it must be admitted that the speaker has fortified it strongly by the quotation of important medical and physiological testimony.

On Wednesday morning the various sections began their work with addresses from the respective Presidents. The address in Medicine was delivered by Dr. JOHN S. BILLINGS, of Washington, the subject of it being "Medicine in the United States." From statistics quoted it seems evident that the medical profession in the United States is much overcrowded even as compared with its position in this country; for whilst in Great Britain the proportion is rather less than six medical men to ten thousand of the population, across the Atlantic there are seventeen medical men to the same number of possible patients. This was attributed by the speaker to a low standard of education and the absence of efficient legal restrictions as to the qualifications that shall give a man the right to practice. According to Dr. BILLINGS there are in the United States, besides schools of a high character, other schools of which the main object is to give the minimum amount of instruction that will enable a man to commence the practice of medicine without much danger of making such glaring and serious blunders as will be readily detected by the public. Entrance to the profession is said to be obtained through more than a hundred gates and a number of turnstiles, whilst a good deal of the ground is compared to unenclosed common. The discussion of methods of improving this condition occupied a considerable portion of the address, the remainder being devoted to some interesting vital statistics. The section of Pathology was addressed by Dr. DRECHSFELD, who claimed that there is no other branch of medicine that is making such rapid strides or covers so large a field, and referred especially to the increase in knowledge respecting the pathological importance of micro organisms. In the section of Public Medicine, Dr. R. P. B. TAAFE dealt with the subject of smoke abatement in towns and the decrease in the death-rate during the last fifteen years. In speaking of the latter he referred especially to the subject of infantile diarrhœa and strongly con-

demned the practice common among nurses of always attempting to soothe a crying child by feeding it, as frequently resulting in serious injury to the digestive functions. The subject chosen by Mr. ERICHSEN for the section of Surgery was the progress surgery has made since the introduction of anæsthetics. This he emphasized by asking his hearers to compare the work of ROBERT LISTON on practical surgery, published in 1846, immediately before the application of anæsthetics to surgical practice, with any manual of the present day. Dr. LAUDER BRUNTON, also, in the section of Pharmacology and Therapeutics, claimed that there had been considerable progress made in that department. On looking back twenty years and noticing the advance of pharmacology since CRUM BROWN and FRAZER'S experiments directed it into a new path, he felt warranted in expressing the hope that twenty years more would make it possible to so ascertain the condition of patients that, either by the modification of a single remedy, or by the proper admixture of remedies, or by suitable changes in the diet or surroundings, a desired action might be ensured.

PROPOSED PHARMACEUTICAL LEGISLATION IN FRANCE.

IT will be remembered that in France, as in this country, pharmaceutical legislation has been anticipated as imminent for three or four years past. Last year progress was so far made that a legislative committee, of which M. NAQUET was the reporter, drew up a Bill that seemed to meet with considerable acceptance amongst those most concerned; but the session came to an end before it became law. This year the subject has been again dealt with by a committee, which has drafted a Bill that has been communicated to the Ministers of Public Instruction and of Commerce for their observations. It differs in several respects from the Bill of last year, and so eminent an authority as M. PETIT has expressed the opinion that it contains certain articles that if passed would ruin pharmacy in France.

The Bill continues the monoply of the practice of pharmacy in France to persons possessing a pharmacist's diploma obtained in France or in a French colony, but it provides for the suppression of the diploma of the second class, and would meanwhile allow pharmacists possessing that diploma to practise where they please. A pharmacist before taking possession of a pharmacy would have to make a declaration and produce his diploma before the prefect of the arrondissement. He would not be able to carry on more than one pharmacy, neither would he be allowed to deal in articles unconnected with the art of healing; his name must appear on his labels, and special labels must be used for medicines for external use. A pharmacist would be allowed to associate a non-pharmacist with him in business, provided that the pharmacy were *de facto* conducted by a qualified man; but this permission is not extended to similar association with a medical practitioner or a veterinarian, which is prohibited. The practice by one person of both medicine and pharmacy is forbidden, except in cases of urgency, or when the nearest pharmacy is five kilometres distant, when the medical man might supply medicine, but not keep an open pharmacy. Besides the supply of official medicines under the names given to them in the Codex, and of medicines on the prescriptions of a medical man, the pharmacist would be allowed to supply any simple or compound medicine, without incurring penalties under the laws as to the illegal practice of medicine, provided that they bear his label and the name of the active substance or substances forming its basis. From this permission, however, are excepted certain poisons and medicines containing them, to be specified in the Codex, which are only to be supplied on the order of a qualified medical man. Certain harmless medicines in common use, a list of which is also to be inserted in the Codex, would be free to be sold by any person, but the sale of all other drugs and medicines in medicinal quantities would be restricted to pharmacists. It will be permitted, however, to hospitals religious communities, benefit societies, commercial companies and co-operative associations to have pharmacies, provided that they are under the personal supervision of a qualified pharmacist, or in the case of a hospital of the medical staff; but they would not be allowed to supply the general public. It is particularly against this clause, and the clauses allowing the association of an unqualified person with a pharmacist and the supply of medicines by medical practitioners, that the opposition of the French pharmaceutical body will be directed. In case of death of a pharmacist the widow or heirs would be allowed to carry on the business under a qualified manager for a period not exceeding twelve months.

Another part of the Bill provides for the publication every ten years of an official formulary, or Codex, written in Latin and French. The editing of this Codex would be entrusted to a permanent Committee appointed by the Ministers of Public Education and of Commerce, and consisting of an equal number of professors of the faculties of medicine, professors of the superior schools of pharmacy and pharmacists holding a pharmacy, with the addition of two veterinarians. It is proposed that a new edition of the Codex shall be published one year after the law comes into force, and that also, if necessary, supplements shall be issued yearly between the times fixed for the new editions. This voluntary recognition by the State of the service pharmacists are capable of rendering on such a committee is an example that might be profitably followed in this country. The penalties for infraction of the law would vary from sixteen to three thousand francs.

BRITISH PHARMACEUTICAL CONFERENCE.

We are informed by the Honorary General Secretaries that the following papers have already been promised for the meeting at Birmingham on the 31st inst.:—

1. Crystallized Aconitine. By J. Williams, F.I.C., F.C.S.
2. Quinological Work in the Madras Cinchona Plantations. By David Hooper, F.C.S.
3. Certain Derivatives of Hymenodictyonine. By W. A. H. Naylor, F.C.S.
4. Note on Iodoform. By D. B. Dott, F.R.S.E.
5. Note on Compound Spirit of Ether. By D. B. Dott, F.R S.E.
6. Note on Artificial Codeine. By D. B. Dott, F.R.S.E.
7. Lanolin. By A. H. Allen, F.I.C., F.C.S.
8. Notes on Trade Samples of Citrate of Iron and Quinine. By F. H. Alcock, F.C.S.
9. The Belladonna Liniment of the British Pharmacopœia. By Francis Ransom.
10. Notes on the Estimation of Emetine. By H. W. Jones, F.C.S.
11. The Assay of Elaterium. By Francis Ransom and H. W. Jones, F.C.S.
12. A Chemical Examination of the Fruits of Daphnidium Cubeba. By J. O. Braithwaite and E. H. Farr.
13. A False Pareira Brava. By W. Kirkby, F.R.M.S.
14. Proximate Constituents of Erythroxylon Monogynum Leaf. By A. E. Tanner.

Papers have also been promised by A. W. Gerrard, F.C.S., and Louis Siebold, F.I.C., F.C.S.

We take the opportunity of recommending that applications for tickets should be made to the Honorary Local Secretary, Mr. Thompson, before the 23rd instant, in order to allow time for perfecting the necessary arrangements.

Reference has already been made to the exhibition that is to be held in Bingley Hall during the forthcoming meeting of the Pharmaceutical Conference and British Association in Birmingham, in connection especially with the reproduction in it of an apothecary's shop of the olden time. Independently of this exhibit there will apparently be much at Bingley Hall to repay a visit. According to a recent statement of Mr. Lawley Parker, the Chairman of the Exhibition Sub-Committee, there will be shown in operation no less than thirty distinct processes of local industry, some dating back four centuries. The motive power will be an exhibition in itself, as it will include the use of steam, gas, water, electricity and petroleum. It is hoped that the exhibition will be ready to open on the 26th inst.

* * *

In connection with the coming meeting of the British Association, a "special intimation" has been issued by the local secretaries to the effect that, in order to place the general body of members and associates on an equal footing with regard to the choice of seats in the Town Hall for the evening meetings, after the requisite provision has been made for the officers the other seats will be allotted by ballot among those who have signified their intention to be present and paid their subscriptions before 6 p.m. on Monday, August 30. The evening meetings will be the President's Address on Wednesday, the 1st of September; a lecture by Professor W. Rutherford, on "The Sense of Hearing," on Friday, the 3rd of September; and a lecture by A. W. Rucker, Esq., on "Soap Bubbles," on Monday, the 6th of September.

About a fortnight since, at the Stratford Petty Sessions, two cases of prosecution under the Sale of Food and Drugs Act, for selling coffee containing in one case 65 per cent. and in the other 45 per cent. of chicory, were summarily dismissed by the magistrates, without any reason being given. These inexplicable decisions have called forth some comment in the public press, including a series of letters in the *Times*, from which it would appear that the impugned samples were of good quality rather than otherwise, as compared with the average mixtures sold associated with the name of coffee. Certainly it has been stated, and we have reason to believe truly, that forty-three samples of coffee and coffee mixtures bought in London during March and April last yielded upon analysis an average of not more than 50 per cent. of pure coffee. If, as is asserted, admixtures consisting principally of chicory or other substances with coffee are indispensable to the public palate, it is not at all necessary that they should be sold and charged for as pure coffee, or even as "coffee mixtures." In the words of one of the correspondents, "the law ought certainly to be altered, and admixtures ought to be sold under the name of the preponderant substance they contain." Instead of this, the law affords a *quasi* protection to the fraud, by authorising the collection of revenue through a "coffee mixture" label, which covers the sale of a mixture containing 95 per cent. of unnamed matter equally with that of one containing only 5 per cent. The returns just issued show that during the year ending on March 31st, the duty paid on "coffee mixture" labels amounted to nearly four thousand pounds. This was a decrease as compared with previous years, but whether it was due to a decrease in the sale of mixtures, or a partial cessation in the proper marking of them is not clear. The case is not unlike that of the patent medicine stamp, which covers sales that would not otherwise be legal.

* * *

Some little excitement has been aroused in France by the fact that a Bill recently introduced into the Chamber of Deputies by the Minister of War contains a provision for the suppression of the military pharmacists. This corps has for several years past been in a state of chronic uneasiness, and in 1882, after an independent existence during ninety years, it was placed under the control of the medical department. Since that time the ranks have been reduced by only filling up some of the vacancies as they fell in, the number of pharmaciens militaires being now one hundred and eighty-four. The subject was under the consideration of the Paris Society of Pharmacie at its last meeting and was referred to a committee.

* * *

We have been requested to correct an error that has crept into the report of Mr. Morris's paper on "Tropical Fruits," recently quoted from the *Gardener's Chronicle*. Mr. Morris had written (see p. 88, col. ii.), "The litchi, rambutan, and longan of the East Indies are co-related by the genip of the West Indies, all of which belong to the same natural order, Sapindaceæ." But through an oversight, the editor of our contemporary spoilt the point of the remark by identifying "genip" with *Genipa americana*, which is a native of Brazil, and is not a Sapindaceous, but a Rubiaceous plant. The botanical name of the genip plant is *Melicocca bijuga*.

Pharmaceutical Society of Ireland.

The monthly meeting of the Council of the Society for August was not held, owing to the attendance being insufficient for a quorum.

British Medical Association.

The fifty-fourth Annual General Meeting of this Association was opened at Brighton on Tuesday last, when the Mayor entertained the council and many members at luncheon in the Royal Pavilion. A General Meeting was held in the afternoon at three o'clock, at which the outgoing President, Dr. W. T. Edwards, resigned the chair to the President-Elect, Dr. Withers Moore, after which the Report of the Council was adopted. At eight o'clock in the evening the members again assembled to hear the President deliver his address, the principal passages in which are here given.

The President's Address.

After expressing his gratitude for the honour done him in placing him in the Presidential chair, Dr. Withers Moore remarked that much had changed since the day—thirty-five years ago—when the Association held its former and only meeting at Brighton; and the Waterloo veteran, Dr. Jenks, then in the chair, rose with diffidence, as he himself said, to address the representatives of such a body—a body the members of which were then hundreds, where they were now thousands. "Much has changed," Dr. Withers-Moore continued, "but unfortunately we cannot reckon among the changes the removal of certain serious evils in the organization and working adjustments of our medico-political constitution and economy which Dr. Jenks pointed out and complained of thirty-five years ago, and could he resume the chair, he would find with surprise and disappointment they have to be complained of still. 'The Medical Reform,' in Dr. Jenks's address, a 'fruit already ripe,' proved, after five years' waiting, to have been plucked too soon; and, after all the long battle of the examining boards, there is still room for doubting whether a ripe fruit has been gathered even yet. The medical aspects of Poor-law administration, the 'degrading and ill-paid appointments not accepted merely, but made objects of eager competition,' the unsolved question of retiring pensions, are not these still with us? Gratuitous medical relief—that demoralizer of the poor, and incubus upon the profession, 40,000 cases of which occur in Brighton every year—that 'indiscriminate abuse of medical charity' which has been well characterized as 'eating out whatever of manly independence may have been left in the poorer classes, and at the same time rendering the struggles of the general practitioner more and more severe,' is it less rife than heretofore? And one other point I cannot help adverting to, less for our own sakes than for its issues as affecting our patients, that is, the public generally—I mean our honoraria. Had but medical fees since Queen Anne's time run a course like that of the legal ones, or had the heads of our profession in London followed the lead of their Parisian brethren, in raising the rate of their remuneration, how great (in these days of railway facilities and consequent influx of country patients into the metropolis) would have been the gain to all parties concerned? The leading practitioners, with less labour, would have had larger remuneration, and an amount of work not overpassing human capacities. Their patients, fewer in number, would receive fuller attention, and far more frequently (bringing up their own medical advisers) would have the great benefit of a real consultation. Practitioners not as yet of the very first eminence would, with more patients, have multiplied opportunities of exercising their skill, and thereby increasing it; and, as the circle went on widening, there would ensue such a diffusion of work (and wages) as would have the effect of largely augmenting the total amount of practical power and promptitude in the profession, and thereby also of practical benefit at once available for the sick and suffering world of their patients. However, if (less, as I said, to our own loss than to that of our patients) we have been making, since the Association assembled in Brighton, but little advance to securing towards ourselves a fair day's wages, the case is far otherwise as to our equipment for a fair day's work. When we think of hygiene raised into a science; of a profound pathology, surely based upon physiology and histology, aided by morbid anatomy, to the unspeakable advantage of clinical observations any diagnosis; of the unwearied observation of the action of remedies on man and animals, which is changing therapeutics from empirical to scientific; of the marvels of etiology, and especially of bacteriology, which may be said to have had its birth some years within the thirty-five, and which is already threatening an entire reversal in our views of the pathology of many diseases of ordinary occurrence among us—thinking, I say, of all these and the like, it may, perhaps, seem but suitable that I should attempt some summary of the wonderful series of our successes, and that I should build a bridge, as it were, reaching from our former meeting here to our present one. Arch by arch, however, that bridge has for the most part risen already, in the able addresses delivered year by year by my honoured predecessors and their distinguished coadjutors. Besides, it seems to me that on a public and, in a certain sense, popular occasion, such as the present, it may be well that your President should devote a large portion of his allotted time to some object of current and popular interest, upon which, as custodian of the public health, instruction and guidance may naturally be looked for from us. And such a course may be taken all the more suitably when, as on the present occasion, you have bestowed the honour of your presidency, not upon some famous scientist or specialist, but upon one of those whose humble (yet not less needful) function it is to take the knowledge which, at the feet of scientists and specialists, they have acquired and apply it to the actual use and benefit of mankind in the persons of their patients. Such a subject—at once popular and professional—may be found I think, in what is called the higher education of women, meaning by 'higher education' one which aims at raising women (as it imagines) to the masculine level, by fitting them for the exercise of brain-power in competition with men. This, then, is our question. Is it for the good of the human race, considered as progressive, that women should be trained and admitted to compete with men in the ways and walks of life, from which heretofore (as unsuited to their sex) they have been excluded by feeling and usage, and largely, indeed, by actual legislation? Will it be well that we should have female doctors and divines, lawyers, mathematicians, and astronomers, professors, publicists, and Ministers of State? Might not one add female generals and commanders of armies? For Amazonian ambitions are still alive; witness the Dowager Maharanee of Baroda's recent offer to the Viceroy of India of a corps of women warriors to aid him in solving the Afghan frontier difficulty. Will it be well, then, that our women should be equipped and encouraged to enter into the battle of life, shoulder to shoulder, and on equal terms with men? Do the 'rights of women,' does 'justice to women,' demand it? Do the 'duties of women' (due to the whole human race, and to their own sex and selves as a part of that whole) admit it? The old chivalrous ideal, certainly, was a very different one. It was that sweat of the brow and sweat of the brain should be mainly masculine; that man should go forth to adventure and achievement, 'to his work and to his labour until the evening,' while woman should wait at home and welcome him back again, and lend her ear to his tale of doing or of suffering, and reward him with her gentle sympathy and loving appreciation.

'She loved me for the dangers I had passed;
'And I loved her that she did pity them.'

To the men of 'the old time before us' those words of Othello's seemed merely natural. Their thought was, not that woman should have her fair chance with man in the battle of life, but that she should be shielded and sheltered from that rude battle, if possible, altogether; that man should fight it for her. But, if we are to 'change all that,' then those who enter into the conflict where cuffs are going—man or woman—must be content to be cuffed and to cuff back again; and the age of chivalry and chivalrous courtesy (so far as woman is concerned), with all which that courtesy did to make life noble and beautiful, must indeed be held finally to have passed away." Dr. Withers Moore next laid before his hearers his reasons for replying in the negative to the question proposed. "I think that it is not for the good of the human race," he said, "considered as progressive, that women should be freed from the restraints which law and custom have imposed upon them, and should receive an education intended to prepare them for the exercise of brain-power in competition with men. And I think this because I am persuaded that neither the preliminary training for such competitive work, nor the subsequent practice of it in the actual strife and struggle for existence, can fail to have upon women the effect of more or less (and rather more than less) indisposing them towards and incapacitating them for their own proper function—for performing the part, I mean—which (as the issue of the original differentiation of the sexes) nature has assigned to them in the maintenance and progressive improvement of the human race. This 'higher education' will hinder those who would have been the best mothers from being mothers at all, or, if it does not hinder them, more or less it will spoil them. And no training will enable themselves to do what their sons might have done. Bacon's mother (intellectual as she was) could not have produced the 'Novum Organum,' but she—perhaps she alone—could and did produce Bacon." Dr. Withers Moore next proceeded to set forth facts and to cite authorities in support of his argument. "'A man's fate,' said an Oxford tutor, looking back upon his college experience, 'a man's fate all depends on the nursing—on the mother, not on the father. The father has commonly little to do with the boy till the bent is given and the foundation of character laid. All depends on the mother.' Galton, in his 'Hereditary Genius,' after citing as examples of remarkable women, the mothers of Bacon, Buffon, Condorcet, Cuvier, D'Alembert, Gregory, Watts, and others, adds:—'It appears, therefore, to be very important to success in science that a man should have an able mother. . . Of two men of equal abilities, the one who has a truth-loving mother would be more likely to follow the career of science.' Again, who can read in Lewes's 'Life of Goethe,' the poet's early history, with its absorbingly interesting account of the training he received from his mother, without feeling how much the marvellous material owed to its marvellous manipulation; how what the son grew into was very largely what his mother made him into, or, at lowest, prepared and fitted—in fact, enabled—him to grow into? What if Goethe's mother had never married? Would he have written 'Faust'? Mr. Herbert Spencer, in his 'Principles of Biology,' after noticing that too much bodily labour probably renders women less prolific, proceeds as follows:—'That absolute or relative infertility is generally produced in women by mental labour carried to excess is more clearly shown. Though the regimen of upper class girls is not what it should be, yet, considering that their feeding is better than that of girls belonging to the poorer classes, while in most respects their physical treatment is not worse, the deficiency of reproductive power among them may be reasonably attributed to the overtaxing of their brains, an overtaxing which produces a serious reaction on the physique. This diminution of reproductive power is not shown only by the greater frequency of absolute sterility, nor is it shown only in the earlier cessation of child-bearing; but it is also shown in the very frequent inability of such women to suckle their infants. In its full sense, the reproductive power means the power to bear a well-developed infant, and to supply that infant with the natural food for the natural period. Most of the flat-chested girls who survive their high-pressure education are unable to do this. Were their fertility measured by the number of children they could rear without artificial aid, they would prove relatively very infertile.' Sir Benjamin Brodie says:—'The mind, in the case of girls in the affluent classes, is educated at the expense of the physical structure, they spending more time in actual study than their brothers.' The late earnest and scholarly Dr. Ed. H. Clarke, U.S.A.), writes:—'It is not asserted that all the female graduates of our schools and colleges are pathological specimens, but it is asserted that the number of those graduates who have been disabled in a greater or less degree by these causes is so great as to excite the greatest alarm, and to demand the serious attention of the community. If these causes should continue for the next half-century, and increase in the same ratio as they have for the last fifty years, it requires no prophet to foretell that the women who are to be mothers in our Republic must be drawn from transatlantic homes.' There is hardly an American physician who has specially treated the diseases of women who does not corroborate these words. For instance, Dr. Emmett:—'I hold that it is not practicable to to educate a girl by the methods found best for a boy, without entailing serious consequences.' Dr. Goodall observes:—'From the age of eight to that of sixteen our daughters spend most of their time in the unwholesome air of the recitation room or in poring over their books when they should be at play. . . . As the result the chief skill of our milliners seems to be directed towards concealing the lack of organs needful alike to beauty and maternity, and the girl of to-day becomes the barren wife or invalid mother of to-morrow. Surely a civilization which stunts, deforms, and enfeebles must be unsound.' So, too, Professor Loomes, of Yale College, looking at the increasing deterioration of American girls, remarks:—'The cry in our colleges and time-honoured universities is, "Open your gates that the fairer part of creation may enter and join in the mental toil and tournament." God save our American people from such a misfortune.' And our own lamented Dr. Thorburn, of Owens College, having said that 'The struggle for existence on the part of single women, and the capacity of a few of their number to ignore with safety the physiological difficulties of the majority, are demanding opportunities for education, and its honourable as well as valuable distinctions, which cannot and ought not to be refused them,' is constrained to add, 'Unfortunately, however, up to this time no means have been found which will reconcile this with the physiological necessity for intermittent work by the one sex. It becomes, therefore, the duty of every honest physician to make no secret of the mischief which must inevitably accrue, not only to many of our young women, but to our whole population, if the distinction of sex be disregarded.' In like strain, Mr. Lawson Tait, after declaring himself an advocate of women's rights, says:—'At the same time I cannot help seeing the mischief women will do to themselves and to the race generally if they avail themselves too fully of their rights when conceded. . . . To have only the inferior women to perpetuate the species will do more to deteriorate the human race than all the victories of Girton will do to benefit it. This over-training of young women is wholly unnecessary in the interests of human progress, and it is most mischievous alike to themselves and to humanity. . . . Exceptional culture will infallibly have the tendency to remove the fittest individuals, those most likely to add to the production of children of high-class brain power, from out of the ranks of motherhood.'" In giving evidence as to results, the President said that "Dr. Hertel, speaking of over-pressure in the

high schools of Denmark, writes that 'of the boys 29 per cent., and of the girls 41 per cent., were found to be in a sickly state of health. The diseases most prevalent were anæmia, scrofula, and headache.' In confirmation of Dr. Hertel, evidence of Professor N. J. Bystroff was given, who has examined 7478 boys and girls in the St. Petersburg schools during the last five years, and found headache in 868—that is 11·6 per cent. He states that the percentage of headache increases in a direct progression with the age of the children, as well as with the number of hours occupied by them for mental labour; thus, while headache occurred in only 5 per cent. of the children aged eight, it attacked from 28 to 40 per cent. of the pupils aged from fourteen to eighteen. The Professor argues that an essential cause of obstinate headache in school children is the excessive mental strain enforced by the present educational programme, which leaves out of consideration the peculiarities of the child's nature, and the elementary principles of scientific hygiene. Even as regards the immediate object—mental progress—it has been well remarked in the *Lancet* that 'a system which leads to such disastrous results as regards bodily health is no less pernicious in checking mental advance and improvement; for at no epoch of life is the necessity for maintaining the balance between construction and destruction of nervous energy greater than in the period immediately preceding adolescence; and it is just at this time that keen competition is most severely felt in the subjecting, as Dr. Ross remarks, the latest evolved portion of the nervous system to a strain so great that only those possessing the best balanced and strongest system can escape unscathed.' Dr. Tuckmann (Cleveland, U.S.) relates that in 1881, 'of 800 pupils in a particular high school, nearly 25 per cent. of the girls, and 18 per cent. of the boys, from one cause or another, had withdrawn; and that it was found, on investigation, that of the girls so withdrawn 75 per cent. had left wholly or in part on account of ill-health—were in poor health while at school. Here it appeared that, whether from necessity or from choice, the girls studied more hours out of school than the boys did.' Quite in accordance are the results arrived at by the extensive investigations of our able co-associate, Sir Crichton Browne. But, indeed, there are facts daily emerging in this direction of such painful significance that I might almost say a cry of remonstrance has arisen from one end of England to the other. All great dangers are apt to be greatly exaggerated. This one of overtraining may, perhaps, not have been an exception to that rule; but the danger does exist, and is a great one; and the sequence of punishment after transgression is sure and certain. Degeneration and impaired nutrition come in place of development; evolution passes into dissolution. And with mental training the danger is far greater than with bodily training. The rules of health, sedulously attended to during the latter, are too often disregarded in the former, and thus the nervous system is developed at the expense of the nutritive. In the case of young children the consequences of over-training are things of frequent observation. The wonderful Westminster boy, 'the learned pig,' was an imbecile before manhood. In our contemporary school reports, how many do we find resembling that of Mr. Tyson (Penrith School Board) respecting the deaths of two children, 'the immediate cause in both cases being brain fever, undoubtedly resulting from over-pressure at school.' Again, to come back to the special subject of this address, 'There can be no doubt,' writes Mr. Alderson, one of Her Majesty's Inspectors of Schools, 'that the work required by the Code presses more heavily upon girls than boys. They work more willingly, and they feel the strain more. They require to be protected from their own willingness to study.'" In conclusion, the President summed up his argument as follows:—"Excessive work, especially in youth, is ruinous to health, both of mind and body; excessive brain work more surely so than any other. From the eagerness of woman's nature, competitive brain work among gifted girls can hardly but be excessive, especially if the competition be against the superior brain weight and brain strength of man. The resulting ruin can be averted—if it be averted at all—only by drawing so largely upon the woman's whole capital stock of vital force and energy as to leave a remainder quite inadequate for maternity. The Laureate's 'sweet girl graduate in her golden hair' will not have in her the fulfilment of his later aspiration—

'May we see, as ages run,
The mother featured in the son.'

The human race will have lost those who should have been her sons. Bacon, for want of a mother, will not be born. She who should have been his mother will perhaps be a very distinguished collegian. That one truism says it all—women are made and meant to be, not men, but mothers of men. A noble mother, a noble wife—are not these the designations in which we find the highest ideal of noble womanhood? Woman was formed to be man's helpmate, not his rival; heart, not head; sustainer, not leader. Many times, indeed, woman's fate has set her in the foremost place; in some of those times, no doubt, such place has been well and grandly filled by her. Yet, even then, our admiration is not untinged with compassion. Even in this year of approaching or commencing jubilee, is it not so with us when we think of that Crown, Royal and Imperial, which, splendid as it is, has so long been left 'a lonely splendour?' 'Victoria Regina et Imperatrix'—bravely, proudly, gloriously is the burden borne; but would she who knows its weight wish a like weight to be laid upon any daughter? Let this address come back to the humbler life which more belongs to it. 'I am king of the household, and thou art its queen,' says the happy husband in Longfellow. Permit me to conclude to-day with King Solomon's eulogy for the happy home queen, the happy wife:—'Who can find a virtuous woman?—for her price is far above rubies. The heart of her husband doth safely trust in her; she will do him good and not evil all the days of her life. She riseth also while it is yet night, and giveth meat to her household, and a portion to her maidens. She girdeth her loins, and strengtheneth her arms. She perceiveth that her merchandise is good; her candle goeth not out by night. She layeth her hands to the spindle, and her hands hold the distaff. She stretcheth forth her hands to the poor; yea, she reacheth forth her hands to the needy. Her husband is known in the gates, when he sitteth among the elders of the land. Strength and honour are her clothing; and she shall rejoice in time to come. She openeth her mouth with wisdom; and in her tongue is the law of kindness. She looketh well to the ways of her houshold and eateth not the bread of idleness. Her children arise up, and call her blessed; her husband also, and he praiseth her. Favour is deceitful, and beauty is vain; but a woman that feareth the Lord, she shall be praised.'"

Proceedings of Societies in London.

ROYAL INSTITUTION OF GREAT BRITAIN.

The Electrical Deposition of Dust and Smoke, with Special Reference to the Collection of Metallic Fume, and to a possible Purification of the Atmosphere.*

BY PROFESSOR OLIVER LODGE, D.SC.

The research of which I have the honour to speak in this theatre to-night takes it origin in an observation made by Dr. Tyndall, frequently shown by him in this place, and of which he has published an account in your 'Proceedings' for 1870.

* Address delivered at a Weekly Evening Meeting, Friday, May 28.

The phenomenon discovered by Dr. Tyndall was a dark or dust-free space formed over a hot body when held in strongly illuminated dusty air. A flame or hot poker held beneath the concentrated beam of an electric lantern shows it perfectly, and the appearance is as of wreaths of black smoke.

That it is not smoke, but anti-smoke, is perhaps rendered most evident by observing the utterly different appearance of smouldering brown paper held in the same place. In fact it is manifest that what we see in a sunbeam is not the beam itself but the dust illumined by it. It is somewhat misleading, though customary, to speak of the motes as rendering a sunbeam visible ; it is really the beam which renders visible the motes. And the more motes there are, the more there is to see, naturally ; hence smoke in the beam greatly increases its luminosity, while anything which removes or expels the dust-particles destroys its luminosity, leaving a clear dark channel.

Now what is the cause of this dust-free space? The first idea was that the dust is burned and destroyed by the flame. But this explanation is negatived by using a moderately warm body, say a hot kettle, and noticing that above this also the dark space is perfectly distinct, though narrow.

Dr. Frankland next suggested that much of visible dust consisted of moisture, and that it was dried and rendered invisible by warmth. Both explanations can be at once disproved by replacing common miscellaneous dust of unknown origin by a carefully chosen smoke, say that of burnt magnesium, which is certainly neither volatile nor combustible.

Finally Dr. Tyndall suggested an ingenious mechanical explanation, that the air was dragged up in convection currents faster than its supported dust, which consequently got left behind ; and with this he was content.

So the matter rested until 1881, when Lord Rayleigh re-examined the phenomenon, "not feeling satisfied with the explanation given by the discoverer," and conclusively established the inefficiency not only of all ready-made hypotheses concerning it, but also of those which occurred to himself. A most interesting reversal of the experiment was made by Lord Rayleigh, for, instead of holding a warm body under the beam, he held a cold body above it, and witnessed the formation of a down-streaming dark plane of great sharpness, bordered by bright fringes of extra dusty air, which he attributed to the dew-point being passed and the consequent condensation of moisture upon dust-nuclei.

Three years ago I took up the subject at Liverpool, and, with the active co-operation of the late Mr. J. W. Clark, then acting as demonstrator, repeated all known experiments with minute care, in order to find out the cause of the singular phenomenon.

The results of this research are numerous ; I can do no more than summarize a few of them to-night, though I believe that some of them, if followed up, would lead to results of considerable interest. The first thing we observed was that the ascending dark plane was the extension and upstreaming of a dust-free *coat* which invested the surface of the warm body, and this was really the essential part of phenomenon, the dark plane being merely an upstreaming extension of it. From gently warm bodies the upstreaming dark plane, being made by the uniting of two coats, one from either side of the body, is easier to see than the coats themselves, but they are usually quite distinct, and on the average may be taken as about the hundredth of an inch thick.

Round red-hot bodies the coat is obtrusively evident. We first observed the coat on the concave side of a hemicylinder of sheet copper. We tried this shape in order to disprove Lord Rayleigh's suggested explanation that the dust freeness might be due to the curvature of the stream-lines and centrifugal force. This idea it does disprove most effectively, for the curvature being negative on the inside of the cylinder, dust ought to be thrown towards the body, instead of being kept well away from it, as in fact it is.

It is not easy to project the actual dark coat and plane on to a screen, because the light from the dust particles is but feeble ; but it is possible to send a beam *along* the rod, instead of across, and to show that the dust-free space is more transparent than the surrounding smoky air. In this way a projection of a thick coat and plane, in light, upon the screen, is easily made.

A platinum wire a few inches long is stretched across a glass box, and arranged to be pulled straight at all temperatures. A parallel beam is sent exactly along the wire, and through a lens, the box is filled with brown paper smoke, and a few Grove cells applied.

In trying the experiment one often finds a copy of the appearance imprinted upon the glass wall of the box in smoke, and this dustgraph also serves to illustrate the phenomenon.

It may be convenient here to state, at least roughly, the line of explanation to which we have ultimately been impelled. We regard it as quite certain that the facts serve as another illustration of the kinetic theory of gases, of the same kind as Mr. Crookes's radiometer. The dust particles are kept out of contact with the warm body by means of a differential molecular bombardment on their surfaces. True, the thickness of the coat is far larger than the mean free path of a molecule at the corresponding pressure ; and accordingly no body as big as a radiometer vane could at that distance be acted upon ; but Professor Osborne Reynolds has shown that very minute bodies are susceptible to a bombardment at much greater distances ; and it is, I think, in accord with this theory that dust particles should be repelled from hot bodies over a measurable distance even at ordinary atmospheric pressure, although radiometer vanes would only be acted on at a pressure of a thousandth, or something approach a millionth of an atmosphere. I do not say that this explanation is yet complete, and I am not aware that any one has adopted it. It is, however, pretty clear that there will be an outward pressure from the surface of a hot body,* so long as the air near it is getting warmer : and if convection currents are allowed, the air near a hot body is *continually* in the state of getting warmer.

The main facts which we assured ourselves of may be thus briefly summarized.

1. The dark plane becomes visible over a cylindrical thermometer bulb indicating a temperature only half a degree warmer than the air.

2. The dark coat becomes just visible round a body one degree hotter than the air ; at two degrees it is distinct ; and at five degrees it is fairly thick.

3. The coat enlarges with diminished pressure, and narrows when the pressure is increased.

4. In hydrogen the coat is thicker, and in carbonic acid thinner, than in air.

5. If volatile smoke like volatilized camphor is used, the coats become thicker, though less sharply defined.

6. Round a rod of camphor in ordinary smoke the dust-free coat is extra thick, owing to the extra bombardment of evaporation.

7. Round cold bodies the coat is practically absent, especially on the top of the body ; and if the cold is too great no descending dark plane is formed ; only a bright one.

8. *Liquids* containing solid powder in suspension (*e.g.*, dried ferric oxide in water) form a very narrow dark plane over a moderately warm cylinder. But the thickness of the plane is so slight that it is difficult to observe, and it gets thinner with increase of temperature, instead of thicker as in case of gases ; hence the experimental rod in a liquid must be only gently warmed.

The formation of a descending dark plane in dusty air below a moderately cool body is singular, for it would

* See for instance some experiments of Mr. Crookes on repulsion by hot surfaces, described in 'Nature,' vol. xv., page 301.

not naturally have been expected on the bombardment hypothesis. The dust particles must be driven towards, instead of away from a cold body ; and this fact is obtrusively evident, from the fact that such a body becomes quickly covered with soot in an atmosphere of MgO or other smoke, while a warm body remains clear.

It is easy to illustrate this fact by two black conical flasks, one full of hot water, the other of cold, both put under a bell-jar of thick white smoke. In about five minutes, if they be taken out, it will be found that the hot one is nearly free from soot, the cold one covered as with hoar-frost.

Mr. Aitken, of Edinburgh, has also observed this fact, and has pointed out that it explains the deposition of soot in chimneys, and of lampblack on cold glass. Mr. Aitken's paper in the 'Transactions of the Royal Society of Edinburgh,' for 1884, is a most comprehensive and lucid account of all this part of the subject. His work was concurrent with ours, as related in the 'Philosophical Magazine' for 1884, and it is better described.

Bodies colder than the air in contact with them have the dust in it bombarded on to them ; as is well seen on a wall above hot water pipes, or on a ceiling above a gas-jet. Smoking of the gas-jet will of course provide more material to be deposited, but the dust and smoke naturally (or unnaturally) in the air are usually ample to effect a sufficient blackening, over even a perfectly clear flame. An incandescent electric lamp hung a foot or so under a white ceiling will similarly cause a small black patch.

In rooms warmed by radiation (open fire or sunlight) objects are warmer than the air and keep much dust off themselves ; though the bombardment may not be sufficiently vigorous to overcome the gravitation of the larger dust particles, especially over a flat horizontal surface, where convection is sluggish.

In stove-heated rooms things are liable to be colder than the air, and thus get exceedingly dusty.

The cause of the clearing of smoky air inside a bell-jar by the introduction of a hot platinum wire, or other hot body, as observed by Tyndall, who called it calcining of the dust, is now manifest : the dust is bombarded on to the sides and floor of the vessel by the warmed air. The self-formed picture of dark coat and plane formed on a glass surface when the end of a hot cylinder is held against it is similarly completely explicable.

But, it may be asked, if dust gets driven towards cold bodies instead of away from them, how is it that any dark or dust-free plane forms beneath them ? At very low temperatures I believe it does not, but rather a bright or dusty layer forms instead. From a rod a few degrees below the air a fine dark plane is visible, however, edged by two bright ones. I do not know what Lord Rayleigh's view of this descending plane is, but it may be due to the gravitative settling of the dust through the air immediately beneath the cold body : a thing which is shown to occur by the existence of a thin dark half-coat formed underneath, but not above, such a rod, and by the deposit of dust on its upper surface. The rod shelters the air immediately beneath it from the shower, and so a layer of clear air forms and streams downward continuously. If the downward convection currents are too rapid the settling has not time to occur, and no dark plane is visible.

The original plan of experiment included a series of measurements of the thickness of the dark-coat at different temperatures (both excess and absolute), at different pressures, and in different kinds of gas. This research Mr. Clark had indeed begun to arrange for, but his untimely death last year cut short this part of the investigation. Another very necessary thing is to see how it varies with size of dust particles. Meanwhile I had devoted myself to developing a branch of the subject which we had accidentally hit upon in the course of testing one hypothesis which had at an early stage occurred to us as perhaps a clue to the cause of the phenomenon of the dust free plane. We thought it possible that air in streaming over the surface of the solid might get electrified, and that, from air so electrified, dust might somehow be expelled. To test this hypothesis, we purposely electrified the rod, positively and negatively, to see what happened. A hundred volts or two produced a barely noticeable effect ; positive electrification causing a slight widening, negative electrification, a slight narrowing, of the dust-free coat. But as soon as the potential rose to a few thousand volts, and brush discharge began to be possible, a very violent and remarkable effect was noticed : the dark coat widened enormously and tumultuously, and the whole box was rapidly cleared of smoke.

To specially observe this new phenomenon is very easy. Fill a bell-jar with any kind of smoke : tobacco, camphor, turpentine, magnesia, ammonic chloride, ammonic sulphite, brown paper, steam, phosphoric oxide, lead fume, zinc fume, no matter what, and then discharge electricity into it from a point connected with a Voss or Wimshurst machine, or even with a common fractional machine, the other pole of which is connected with the ground or with the base of the bell-jar.

In a second or two, aggregation of the smoke particles sets in, they form in masses or flakes along the lines of force, and in another instant the jar is clear of smoke : it has all been condensed on the sides and floor of the vessel.

The kind of smoke used is quite immaterial, it is all acted upon in the same way, but to make the effect visible to an audience, it is better te use something which does not dirty or render opaque the glass. Burning magnesium ribbon makes a very good and clean smoke. For experiments on a large scale a cheap smoke is obtained by burning sulphur in the neighbourhood of a pan of ammonia. Whether positive or negative electricity be used seems to make no difference.

Instead of a single point, a double set of points may be used, each connected with one pole of the machine. A round knob will act instead of a point, but not so quickly. Brush discharge, or anything that electrifies the air itself, is the most effectual. When a knob or pair of knobs is used, the lines of force are interestingly mapped out by the dust-flakes.

The cause of the phenomenon is manifest enough. The electrified or polarized particles attract each other, and are attracted by the opposite poles, just as iron filings are influenced near a magnet. In thinking over what manifestations of this aggregating power of electricity were already known, the beautiful observations of Lord Rayleigh on water-jets occurred to me ; though the cause in this case is not so clear. The experiment is not so well known as it should be, and, being an extremely simple one, I venture now to show it. A vertical water-jet two feet high, from an opening one twentieth of an inch in diameter, scatters into drops and falls as a shower like rain ; but hold a piece of rubbed sealing wax a yard or so distant from the place where the jet breaks into drops, and they at once cease to scatter : they fall in large blobs as a thunder shower.

The rain may be allowed to patter on to paper, when the difference in sound is very distinct. The air should be free from electricity beforehand, as the jet is extremely sensitive.

Clouds can probably be caused to rain by discharging electricity into them ; at any rate, a cloud of steam in a bell-jar rapidly turns into Scotch mist or fine rain, and so disappears.

To make a thick mist or fog it is sufficient to introduce a scrap of burning sulphur under the bell-jar ; instantly the country mist becomes more like a town fog, but this also is rapidly dispersed by electricity.

I have ventured to think it possible that the coagulation and combination of oppositely charged dust particles is a gross imitation of the cohering of oppositely charged atoms in a chemical compound. When nitrogen and

hydrogen are subjected to sparks they unite gradually into ammonia. When a brush discharge passes into oxygen it aggregates into ozone, as is well known from the smell near an electrical machine in action. Such actions (especially the latter) do seem to me of the same nature as the aggregation of charged smoke particles, though far more refined. The size of a smoke particle is not great, but it is enormous compared with an atom. Each granule of a lycopodium cloud may be taken as containing pretty exactly one trillion molecules. A smoke particle is a good deal smaller than a lycopodium granule, but not incomparably smaller. It is because of the minuteness and the interleaved arrangement of oppositely charged atoms in a compound, that its electrical capacity is so enormous ; so that ten billion units of each kind of electricity can be stowed away among the atoms of a milligram of water, without raising the potential of each above a volt or two.*

Two bell-jars as used for smoke and fog condensation in lecture experiments. The one with the point let in at top is for any dry smoke ; the other is for any damp or acid smoke. Insulation is in this latter case quite outside the chamber, and the rod, swathed in glass or gutta-percha, enters through a wide hole in the base-board. The little flask is only to catch drip. The ivory ball is to be illuminated by a beam of light, and to shine through the fog as it clears.

Application of the Coagulating Power of Electricity to practical purposes.

In many industries the presence of fine dust or fume suspended in the atmosphere is highly objectionable, sometimes because of the poisonous or dangerous nature of the dust, sometimes because it is valuable and apt to escape and be wasted.

In flour-mills and coal-mines, the fine dust is dangerously explosive. In lead, copper, and arsenic work it is both poisonous and valuable.

Mr. Alfred Walker, of Walker, Parker and Co., first informed me of the difficulty which lead-smelters labour under in condensing the fume which escapes along with the smoke from red-lead smelting furnaces, and he wished to put an electrical process of condensation to the test on a large scale.

The devices which are in use at different works to collect or condense this fume are very numerous, and some of them very cumbersome. Professor Roberts-Austen has been kind enough to lend me diagrams illustrating several of these contrivances.

At Bagillt the method used is a large flue two miles long, coiled up in the side of a hill between the furnace and the chimney ; much is retained in this flue, but still a visible cloud of white lead fume continually escapes from the top of the chimney.

The only difficulty in the way of depositing fume in the flue by means of a sufficient discharge of electricity, is the violent draught which is liable to exist there, and which would blow away mechanically any deposited dust. In some ways the blast may be helpful, for instance, by keeping the electrical points clear and preventing local clogging, but a large chamber must be provided somewhere for the coagulated flakes of dust to settle and remain in calm,

The plan I suggest at present is to line a certain portion of the interior of a flue with spikes, and then to hang in the middle of it wire netting, well insulated and studded all over with ragged edges and points. It may be suspended lengthways in the flue. If the chamber be very large, it may be well to have a number of long prickly nets arranged parallel to each other, and kept alternately positive and negative.

The insulation of the suspended conductor, whatever its shape, has of course most carefully to be arranged : everything depends upon that.

[Experiment showing the action of an electrical point held above a model chimney emitting smoke. Its first effect is to destroy or reverse the draught : but if the chimney be itself provided with points at the top, and an electrified cap be held over it, *e.g*, a small sheet of prickly wire gauze, the draught is assisted, and the smoke is mainly condensed.]

I do not regard this as a good method of dealing with smoky chimneys : the right way to deal with them is to abolish them, *i.e.* to make combustion so perfect that no unburnt matter escapes.

The experiment illustrates, however, that smoke can be caught and deposited on the wing.

[Special apparatus for producing and condensing quantities of smoke was next shown in action. It could be kept electrified by a splendid machine kindly lent by Mr. Wimshurst, but a small Voss machine was amply sufficient for the purpose. After the lecture, I had an opportunity of trying Mr. Wimshurst's 8-plate machine on the smoke-chamber, and the rapidity with which it was cleared was surprising. Roughly speaking, it might be called instantaneous.]

When such a machine as this of Mr. Wimshurst's comes to be used, one may hope to make an impression on fume produced on a manufacturing scale. But further data in this direction are desirable.

Leaving these sublunary and industrial applications, let us ask finally if there may not perhaps be some possible mode of artificially affecting atmospheric conditions by means of electricity. It certainly seems to me rather probable ; and I should much like to have the means of discharging a large quantity of high-pressure electricity into the air, either for the purpose of acting on a fog, or in the hope of perhaps affecting the weather

This much I regard as certain, that if a kite or a captive balloon (a kite for windy days, a balloon for calm ones) be flown into a cloud, and made to give off electricity for some time, that cloud will begin to rain.

It is just possible, though hardly probable, that by the automatic coalescence of drops into larger ones, the potential of the charge so given could become high enough to cause an artificial thunderstorm.

The amount of electricity in a thunderstorm is not very great (Faraday reckoned it as less than the amount in a thimble-full of water, and he was quite right) ; its potential is enormous, but there is certainly some automatic regenerative action going on in the atmosphere, which is able to raise the potential of a given charge higher and higher until a flash occurs.

It is well known, from observations made with Sir W. Thomson's atmospheric recorder, that variations in the electrical condition of the air precede a change of weather, but it is not known which is cause and which is effect in this case.

With a very large voltaic battery, such as that constructed by Dr. de la Rue, or perhaps even a bigger one, of sufficient E.M.F. to give a constant brush discharge from points, a tremendous quantity of electricity could be poured into the atmosphere, and its electrical condition could be certainly disturbed.

Whether this disturbance would be beneficial or not, is, I know, another matter. I do not see how one is to tell without trying the experiment.

Perhaps usually the weather is best left alone ; but there are times when any change feels as if it must be for the better.

Very little is known at present concerning the causes operating in the formation and dissipation of those cyclones which act so powerfully on our climatic conditions as to be now the main object of study with meteorologists, since Mr. Buchan proved to us their existence, and showed us how to study them. Some of them are gigantic, but some are small and almost local whirls. A long way we are at present from even enter-

* In connexion with this part of the subject, see British Association Report for 1885 (Aberdeen), page 744, where an electrostatic theory of chemistry is discussed.

taining the idea of artificially controlling them ; but we have learnt to control a great number of natural agents —torrents, cataracts, fire, electricity ; and the main effect of a thunderstorm on a civilized town is now merely to clear its air and stir up its lightning conductors. Storms, earthquakes, and volcanoes we have not yet learnt to control, perhaps we never shall. Perhaps, also, we may always remain unable to exert any effect even on ordinary winds, clouds, and rain ; but the interests involved at certain seasons of the year in the presence or absence of a succession of rain-compelling cyclones, or of frost- and sun-transmitting anti-cyclones, are so prodigious, that even the barest glimpse of the possibility of exerting any kind of effect upon these great agents is worth attention, and it is a subject eminently suited for experiment. The experiments, however, must be on a large scale, and must be costly ; were it not so, I for one should not hesitate to make some preliminary attempts in the direction indicated.

Parliamentary and Law Proceedings.

Prosecutions under the Irish Pharmacy Act.

At the Kells Petty Sessions, on the 2nd inst., the Pharmaceutical Society of Ireland prosecuted George Cooney, ironmonger, of Kells, for three offences against the Pharmacy Act (Ireland) which was passed in the year 1875. The first charge was for having sold poisons, not being a registered chemist and druggist, on July 22 last—namely, tartar emetic and laudanum. The second charge was for not having the packet labelled poison, with the name and address of the seller, and selling same to unknown persons, and not entering it in the register, which should be kept for that purpose ; and the third charge was for not having it entered. The minimum penalty for the first offence is £5, and for the second and third offence any sum not exceeding £5.

Mr. John C. Sullivan, solicitor, Navan, appeared for the Society, and handed in the Act dealing with the case, also the *Dublin Gazette* to be marked, and after explaining the several sections of the Act dealing with the case, produced—

Mr. William Henry Ashe, the Society's Inspector, who said that on July 22 last he entered the shop of Mr. Cooney, asked for half an ounce of tartar emetic and one ounce laudanum, and paid for it.

In answer to the Chairman the witness said the contents of the packet had not been analysed. He was unable to prove it was poison.

The defendant said he was not aware that the sale was an offence.

A magistrate remarked that the defendant had been making these sales since 1875, and had not been warned.

A fine of £5 was inflicted for the first offence, and the Chairman recommended a memorial to be sent to the Society to reduce the fine to £1. On the application of Mr. Sullivan, £1 was allowed as costs. A fine of 1*s.* and costs of court was inflicted in each of the last two charges, 1*s.* 3*d.* of the fine to go to the persons bringing the party to justice, the remainder to the treasurer to be applied to the purposes of the Act.

The same Society also prosecuted Miss Leonard for selling corrosive sublimate, not being duly licensed. The charges two and three preferred against Mr. Cooney were also brought against Miss Leonard, and Mr. Ash proved the several offences.

Mr. P. Charles, Miss Leonard's manager, appeared, and said he would leave the matter in the hands of the bench ; the commodity was sold in total ignorance of the law.

The same fine as in the case of Mr. Cooney was inflicted, with the recommendation to have same reduced to £1, and the same order as to the appropriation of the fines in the last case was made.

Poisoning of a Family by Vermin Powder.

On Monday, July 26, Mr. J. Harrison, jun., held an inquest upon the body of Mrs. Eliza Cripps, aged 63, of Strood Green, near Rochford. The death of the deceased was occasioned, and her husband, son and servant were seriously poisoned, in consequence of her putting some poison for killing mice instead of baking powder into a pudding, which they ate.

Golden Bacon, a vermin destroyer, of Burnham, said he called at the deceased's house last Wednesday week, and killed some rats with dogs and ferrets for her husband, Mr. Richard Cripps, who was a farmer. For the last twenty-five years he had been in the habit of supplying the deceased with some vermin powder for killing mice, and he gave her some—probably about an ounce—last Wednesday week. The powder was white, and looked like baking powder. When he gave the deceased the powder he told her, as he always did, to be very careful with it ; he wanted to put a label upon the little tin which he put it in, but she said she did not want the label, as she had a special tin which she had kept some in for years.

By Mr. Harrington: I gave her the powder ; I did not sell it. I do not colour the arsenic. I never made a point of selling the powder ; but if anyone liked to give me anything for it they could. The deceased occasionally gave me a few halfpence for some beer. I make it a regular thing to give this away, and I have never charged for it. I have some other mixtures, which I charge 6*d.* a bottle for. There have been accidents before from the use of my powder. On one occasion some was taken when it was standing on a wall at Foulness, and another time I gave a woman some to clean her bedsteads, and she left it on a table, and a child drank some of it. Another time some children picked some "preparation" up in my yard, and one of them died through swallowing it.

Mr. Harrington said it was contrary to law not to have coloured the powder. There was a special order made in view of a case like the present one that the powder should be coloured with soot or indigo, so that it should not be mistaken for baking powder.

The Coroner: But he buys it in blocks, and he cannot very well colour that.

Mr. Harrington: He grinds it into a powder before he sells it. I believe Bacon has been a very careful man, and accidents will happen; but he ought to keep the law to the letter.

Dr. King pointed out that the Act did not refer to a case like that, as Bacon did not sell the powder.

Mr. Harrington : No one has a right to sell it unless he is registered.

Dr. King said between three and four o'clock on Saturday afternoon Arthur Cripps, son of the deceased, went to his surgery and said he had partaken of some pudding which had had some mice poison put in it instead of baking powder. Witness immediately had an emetic prepared and gave it to him, and advised him to take the other half when he got home. He did so, and became violently sick. Upon witness proceeding to the house he found Mrs. Cripps vomiting violently and complaining of a deathly faintness. She then stated that Bacon, the rat catcher, had supplied her with some poison to kill mice, and he particularly cautioned her to be very careful with it. She put it in a box similar to that in which she kept the baking powder. She was making some puddings on Saturday morning, one of which they had for dinner, and she afterwards found that she had put the poison in the pudding instead of baking powder. She had made a quantity of other pastry and pies (in which she had also put the poison by mistake), as several members of the family were coming to spend Sunday with her. She said they could not blame Bacon, because he particularly cautioned her at the time. She ate some of the pastry with the rest of the family at dinner, and they all suddenly became ill. Whilst witness was at her house

she was violently sick, and he administered remedies to relieve the sickness, but she gradually became exhausted and died during the night. She suffered also from violent cramp. In his opinion there were symptoms of poisoning by such powder as had been described. Dr. King also added that he attended to the husband, who was ill in bed from the same cause ; and the son Arthur was also ill in bed, but he thought they would recover. The servant likewise ate some of the pudding, but she vomited violently whilst at the dinner table, and was now convalescent.

Bacon, upon being recalled, said he never sold any arsenic. Mrs. Cripps gave him 2½*d.* to get a pint of beer at times.

Mr. Hunt : I think if you give any away at any time you ought to label it, whether the people like it or not.

Bacon said he would have done so this time, only the deceased said she had a special tin for it. He had supplied her with it for twenty-five years.

Mr. Harrington said the law distinctly required that no one should sell or distribute any of this preparation, unless a qualified chemist, surgeon, or veterinary surgeon, and then that the sale should be registered. No doubt Bacon had made a business of this sort of thing and ought to be registered. Another point of the law he had broken was that which said such powder should be coloured with soot, and for the very reason of guarding against a case like that. It ought also to be labelled. If the law had been carefully observed by Bacon the poor woman might have been alive now.

The Coroner : If he sold it he is clearly liable to be proceeded against (the penalty being £20) ; but he says he gave it to the deceased.

Mr. Harrington said he did not desire to press the point, because he believed that for many years Bacon had been a useful man, and had been careful with these poisons.

One or two of the jurymen stated that they knew Bacon had made a point of giving it away, as they had received some and had not paid him anything for it.

The Coroner then told Bacon to remember in future not to sell or give away any of the poison until it had been coloured with soot or indigo, and properly labelled. The Coroner briefly summed up, and said there was no doubt as to the cause of death. It was a pity almost that Dr. King could not have seen the deceased earlier, and then probably he would have saved her life, as he hoped to save the others. With regard to Bacon he did not know whether they wished to carry the matter any further ?

Mr. Harrington : No, Sir. I think not, after the words you have addressed to him.

Dr. King : The poor woman told me that Bacon told her to be very careful with the poison.

The Jury then returned a verdict to the effect that the deceased met her death through misadventure, from putting arsenical powder in some pastry in mistake for baking powder.—*Southend Observer.*

Singular Death from Poisoning.

Mr. J. West-Jones, borough coroner, has held an inquest at Hanley, on the body of a youth named Thomas Henstock, who died under mysterious circumstances on Monday evening, August 2. The deceased was apprenticed to Mr. Churchill, chemist, New Street, Birmingham.

It appeared from the evidence that during the absence of Mr. Henstock's family, the deceased arrived at his house shortly after ten o'clock on Monday morning. At mid-day a servant found him asleep in a chair in the breakfast-room, and as he remained in the same condition when she saw him again in the evening, she and another servant tried to arouse him, but failed. Becoming alarmed they eventually sent for a doctor.

Mr. Spanton, surgeon, stated that he was called to the deceased about half-past eight o'clock, and found him insensible, breathing heavily, and with the face and skin livid, and eyes contracted, as if suffering from the effects of some narcotic poison. All possible remedies were tried, but he died about twenty minutes past nine o'clock. On subsequently making a *post-mortem* examination of the body he found the appearances of the brain and heart indicated death from morphia or opium, and the state of the other internal organs pointed to the same conclusion. There were no indications of the habitual consumption of morphia or opium.

In reply to the Coroner, Mr. Spanton said it was possible that deceased might have taken an overdose of opium or morphia in trying to allay pain, and the fact that a quinine pill was found upon him lent character to that view, as it showed that he was taking quinine for something, possibly neuralgia. A moderate or medicinal dose of narcotic poison might prove fatal if the patient was left alone and the symptoms neglected.

Mr. P. Henstock, the father of the deceased, said he did not expect the deseased home on Monday, or he should not have been away. Deceased's holidays were to have commenced on Friday, when he was to have joined the family at Llandudno. He had communicated with the deceased's master, who was unable to throw any light on the affair. There was only one circumstance which he could think of as at all likely to account for the death. He had been given to understand that deceased had been keeping company with a young lady at Bromsgrove, and it might possibly be that some unpleasantness had arisen between them. Of that, however, he had no direct knowledge ; but in the absence of any other assignable cause he was disposed to come to the conclusion that this was so.

The Jury returned a verdict to the effect that deceased died from an overdose of morphia, but how administered there was no evidence to show.

Poisoning by an Overdose of Aconite.

On Monday the 2nd inst., at Darlington, Mr. J. T. Proud, deputy coroner, held an inquest on the body of James Stabler, eighteen years of age, found dead in bed early the previous day. The evidence disclosed that on the day prior to his death deceased applied to Dr. Jackson, who gave him some medicine to relieve neuralgia, with instructions on the bottle, and also verbally, to take at intervals of two or three hours one or two teaspoonfuls if the pain was very severe. Deceased must have taken eighteen teaspoonfuls, and twelve of them, it was stated, after 12 o'clock at night and before his death early next morning.

Dr. Raine and Dr. Eastwood made a *post-mortem* examination, and the former stated that the stomach of deceased was congested and inflamed throughout, caused by the poison of aconite contained in the medicine. The medicine, he said, was a very usual one and one teaspoonful was a minimum, and even two would have been less than a full dose of aconite, which might have been safely taken.

The Coroner summed up, and the Jury returned a verdict that deceased died from an overdose of medicine containing the poison aconite, and that it was inadvertently taken. The jury were of opinion that there was no carelessness on the part of the doctor, as his instructions were plainly given both on the label and also verbally.—*Leeds Mercury.*

Death from Ether.

Dr. Diplock has held an inquiry at Bayswater as to the death of Mary Sarah Wesselhoeft, aged 40, the wife of Mr. Walter Wesselhoeft, a physician.

The husband deposed that his wife suffered from asthma, and had been in the habit of taking small quantities of ether.

The Coroner: Had she been cautioned of the danger?
The witness: She was well aware of it.

Mrs. Maker, a widow, said the deceased had been on a visit to her. On Monday evening she asked for a bottle of ether. On the following morning the witness took her a cup of coffee and found her dead in bed. She took ether to relieve the asthma.

Dr. F. M. Robertson said he was called to the deceased, whom he found dead in bed. Death was due to an overdose of ether, accelerated no doubt by the position of her mouth on the pillow.

The Jury returned a verdict that the deceased was poisoned through inhaling an overdose of ether, and added a rider to the effect that they were of opinion that so large a quantity of ether should not have been placed at her command.

Obituary.

Notice has been received of the death of the following:—

On the 26th of June, Mr. James Kershaw, Pharmaceutical Chemist, Southport. Aged 65 years. Mr. Kershaw had been a Member of the Pharmaceutical Society since 1847.

On the 8th of July, Mr. William Brown, Chemist and Druggist, Newbiggin-by-Sea. Aged 69 years.

On the 13th of July, Mr. John Laker McMillan, Chemist and Druggist, Maida Hill, London. Aged 70 years.

On the 16th of July, Mr. Thomas Farren Humble, Chemist and Druggist, Abergavenny. Aged 50 years.

On the 29th of July, Mr. Richard P. Williams, Chemist and Druggist, Liverpool. Aged 47 years. Mr. Williams had been a Member of the Pharmaceutical Society since 1869.

On the 30th of July, Mr. Thomas Milton Wheeler, Chemist and Druggist, Sydenham, London. Aged 53 years.

On the 1st of August, Mr. Hervey Lowndes, Pharmaceutical Chemist, Stockport. Aged 64 years. Mr. Lowndes had been a Member of the Pharmaceutical Society since 1842.

On the 1st of August, Mr. Charles Eve, Pharmaceutical Chemist, Plough Court, London. Aged 44 years. Mr. Eve had been a Member of the Pharmaceutical Society since 1869.

On the 1st of August, Mr. Robert Walker, Chemist and Druggist, Maidenhead. Aged 64 years.

On the 4th of August, Mr. Thomas Bulmer Layng, Chemist and Druggist, Lewisham, London. Aged 48 years. Mr. Layng had been a Member of the Pharmaceutical Society since 1871.

On the 6th of August, Mr. William Harris, Chemist and Druggist, Faringdon. Aged 66 years.

Review.

THE BATHS, BATHING, AND ATTRACTIONS OF AIX-LES-BAINS, SAVOY. By H. H. WAKEFIELD, M.D.*

This little book, which, by the bye, is most charmingly got up, is intended as a guide, as the author tells us in his preface, "for those desirous of visiting Aix-les-Bains, either for health or pleasure." Most thoroughly has this intention been carried out, for not only does it treat of baths, mineral waters, hotel charges, excursions, and tariffs of guides, carriages, etc., but it also gives a most interesting historical, as well as botanical and geological account of the town, not forgetting the antiquities, of which there are a few left, the most conspicuous being the Arch of Campanus. There are also the remains of a Temple to Diana or Venus, without which no Roman town was ever complete. This ancient monument is situated at the side of the old chateau, and is now used as a museum. There are also the remains of some ancient thermæ, over which the Hotel and Pension Chabert has been built, the place where Romans formerly bathed now serving as a cellar for wine.

Another part of the book treats of the mineral waters, the source of the mineral springs, the baths, and their different uses, and names, and the drinking of the waters. The springs are called respectively, "Source Alum" and "Source Souffre" (the alum and the sulphur springs). Here again is a great deal of information well worth careful perusal, both with regard to the nature and the analysis of these waters. The water from the Alum Spring (which Mr. Wakefield tells us contains no alum) is the better of the two for drinking, "as being more easy of digestion; but neither is very distasteful, and after a few days many take a great fancy for their medicinal draught. The quantity to be drunk per diem is two or three glasses." There are three other mineral waters often employed, one called the St. Simon Spring, and taken with benefit by sufferers from dyspepsia. The class of maladies benefited by these waters are debility of the nervous system, rheumatism, gout, scrofula and all diseases requiring a tonic and not a depressing action of the remedy. The modes of giving the various baths are very curious to read. For instance there is the vapour box, in which the patient is shut with his head outside, as well as other special contrivances when it is advisable to subject only a limb or other part of the body to the influence of the vapour. The suggestions for bathers as to clothing, time of year for going, diet, procedure of treatment, as well as the chapter on professional advice, may be specially commended to all who take up this little book. Chapters six to nine treat of the many and varied amusements and excursions, boating, walking or driving. Chapter ten and last gives general information.

* London: Sampson Low, Marston, Searle and Rivington. Small 8vo. Pp. 224.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE MAJOR AND MINOR EXAMINATIONS.

Sir,—We have heard a good deal about the alterations of the examinations lately, but almost entirely from the examiner's point of view; as I have recently appeared as an unsuccessful and successful candidate at both examinations, my ideas from the opposite side may not be without interest.

Practical Dispensing.—In the Major examination six hours are allowed for Practical Chemistry, but the time for Dispensing, which is at least as important in the case of the Minor candidate, is only about one hour. I think it is unsatisfactory for a candidate to pass or fail on one prescription only; he has not time to become accustomed to his surroundings, so as to do the best work of which he is capable; much also depends on the prescription. The first time I failed in Dispensing, but if my second prescription had been given me then, I should have passed. In so large a subject as Dispensing, it can hardly be expected that a candidate should select at once (a second attempt not being permitted) the best excipient for every combination, however awkward it may be. If the examination in this subject lasted three hours, an examiner would have a much better chance of seeing a candidate's average work; nervousness (a candidate lately failed by putting a drop too much glycerine in his pills, making them too soft), or forgetfulness of one excipient would not involve failure if the greater part of the prescriptions were satisfactorily dispensed.

Practical Chemistry.—The Major examination in this subject is a fair test, but I had a gravimetric determination. This not being mentioned in the "Regulations for Examinations," should not have been given, for it cannot fairly be classed under "volumetric solutions."

The Minor examination should be conducted in the same way as the Major, but a shorter time be given.

I think there is much room for improvement in the apparatus and fittings of the examination laboratory.

Theoretical Subjects.—All examinations are somewhat uncertain, but, that the Society's examinations excel in this respect is notorious. This seems to me to be due to their not being written examinations.

I do not wish to say one word against the examiners, for I have found them (with one slight exception) very gentlemanly, kind and considerate; but they are human, and if they are not well, or have had an impertinent student just before, it is unfortunate for the candidate. Again, those who are well prepared, but nervous, may make hastily one or two erroneous answers at first, and be either failed there and then, or not be able to overcome the bad impression so produced.

If an examiner has made a special study of some subject he may question on it more deeply than its pharmaceutical importance deserves, or he may examine chiefly on only one part of the subject. In the Major some are questioned almost entirely on physics, with very little chemistry.

If a written examination were substituted, each set of papers being examined by two or more gentlemen, a more uniform standard of questions would be attained. Candidates having more time to think would not make such foolish answers, and as the questions would cover more ground, the examiners would be better enabled to judge of the knowledge of the candidates.

If not thought desirable the questions need not be published or taken away by the students.

For the practical recognition of drugs, plants and chemicals the candidates might be required to furnish the names of numbered specimens.

That the examinations should be, not easier, but fairer is the wish of

Birmingham. FORWARD.

THE BENEVOLENT FUND.

Sir,—Every question presents two sides, and the subject of the Benevolent Fund is no exception to this rule.

The discussion which took place at the last meeting of the Council shows that, considering the number of registered chemists and druggists, the amount collected is small, and the Council is desirous of increasing the income. It is proper to ask how it is that such apparent indifference exists for such a good and laudable object? To this question several replies may be given, and I will express my own, founded upon facts.

For some years I was a subscriber to this fund, and was satisfied with the course then adopted of not printing the names of the subscribers. One year the profits of my business being considerably reduced by severe competition and other causes, I withheld my subscription, considering that I must be just before being generous. In that year a resolution was passed that for the future a list of those who subscribed to this fund should be published annually. This resolution annoyed me very much; it seemed to convey the meaning that because I, and it may be several others similarly situated, had good reasons to withhold our subscriptions, the fact should be made known by the absence of our names from the published list to the world at large, and I felt this an act of coercion which I determined to resent. Anyone living in the town where I reside can find by referring to the list of its various charitable institutions that I am favourably disposed towards such objects, but I have a natural aversion to any interference with my liberty of action in this or any other philanthropic object.

The cost of printing the list must be very great, and if there are any who will not subscribe except the names are published, it is fair to presume that the money is not given to benefit their poorer brethren, but rather as an ostentatious display of wealth.

A CHEMIST AND DRUGGIST.

PHARMACY IN ITS RELATION TO THE PRACTICE OF MEDICINE.

Sir,—With good intent Mr. Lucas signs a short letter in a recent Journal, but it raises a very important and serious question. How far is a pharmacist justified in correcting or commenting on the prescription of a medical man? I think the answer must be, the courteous suggestion of choice combinations, and a very kindly watchfulness over unusual doses of potent accumulating, or unreliable medicines. There is nothing that requires greater care in going further than that, because the best of us are eminently unqualified to meet the trained mind and careful observer of vital phenomena as they are influenced by extraneous substances.

It is the more important this matter should receive attention, because a change of large and far-reaching extent is slowly but surely coming over the heterogeneous calling which in this country has hitherto been covered by the term chemist and druggist. Not, I deeply regret, quite in the manner one would have desired, nor in accordance with the able minds who laid so masterly the foundations of our early examinations. However, men will reap as they have sowed. And after all it is with the successful men in both branches of our subject that we have to deal.

Chemists in the near future will be few and far between, and the public will be the gainers by being served by better men, a higher class of medicine, and fresher drugs and preparations. This is inevitable, and must be faced bravely or not at all.

With regard to incompatible prescriptions every dispensing chemist is so familiar with the current stories in the profession I will not repeat them. Going back to what I call the age of incompatibles, the fifteen years succeeding the burst of the brilliant genius of Liebig, who, putting animal chemistry on a rational footing, brushed the cobwebs and dust away which had been accumulating in medicine for some 1800 years, the devotees drank with eagerness the new wine of science which they fondly believed had just been born for their especial delectation, and was going to explain the whole creation away. There were clever, cunning men doing a large amount of good by the teaching of their own experience and the traditions of their elders, and one of these medical men, in the centre of London, transferred his dispensing to a neighbouring chemist, but finding that some of his most fondly cherished medicines were not conducting themselves as heretofore, complained that the chemist's assistants did not make his calomel pills with aromatic confection as he ordered. They certainly did not, and the only rejoinder he got behind his back was "How could the old fool know that?" I quote the "pure Saxon;" it is past history; the actors in the scene are all dead and gone, and the "old fool" was capable of holding his own even with the pharmaceutical novices. Mr. Lucas will detect in this anecdote a fitting corollary to that prescription he has gibbeted.

I need not tell the readers I am addressing that some of the finest remedies divined by the ablest gentlemen in the profession of medicine are very unchemical in their character—made up of incompatibles; but the human stomach is not washed out with the stomach-pump first, before the perfect chemical is administered, and even then that organ would not agree that essence of lemon and oil of turpentine were chemically the same.

GEORGE MEE.

J. Maltby.—The advertisement has been forwarded to Messrs. Churchill.

Coca.—The paper by Mr. Schacht to which you refer was published in the present series of this Journal, vol. viii., p. 225.

D. Stewart.—(1) *Parnassia palustris.* (2) *Euphrasia officinalis.* (3) *Achillea ptarmica.* (4) *Scabiosa succisa.*

W. E. E.—All the information at our disposal was published in the official report. Should you require any further details you might write to the Secretary.

S. R. Schofield.—Proctor's 'Lectures on Practical Pharmacy,' published by J. and A. Churchill.

D. T. E.—Any good white spirit varnish.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Buckle, Brown, Macalister, Thompson, Mee, Rowsell, Hesse.

THE COLONIAL AND INDIAN EXHIBITION AT SOUTH KENSINGTON.

Canada.

Leaving the British Guiana Court and proceeding to the right, the very extensive Canadian Court comes into view. Although the Dominion exhibits an extremely large and varied collection of articles of general interest, it presents comparatively few of a purely pharmaceutical character, the most representative exhibits being timbers, and goods manufactured from them, furs, minerals, fruits and food products.

Messrs. Lyman and Sons, of Montreal, have the most varied display of drugs and preparations, including compressed herbs, oils, resins, fluid extracts, abstracts, etc. Linseed and caraway seed of Canadian production were also noticed. The former might possibly be worthy of a trial to replace Russian linseed for flax growing, since the seed obtained from cold countries is preferable for growing in a temperate climate to seed from southern countries, which produces less hardy plants. The abstracts, which are in the form of powder, present the appearance of being carefully prepared and kept, that of jaborandi preserving its green colour although exposed to the light. Resin of red spruce (*Abies rubra*) and Canada balsam are, of course, present among other native products. The fluid extracts include apparently all the most recent introductions. Among the chemical preparations is ethyl formate, being one that does not seem as yet to be much used in this country. Deodorized tincture of opium may also be mentioned as a preparation probably not frequently prescribed in England.

Messrs. Evans, Son and Mason exhibit a series of fluid extracts, also their well-known lime juice cordial, Florida water, etc. Fluid extracts and elixirs are shown by Messrs. Archdale Wilson and Co., and a large number of fluid extracts by Messrs. W. Saunders and Co. These are a class of products of which it is difficult to judge without tasting and smelling them, but they appear to be well made and free from deposit. Compressed hops, having a very good odour, but rather faded in colour, are exhibited by Mr. W. Touner, of Vancouver's Island, and by Mr. J. W. Ward, of Montreal. The extension of hop cultivation in New York State has led to a large business of late years in Central Canada, whence young cedar trees are sent for hop poles.

A trophy of fruits shows what may be done in preserving the appearance of fruits. Mr. W. Saunders, of London, Ontario, a pharmacist whose name is as well known in this country as it is as an entomologist in Canada, after many unsuccessful experiments has at length hit upon a fluid which itself remains uncoloured while preserving the plumpness and a good deal of the natural colour of these fruits, and it may be hoped that he will publish some information respecting the preparations employed. Some idea of the fruit trade in Canada may be gathered from the fact that 200,000 barrels of apples are annually produced in Nova Scotia alone. Cranberries are said to be one of the most profitable fruits grown, and the facilities for their production to be unsurpassed. It is a pity therefore that Canada, instead of Scandinavia, should not supply Great Britain with this fruit. One of the products which is seen to attract attention in this exhibit is maple sugar. This product was manufactured last year in the various provinces of the Dominion to the extent of 20,556,049 lbs., according to the last report, but these figures are probably below the mark. Sugar is also made, according to Professor Macoun, from the sap of the birch* and the ash-leaved maple. In British Columbia the inner bark of *Pinus contorta* is dried and chewed for the sugar it contains.

Among the chemical and pharmaceutical products it is interesting to note that there is a collection of chemicals exhibited by the North American Chemical Co., and presumably manufactured in the Dominion. Hemlock bark extract, obtained from bark of *Tsuga canadensis*, is also placed in the same class of products, instead of, as might have been supposed, amongst tanning materials. According to Mr. H. B. Small's pamphlet on Canadian Forests, the manufacture of this extract is assuming large proportions, the export of extract having risen from 190,068 dollars in 1881, to 305,426 dollars in 1883, exclusive of the bark, which amounted in 1883 to 321,291 dollars. According to the census of 1881 there were at that date four factories employing 140 hands engaged in this industry. In a Report of a Committee of Parliament in 1868 it was estimated that an extent of 10,000 acres of the best hemlock land was stripped every year for the bark, the timber being left to rot on the ground. This wholesale destruction threatens to diminish the future supply of a wood that will become more and more useful as the pine disappears.

In the same pamphlet Mr. Small directs attention to the fact that the leaves of the sumach (*Rhus typhina*) might well replace the Sicilian sumach, which is largely imported from Sicily, since the Canadian sumach contains 15 to 20 per cent. more tannin than the Sicilian.

Among the forest products may be noticed a handsome cabinet containing an herbarium of 2600 species of Canadian plants exhibited by the Canadian Government. This includes a collection of the medicinal plants of the Dominion.

Among the animal products neither castoreum nor isinglass appear to be exhibited. The mineral exhibits are far too extensive to be noticed at length here. Among the more striking exhibits in this class are a large mass of graphite, surmounted by a gigantic plumbago crucible, a fine block of crystalline sulphate of strontian (celestine), magnesite, sulphate of barytes, a very large crystal of apatite (native phosphate of lime) for which £50 is asked, and a case illustrating the manufacture of asbestos; also some good specimens of mica shown close by. Paraffin oils of different densities and tints and suitable for all kinds of mechanical work, such as bolt and screw cutting, locomotive cylinders, etc., etc. are shown. Solid paraffin in small shavings appears under the name of "paraffin flour," and suggests the advantage of this form for quick melting in pharmaceutical operations, since it is not, like wax, liable to be acted on by the air.

Queensland.

Passing from the Canada Court on the left hand side the fine exhibit from Queensland comes into view, and two large stuffed specimens of that curious mammal, the dugong (*Halicore Dugong*), are almost the first objects to attract notice. This animal not

* Sugar has been found by Attfield in *Betula alba* to the extent of 616 grains (nearly 1½ oz.) in a gallon of sap (*Pharm. Journ.*, [3], xiii., p. 820).

only affords dugong oil, which is recommended as a substitute for cod liver oil, and of which specimens both unrefined and refined are shown, but furnishes excellent bacon, while "potted dugong" is evidently considered a toothsome diet in the colony. The hide of the animal is also tanned into leather.

Pharmacy is represented by two or three very interesting exhibits, concerning which a good deal of useful information is afforded by an excellent little pamphlet by Dr. J. Bancroft, entitled 'Contribution to Pharmacy from Queensland.'

The most prominent of these exhibits is a collection of essential oils prepared by the Hon. A. C. Gregory, C.M.G., and Mr. K. T. Staiger.

A sufficient quantity of these oils has been sent to serve for experiments. This wise provision will, it may be hoped, lead to the introduction of some of the more fragrant of the oils into commerce.

The following table gives a list of the oils exhibited, and particulars concerning them furnished by Mr. Staiger, the Government Chemist:—

		Spec. grav.	Yield p.c.	State of material.
Eucalyptus hæmastoma . .	s. acid	0·880	1·875	fresh
„ *microcorys* . .	acid	0·896	1·960	„
„ *Baileyana* . .	acid	0·890	0·900	„
„ *Planchoniana* .	—	0·915	0·060	„
„ *maculata* . .	neutral	0·891	—	„
„ *maculata* var. *citriodora* .	„	0·892	—	dry
„ *Staigeriana* . .	s. acid	0·871	2¾–3	„
Melaleuca Leucadendron .	s. acid	0·917	0·895	fresh
Backhousia citriodora . .	s. acid	0·887	—	dry

From this table it will be seen that *E. Staigeriana** is one of the richest oil-bearing species of the *Eucalypti*, yielding 1200 ounces per ton as against 450 ounces afforded by *E. oleosa*, and only exceeded, so far as is known, by *E. amygdalina*, which affords, in round numbers, 1250 ounces per ton. The oil of *E. Staigeriana* has an odour exactly like oil of verbena, from which it would be difficult to distinguish it by the odour alone, although it differs in its lower specific gravity, which is 0·871, or when freed from moisture 0·880,† that of verbena being 0·890.‡ The solvent action of this oil on resins and its physiological properties do not appear to have as yet been determined. It is remarkable that there are two other oils of Queensland *Eucalypti* in the above list which have a somewhat similar odour, viz., *E. citriodora* and *Backhousia citriodora*. Concerning the latter Dr. Bancroft remarks that by age it becomes yellowish and resinous, and, so far as experiments have gone, in its effects it is similar to the oil of lemon grass.

Information is not obtainable at present concerning the distribution of *E. Staigeriana*, since the species was discovered but a few years since, and the only tree in Brisbane is grown in the garden of Mrs. C. Coxen, of that city, so that the tree would probably have to be cultivated if a demand should arise for the essential oil.

The oil of *E. hæmastoma* is said by Dr. Bancroft to be plentiful, and to be among the more agreeable oils derived from this genus, the odour being intermediate between oil of geranium and oil of peppermint. It is nearly colourless, while that of *E. Staigeriana* is of a golden yellow tint. The yield of oil from *E. hæmastoma* is even larger than that from *E. dumosa*, being 672 ounces per ton of leaves.

The oil of *Melaleuca Leucadendron* is said to closely resemble cajeput oil in odour, but is stated by Dr. Bancroft to be more agreeable. He finds that small insects imprisoned in its vapour are intoxicated. He has also found it of value as an antiseptic inhalation in phthisis, for which purpose he considers it more pleasant than eucalyptus oil. It may be remarked that the slight difference in odour from cajeput oil may be due to local causes, since some botanists consider *Melaleuca minor* to be only a form of *M. Leucadendron*.

The oil of *E. microcorys* has not a very agreeable odour, but might probably be suitable for varnish making.

Dr. Bancroft points out that the oil distilled from young leaves is of finer quality and more fragrant than that from the mature foliage.

Besides the oils above mentioned there are exhibited those of *Eucalyptus dealbata*, sp. gr. 0·871 (at 72° F.), and of *E. populifolia*, and of the Queensland sassafras bark (*Nesodaphne obtusifolia*, Benth.). The specific gravity of the last-named oil is given as 0·978 at 72° F. A ton of the leaves was found to yield 770 ounces of the oil.

Through the courtesy of Mr. J. Little, the writer was permitted to examine the odour of the various oils. That of *E. hæmastoma* appeared to be intermediate between geranium and peppermint. The oil of *Melaleuca leucadendron* had a distinctly disagreeable odour, not resembling cajeput, but reminding one of rotten fruit. That of *E. Baileyana* had a turpentine odour; that of *E. populifolia* resembled cajeput; and those of *E. Planchoniana* and *E. dealbata* had a peculiar odour allied to citronelle, but differing from it. The oils of *E. hæmastoma*, *E. Planchoniana*, and *E. dealbata*, suggest by their odour their fitness for perfuming soaps; that of *E. Staigeriana* might well replace oil of verbena as a perfume; the others might probably prove to be useful as solvents of resins not easily soluble in alcohol.

Of fixed oils those of the seeds of *Calophyllum inophyllum*, L., and of *Aleurites moluccana*, Willd., are shown. The kernel of the latter is said to yield 54·3 per cent. of oil, and 45·7 per cent. of amylaceous and nitrogenous substances. It is doubtful, however, considering the frequently acrid nature of euphorbiaceous seeds, how far the cake or even the starch could be made available for feeding purposes. The oil is extensively used in oil painting as a substitute for walnut oil. The oil of *C. inophyllum* is used for varnishes, soap-making, etc.; it is exhibited in two forms, as a thick green oil and as a clear yellow clarified oil.

A very interesting series of gums is shown by Mr. F. Manson Bailey, F.L.S., the Government Botanist, who is evidently the right man in the right place, since he is not only a good systematic botanist, but takes considerable interest in the economic uses of plant products and in developing these resources of the colony. In his excellent 'Flora of Queensland' useful practical notes as to the economical value of the plants may be found on nearly every page, a feature which is too often

* See *Pharm. Journ.*, [3], xvi., p. 581.

† The oils when fresh contain from 0·1 per cent. to 0·3 per cent. of water dissolved, which can be easily removed by chloride of calcium.

‡ *Pharm. Journ.*, [3], x., p. 212.

neglected in modern floras. The specimens exhibited by Mr. Bailey include the following :—

"Gums."	Specific gravity.	Percentage of tannin.
Iron bark (*E. siderophloia*) . .	1·413	72·13
Scribbly gum (*E. hæmostoma*) .	1·378	64·51
Turpentine tree (*E. microcorys*)	1·395	53·33
"Jimmy Low" (*E. resinifera*)	1·416	65·57
Spotted gum (*E. maculata*). .	1·405	34·97

Besides these the gums of the stringy bark (*E. acmenoides*), the rough stringy bark (*E. Baileyana*), the narrow-leaved iron bark (*E. crebra*), the gum-topped box (*E. hemiphloia*), and the Moreton Bay ash (*E. tessellaris*) are shown, but their percentage of tannin and specific gravity are not given. The analysis of the gum of *E. maculata*, given by Mr. Bailey, differs somewhat from the analysis made by Mr. E. N. Grimwade.* The former found 59·03 per cent. of matter insoluble in water, of which alcohol dissolved 10·82 per cent., and the remainder, 48·21 per cent., was mostly soluble in caustic soda. It possessed an intensely black colour, and was partly derived from altered kino tannin and partly from other substances not yet thoroughly investigated. A specimen of this gum received from Dr. Bancroft, and collected by his son, presented more the appearance and odour of a grass tree gum, the odour being due to a mere trace of volatile oil resembling styrol or toluol, two or three drops of oil only being obtained by Mr. Grimwade from ¾ lb. of gum. The crude gum dissolved in rectified spirit to the extent of 80·85 per cent., the remainder consisting chiefly of bark and other impurities. Of the purified gum about 18 per cent. was soluble in water, and gave 10–15 per cent. of tannin. The much larger yield of tannin obtained by Mr. Bailey is probably due to the great variations in the *Eucalyptus* gums. Attention has already been directed to this fact by Dr. Bancroft, who remarks that "only newly discharged gums should be gathered. When first discharged from the tree the gum may be colourless or slightly reddish and soluble in water; but in time it becomes darker, and eventually jet black, a large portion being then quite insoluble in water or in alcohol." On this account he recommends that for use in pharmacy the gums, as soon as possible after being collected, should be dissolved in hot water, strained or filtered, and the concentrated solution evaporated in the sun or by a gentle heat, on a glazed surface. In this way he believes that some uniformity of composition might be arrived at, and satisfactory results obtained by the prescriber.

Besides the eucalyptus gums, those of the (Queensland) apple tree (*Angophora Woodsiana*, Bail.) and of the rusty gum tree (*Angophora lanceolata*, Cav.) are exhibited by Mr. Bailey. Concerning these gums, Dr. Bancroft makes the following practical remarks :—

From *E. siderophloia* the gum exudes in great plenty, and is at first in long tears of a pale yellow colour, which darkens into bright red, and eventually into black, becoming then more insoluble. A tincture made with 2½ ounces to a pint of proof spirit is valuable as an astringent in diarrhœa, but gelatinizes on keeping.

E. microcorys yields a gum soluble in water, and the solution when evaporated affords brownish scales. The gum of *E. hæmastoma* is soluble in water, and when dried forms shining scales. That of *E. acmenoides* occurs in small quantity only, is of an amber colour when recently exuded, passing subsequently to red and black, and is soluble in water only when recent. *E. resinifera* yields a gum which when newly exuded is soluble in water, but when old is almost insoluble. Old gum is soluble in alcohol, but older gum insoluble. According to Mr. Staiger's analysis it is perfectly soluble in cold distilled water, and contains 54 per cent. of kino-tannic acid, and also a kind of gum arabic, but in older samples the amount of kinotannic acid is greater and the gum less.

The gum of *E. tessellaris* differs from all those previously mentioned in exuding of a dark brown treacle colour, and soon becoming black without any tint of red. According to Mr. Staiger it has a specific gravity 1·35, and contains 71·7 per cent. of matter soluble in boiling water, and 28·3 per cent. insoluble. On cooling the solution becomes turbid, and deposits catechin. The portion insoluble in water is soluble in alcohol, and the residue when treated with ether leaves a dark-coloured brittle mass identical with shellac, possessing the same qualities both technically and chemically, and giving a good French polish of a rather darker colour than the usual commercial article. This shellac constitutes about one-fifth of the entire gum ; it is insoluble in benzene, kerosene, and the essential oils. The portion dissolved by ether forms a pliable, reddish, transparent mass, which does not become dry even after four or five days.

The gum of *E. corymbosa* when recent is bright red, brittle, and easily reduced to a pinkish-white powder. It varies from complete solubility in water to complete insolubility both in that fluid and in alcohol.

E. maculata, according to Mr. Staiger, yields a gum which is soluble in boiling water to the extent of 60 per cent. It contains benzoic acid in an impure state, and catechin. Like that of *E. tessellaris* the insoluble portion of the gum treated with ether gives up a sticky substance, and leaves behind a clear, reddish, tasteless, brittle resin, having the properties of shellac.

Angophora Woodsiana yields a brittle reddish gum used by the settlers as a medicine for diarrhœa. In cold water the astringent matter is dissolved out leaving a bulky whitish powdery substance, which does not cohere or form the glutinous masses characteristic of the insoluble portions of the gums of *E. maculata* and *E. tessellaris*. The gum of *A. lanceolata* behaves in a similar manner. Dr. Bancroft believes that the gum supposed to be from *E. maculata* stated by Dr. Wiesner to dissolve easily in hot water was the gum of *A. lanceolata*. This tree bears a remarkable resemblance in the stem and bark to *E. maculata*, and it is only when in flower that it can easily be recognized by the petals, which are absent in the genus *Eucalyptus*.

Dr. Bancroft exhibits specimens of eucalyptus gums purified in the manner above described. That of *E. rostrata* is of a brilliant garnet-red colour, much brighter than that extracted from the gum of *E. siderophloia*, which forms curved angular shining fragments of a dark reddish-brown colour. It dissolves readily in warm water but is not easily powdered. That of *E. resinifera* is brown, shining and tough, and that of *E. hæmostoma* forms brilliant shining plates, which are of larger size than those of *E. siderophloia*, and readily admit of being placed on

* *Pharm. Journ.*, [3], vol. xvi., p. 1102.

wounds, cuts, or ulcers, for which purpose they have been employed by Dr. Bancroft, with satisfactory results. The extract from the gum of *E. corymbosa* differs in being brittle and easily powdered and is hence much more suitable for powders and pills. It is given in doses of 2–10 grains.

The extract of the gum of *Angophora lanceolata*, *A. Woodsiana* and *A. subvelutina* is of a red-colour, but does not curl up and leave the glazed surface on which it is dried like the eucalyptus gums. It is prepared in the form of a reddish powder and bears some resemblance to that of *E. corymbosa*. Nevertheless its chemical composition differs from that of the latter and deserves further investigation.

Several medicinal barks are also exhibited by Dr. Bancroft. These include the Queensland sassafras (*Nesodaphne obtusifolia*, Benth), which has a sassafras odour; it contains about 2 per cent, of a volatile oil, and 9 per cent. of a tannin which does not precipitate solution of gelatine and behaves like the tannin of Peruvian bark. It has been used as an aromatic astringent in diarrhœa and dysentery, in the form of a tincture of two ounces of the bruised bark in a pint of rectified spirit.

Another bark is that of *Achras laurifolia*, F. von Muell. It has a remarkably sweet taste, but is at the same time astringent, like monesia bark (*Chrysophyllum Buranhem*). Dr. Bancroft suggests that lozenges made of the extract of the bark might be valuable in throat diseases. The following analysis of the *Achras* bark is given by Mr. Staiger: — extract, containing glycyrrhizin, 30; tannin, 12; a substance intermediate between caoutchouc and gutta-percha, 0·25; woody fibre, 50; moisture, 7·75.

Other articles exhibited by Dr. Bancroft are Taj bark, *Cinnamomum Tamala*; the stem of *Piper Novæ-Hollandiæ*, the extract of *Erythroxylon australe*, and of *Alstonia constricta*, tincture of pituri (*Duboisia Hopwoodii*), and duboisine. With respect to the stem of *Piper Novæ-Hollandiæ*, he states that the plant is one of the largest native creepers, the root being at times from six inches to a foot in diameter. The plant climbs like ivy to the top of the tallest trees, and when full grown weighs many tons, so that a good supply of the drug is readily obtainable. The active principle, as dissolved out by ether, is a brownish oily fluid, soluble in water to a limited extent only, the insoluble proportion producing an oily emulsion. It has a warm, aromatic, pleasant taste, and a benumbing effect on the tongue, when applied to it in minute quantity.

Euphorbia pilulifera and *Alstonia constricta* are now well-known Queensland products, but kamala from that colony has not yet become a commercial article although it would probably come over to this country with a much less percentage of sand or foreign matter than it usually does from India.*

THE DISCOVERY OF THE MYDRIATIC ACTION OF THE SOLANACEÆ.†

BY DR. RUD. KOBERT,

Professor of the History of Medicine and Pharmacology in Dorpat, Russia.

There can be no doubt that the discovery of the mydriatic action of certain Solanaceæ was a matter of great importance for therapeutic practice. Nevertheless, there exists a singular uncertainty, if not confusion, as to the time of this discovery and as to the discoverer himself. In fact, there is not a single book published in German, French, or English, in which I can find reliable data in regard to this matter.*

In order to mend this defect, I beg leave to gather for a historical discussion all pertinent material, which, as may be presumed, is no light task.

The Greeks and Romans understood by mydriasis a condition of visual weakness, together with a dilatation of the pupil. This definition can be found in Paulus Ægineta (iii., 22),† Celsus (vi., 6), and Isagoges; and is probably derived from the peculiar condition of visual weakness and pupillary dilatation invariably to be found in glaucoma. Some few authors, as Aëtius, designate improperly, also, other pathological conditions of the eye, such as phthisis bulbi, as mydriasis. In the presently accepted meaning—*i.e.*, dilatation of the pupils‡—the word appears to have been first used by Cælius Aurelianus ('Chron,' ii., p. 344).

The first mention of a mydriasis produced by preparations of Solanaceæ§ we find in Galen's third volume of 'Methodus Medendi' (Edit. Kühn, tom. x., Lipsiæ, 1825, p. 171). This author states in the second chapter of the quoted volume that grave visual interferences and mydriasis may result by a too intensive local application of drugs containing mandragora or hyoscyamus. Dioscorides and Plinius Secundus do not appear to have known anything of this action, at least these writers never mention it, while mydriasis itself occurs in Pliny, who even mentions an artificial production of mydriasis by the seeds of anagallis. Galen, therefore, is unquestionably the first author who refers to the mydriatic action of two species of Solanaceæ. Still, his in every way correct statement appears to have been wholly forgotten, for no subsequent writer ever speaks of this action, which fifteen hundred years later had to be discovered anew.‖

In 1686, Dr. Ray, a famous English physician, reported in his 'Historia Plantarum' (vol. i., p. 680) that a lady coming under his observation had placed upon a small ulcer beneath the eye a belladonna leaf, and had afterwards been annoyed by an excessive dilatation of the pupil. Simultaneously the lady lost entirely the power of the pupil to react on light. The physician regarded this defect at first as a matter of accident, until a repetition of the belladonna application taught him that a dilatation of the pupil and loss of reactive power for several days were the physiological effects of belladonna.

But this second discovery also was again forgotten, although Ray's work was largely read. Thus Boerhave (1668–1738), however familiar with medical literature, says in his book, 'De Morbis Nervorum' (p. 371), expressively that the juice of belladonna had no

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* See *Pharm. Journ.*, [3], xv., p. 654.

† From the *Therapeutic Gazette*, July 15.

* The statements of A. Hirsch in the 'History of Ophthalmology' (Graefe-Saemisch, 'Textbook of Ophthalmology,' vol. vii., p. 235) appearing to be more trustworthy than those of other authors, have been adopted in the main in this paper.

† This interesting passage is rendered by Adams as follows: When the pupil does not appear changed in colour, but much wider than natural, and when it sometimes wholly impairs the vision, and sometimes nearly so, and when every object appears smaller, the affection is called mydriasis. The cause of it is some redundant humour.

‡ The word pupil, with its present signification, was used by Cicero ('De Natura Deorum,' ii., 57), who derived it from pupula, a little doll.

§ The identification of the Solanaceæ of the ancients is a difficult and as yet but partially-solved problem, *vide* Sprengel ('Ped. Dioscorides de Mat. Med.,' Lipsiæ, 1829, pp. 602–605), Francis Adams ('Paulus Ægineta,' London, 1847, ii., pp. 218–19, and iii., p. 290), and Imbert Gourbeyre ('Recherches sur les Solanum des Anciens,' Paris, 1884). For our purposes it is of importance to know that all of the species in question have a mydriatic action.

‖ Ebn, Baithar, and Paulus Ægineta, know positively nothing of this action.

influence upon the eye, while Van Swieten, in his commentary of Boerhave's 'Aphorisms' (vol. iii., p. 363), quotes Ray's case. And quite independently of Ray's observation, Evers reported in the *Berliner Sammlung*, 1773, vol. v., p. 565,* that he noticed in six persons hebetudo oculorum and dilatatio pupillæ as symptoms of the belladonna intoxication. Evers must accordingly be mentioned as the third discoverer of the mydriatic power of belladonna. Three years later the following case of poisoning occurred at Hamburg. A physician of repute, Dr. Reimarus, had ordered in a drug-store belladonna. The nephew of the apothecary, Johannes Andreas Daries ('De Atropa Belladonna,' Dissert. Inaug. Auctore Petro Joanne Andrea Daries. Lipsiæ, 1776. Reprinted in Ballinger's 'Sylloge,' vol. ii., p. 58), who prepared the prescription from the fresh plant, had a drop of the juice of the berries, or of the herb, accidentally get into his right eye. Very soon after this accident he was troubled by mydriasis and considerable visual interferences. Reimarus, informed by letter of the druggist's trouble, wrote that he was aware that the ingestion of large quantities of belladonna produced mydriasis, but that he was surprised to learn that the external application of the drug could likewise produce this result. This was, however, Reimarus added, a very interesting matter, and invited decidedly to therapeutic trials of the drug in cataract operations. But even before the arrival of this letter, Daries ascertained, by experiments on a cat, that the fresh juice of the herb and of the berries of belladonna had actually a mydriatic power. Hence Daries is to be designated as the fourth discoverer of the mydriatic action of belladonna.

About the same time, or a little later. Doederlein† observed in his practice a case recalling that one of Ray mentioned above. A patient having placed a leaf of datura stramonium upon an ulcer near the eye was soon affected with a complete paralysis of the pupil. Doederlein interpreted this mydriasis very correctly as the action of stramonium, and is accordingly to be regarded as the fifth discoverer of this action. Independently of him, Schiferli,‡ following the example of his preceptor Loder, who appears to have found the belladonna action for himself, used and recommended in 1796 an infusion of belladonna for cataract extraction. Loder is consequently the sixth discoverer of this action.

After this time the specific action of belladonna upon the eye became generally known in Germany and in other countries.

Thus we find it mentioned as something generally known in Tromsdorf's 'Pharmacological Dictionary' (Hamburg and Leipzig, 1802, vol. i., p. 299). The action of hyoscyamus was discovered by Himly in 1800 from botanical deductions, and was warmly recommended for ophthalmalogical purposes.§ Ehlers,‖ one of his pupils, translated the publication of Himly in question into French, but, either on purpose or by mistake, always wrote belladonna instead of hyoscyamus, inducing thus the French physicians to employ belladonna therapeutically. In the second French edition, however, appearing 1803 in Altona, the word jusquiame is used instead of belladonna. In England Paget* recommended the belladonna application for cataract extraction.

In lay circles, however, the mydriatic action of the Solanaceæ was in the beginning of this century still wholly unknown, and was anew discovered by Runge, the discoverer of the aniline colours. This chemist makes, in his 'Chemischen Briefen,'† the following interesting communication :—

"In Jena I became soon acquainted with Döbereiner, and discussed with him my researches about vegetable poisons, especially the Solanaceæ. Döbereiner appeared pleased with the methods instituted by me and the results of my investigations ; he constantly stimulated me to new researches. About this time I met Goethe, at the instigation of Döbereiner, who had told the poet that by experiments upon cats I had found a method of ascertaining with certainty whether or not a poisoning with stramonium had occurred. Goethe had thereupon expressed the desire to meet the young chemist, and to see the demonstration of his discovery. When I crossed the market square in the afternoon, dressed with a borrowed frock coat and stove-pipe hat, and carrying the cat under my arm, I created a universal sensation. The boys who were loitering about the place, at the cry 'Doctor Poison!' suddenly came towards me and surrounded me. To those joking at my fantastic appearance I said, 'Let me in peace. I am attending to some important business. I am going to Goethe.' I was instantly released. Coming to Goethe's house, I was led into the reception-room, and soon stood before the poet. His lofty, handsome, and powerful presence made such an overwhelming impression upon me, that, all in a tremble, I handed him the cat, as if I wanted thus to defend myself. 'Ah ! So,' Goethe said, 'that's what is going to be the future terror of the poison-mixers. Just let me look.' I then turned the cat's head so that the light struck both eyes simultaneously, and the difference between the eyes could be readily seen. Goethe was greatly surprised. Alongside of the small slit in one eye, the round great opening in the other presented a very striking difference. In consequence of a somewhat large dose, the entire iris had almost become invisible, thus enhancing this singular aspect. 'How did you obtain this effect?' asked Goethe. 'With hyoscyamus, your excellency,' I answered. 'I have placed the unmixed juice of the pounded herb in the eye, therefore the action is so strong.' 'Döbereiner told me,' said Goethe, 'that both balladonna and stramonium act alike, and that you have ascertained that the active toxic principle is contained in the plant in all of its parts, from the root to the blossom, fruit, and seed. How is it with other plants, especially those of an affiliated relation?' 'A friend of mine, Dr. Carl Heise, induced by the peculiar action of the stated plants, has shown in an elaborate work that only the plants of the three orders mentioned above affect the pupils in a mydriatic manner. He has tried the action of innumerable other plants on the eye, and found them all to be inert save a few which produced the reverse of mydriasis, viz., a contraction of the pupil, such as aconitum.' 'Well,' Goethe said, 'there is a chance to discover the proper antidote for the toxic action of belladonna. Try this, and apply both antagonistic plants either simultaneously or one after another to the eyes of a cat. Observe the result. The matter is not without difficulties, but you will overcome these. But now, pray tell me, how you came to this peculiar kind of organic chemistry?'" Runge related :

* Gmelin states, in his 'General History of Vegetable Poisons' (Nuremberg, 1777), p. 301, that already in 1765 he had noticed mydriasis as one of the symptoms of belladonna-poisoning, but he does not appear to regard this symptom as characteristic, but rather as an incidental one, for, in reviewing all symptoms, he omits this one.

† Conrad Moench, 'Lehre von den Arzneimitteln,' Marburg, 1795, p. 337. Moench, by the way, was quite familiar with the publications of Ray and Daries.

‡ Rud. Abraham Schiferli, 'Dissertatio de Cataracta,' Jenæ, 1796 ; and 'Theoretical Practical Treatise on Cataract,' Jena and Leipzig, 1797, p. 85. He was military surgeon, later professor of surgery, and died as such in Bern in 1837.

§ 'Ophthalmolog. Beobachtungen und Untersuchungen,' Bremen, vol. i., p. 1.

‖ 'De la Paralysie de l'Iris occasionée par Application locale de la Belladone, et de son Utilité dans le Traitement de divers Maladies des Yeux,' par Himly, trad. par Emil August Ehlers, Paris, 1802.

* *London Med. and Phys. Journal*, 1801, vi., p. 352 ; cf. *Edinburgh Med. and Surg. Journal*, 1813, ix., p. 279.

† This book is wholly unobtainable in the book market. A brief abstract of it appeared in the *Pharmac. Handelsblatt*, 1885, p. 23.

"In 1810 I was—a pastor's son, from the country near Hamburg - sent to Lübeck, and placed in the Raths-apotheke as an apprentice. It was a warlike time, and Napoleon prepared his invasion of Russia. All men able to carry arms were mustered out, and, on account of the universal unwillingness to serve under the tyrant, it was a matter of difficulty to find a substitute. Through recommendation of my uncle, I had received admission into several aristocratic families, and the son of one of them became a friend of mine. One evening he came to the drug-store in great commotion, and told me his trouble, that the day after to-morrow he had to present himself for service, and that, being without physical defect, he probably would be taken. 'I would like to mutilate my hand,' he sighed 'in order not to go into this ignominious war.' 'That is not necessary,' I said. 'Confide in me. I believe to be able to mutilate you for a short time with impunity. They will have to exempt you from service.' 'What are you going to do with me?' 'I will make you blind for twenty-four hours.' 'How are you going to do that?' 'Listen to me. About eight weeks ago I had to prepare a medicine, according to a doctor's prescription, in which a decoction of the juice of hyoscyamus was to be dissolved in water. Preparing the medicine in a mortar, a drop accidentally got into my eye. I experienced no pain, and did not observe any alteration until sensations of light flashes caused me to go to the looking-glass. How great was my astonishment when I saw the change that had taken place in my eye. The iris had almost wholly disappeared, and the eye looked precisely like that of a man suffering from amaurosis. The power of vision was also greatly weakened, as I noticed when I closed the unaffected eye. I don't know why this state of things did not raise any fears in me. After lasting a few days, the abnormal condition disappeared, the power of vision returned, and also the normal proportions of the iris, so that both pupils appeared again of equal size. And behold! such an affection I will produce in both your eyes, and it would be very queer if you would not be discharged even after a superficial examination.' After making some easily-removed objections, my friend consented to this at that time very pardonable fraud, and thus saved his life, for of all men that went from Lübeck to the war in Russia but few returned. His temporary blindness lasted thirty-six hours, passed away painlessly, without leaving behind any deleterious results."

Thus far goes the report of Runge, from which we can distinctly see that he obtained the knowledge of the mydriatic action of the Solanaceæ by the same accident as Daries derived his knowledge. Runge is consequently the seventh discoverer of this action. He tried even to practically utilize his discovery at once; for he recommended in his dissertation ('De Novo Methodo Veneficium Dijudicandi,' Jenæ, 1819) in a case of suspected atropine intoxication to place a drop of the urine of the poisoned person into the eye of a cat. The word atropine does not seem to have been known to Runge, for the solanacea alkaloid, isolated approximately by him, he calls koromegyn (Greek, magnifier of pupil). This alkaloid was isolated in 1830 properly by the apothecary Mein,* of Neustadt-Göders, and independently of him in 1832 by Geiger and Hesse,† while Liebig,‡ determined its chemical formula. The solution of the pure sulphate of atropine, instead of the extract of belladonna, was at once used by Geiger§ and Hesse for the purpose of dilating the pupil. The named chemists succeeded soon‖ after also in isolating hyoscyamine, the active principle of hyoscyamus. They showed that this alkaloid, like atropine, had a distinctly mydriatic action even in a dilution of 1 to 1000.

* 'Liebig's Annalen,' vol. vi., p. 67.
† *Ibid.*, vol. v., p. 38.
‡ *Ibid.*, vol. vi., 1833, p. 66.
§ *Ibid.*, p. 68.
‖ *Ibid.*, vol. vii., 1839, p. 271.

In the majority of books treating of these historical facts, such as in Hirsch's 'History of Ophthalmology,' and in Hirsch's 'Latest Discoveries of Materia Medica,' Heidelberg and Leipzig, 1843, vol. ii., p. 160, we find the statement that the complete isolation of atropine and hyoscyamus occurred in the first half of the second decade of this century, and was obtained by Brandes and Runge. This, however, is wholly untrue.* For all those cases referred only to purified extracts, but not to chemically pure alkaloids. After the mydriatic action of the Solanaceæ alkaloids was positively made out, and had become generally known, their physiological *modus operandi* had to be determined.

Ernst Heinrich, as early as 1821, stated in his famous paper, 'De Motor Iridis' (p. 102), that belladonna paralyses the nerves of the muscular sphincter iridis. This view was confirmed by the experiments of Biffi (1845), Cramer and Ruiter (1853), and is now held exclusively by all ophthalmologists. Nevertheless, this view is only partially correct, for the most recent students of pharmacology have demonstrated that we have to deal here only with a paralysis of the peripheral ends of the nervus oculo-motorius, while the nervus sympathicus supplying the musculus dilator remains absolutely unaffected.

Fraser, of Edinburgh, discovered in 1861 the only practically applicable medium of pupillary contraction, viz., physostigmine or the extract of Calabar bean. Pilocarpine, muscarine, and nicotine likewise contract the pupil, but this contraction is in intensity and extent far inferior to that produced by physostigmine, and is of little practical importance.

A NEW FORM OF STEREOSCOPE.†

BY A. STROH.

Although the late Sir Charles Wheatstone's beautiful invention, the stereoscope, gives the appearance of full relief or perfect solidity to photographs of objects seen by its aid, the photographs for the same must naturally be of limited dimensions; and though viewed through magnifying lenses, the images of the objects are presented to the eye on a scale far below the size of their originals.

It has therefore occurred to me that if the magnified image of a photograph projected on a screen by the optical lantern could be made stereoscopic, a still greater resemblance to the original might be obtained.

With a view of producing such an effect, I have constructed the apparatus I will now describe, which is, however, not intended to enable a large number of persons to see the projected pictures at the same time, as in the case of dissolving views, but is at present limited to the use of two persons simultaneously. It could, however, be easily constructed so as to be available for a greater number.

The principle of the arrangement depends on the well-known effects of the persistence of vision; revolving discs are employed for alternately obscuring two pictures, projected on a screen in the same place, and at the same time interfering with the view of the observer in such a manner that only one picture is seen by the observers' right eyes, and the other by the left eyes.

Two optical lanterns are placed side by side, as for dissolving views. Two transparencies, photographed in the same manner, as if intended for an ordinary stereoscope, are placed one in each lantern, and projected on a screen in such a position that they overlap each other as nearly as possible. The picture which is intended to be seen by the right eye may be placed in the right hand lantern, and the other in the left.

* Equally erroneous is the statement that Reisinger ('Bayerisch's Annalen;' Abhandlungen aus den Gebiete der Chirurgie, Sulzbach, 1827; also *Salzburger Med. Chir. Zeitung*, 1825, No. 14, p. 237, and No. 15, p. 253) in 1824 had used the pure alkaloids of Solanaceæ.

† From the 'Proceedings of the Royal Society,' No. 244.

Supported by suitable framework, and in the front of the two lenses of the lanterns, is a revolving disc, portions of which are cut away, so that during its revolutions it obscures the light of each lantern alternately, or in other words, so that only one picture at a time is thrown on the screen. A continuous change from one picture to the other is thus obtained.

In the same framework, and in convenient positions for the observers, two pairs of eye-holes are provided, one pair on either side of the apparatus. Behind each pair is also a rotating disc, and these discs are connected by suitable wheel-work or driving bands with the one previously mentioned, in such a way that the three discs rotate together, and at the same rate. The two last-named discs are also so cut that they will obstruct the view through the right and the left eye-holes alternately.

Finally the connection between the three discs has to be so arranged that the time of obscuring the view of the observers' right eyes or left eyes shall coincide with the time when the light is shut off from the right or left lens of the lanterns respectively.

It is obvious that by this arrangement the left eyes can only see the picture projected from the left hand lantern, and the right eyes can only see that from the right hand lantern.

The rotation of the discs must be of such a rate, that the alternate flashes of the right and left pictures on the corresponding eyes follow in such rapid succession that the impression made by one flash does not diminish sensibly before the next flash on the same eye is received. The number of flashes for each eye which is required to produce an apparently continuous view, without any flickering effect, is from thirty to forty per second. As the discs are so cut as to produce two flashes for the right eyes, and two for the left in one revolution, they must consequently be kept rotating at a rate of from fifteen to twenty revolutions per second.

The rotation of the discs is effected by a driving-wheel and band, worked by a crank handle at the back of the apparatus.

The perspective effect obtained by the above arrangement is very perfect, the image of each object standing out in solid relief.

Considering that by this arrangement the two eyes never see at the same time, and that each eye views its picture after the other, it is interesting to find that the persistence of vision so completely bridges over the alternate interruptions to which it is subjected as to produce the effect of a continuous view.

An unavoidable effect resulting from this arrangement is, that by the rotation of the discs one half of the light produced by each lantern is always cut off; the higher, therefore, the illuminating power used the better is the result.

This defect is, however, I consider, counterbalanced by several advantages which this form of stereoscope possesses. Firstly, the pictures can be enlarged to such an extent as to appear equal, or even larger than the original objects from which they were taken; and secondly, the eyes, in looking at the pictures, are not in any way subjected to strain by lenses, prisms, or reflectors, or by the difficulty which some persons experience in getting the two pictures to superpose. For each eye views its corresponding picture in exactly the same position it would see it in if it were looking at the original, since the two pictures are practically in the same place, which is not the case in any other form of stereoscope.

Although with the apparatus as here described only two persons can see the pictures at the same time, it would not be very difficult to construct it so as to be available for a greater number. The side discs above described only serve to control one pair of eye-holes each, but by making them a little larger they would serve for two pairs each, thus accommodating four observers. By increasing the number of discs, the number of observers might be increased proportionately.

TYROTOXICON; ITS PRESENCE IN POISONOUS ICE CREAM; ITS DEVELOPMENT IN MILK; AND ITS PROBABLE RELATION TO CHOLERA INFANTUM AND KINDRED DISEASES.*

BY VICTOR C. VAUGHAN, M.D., PH.D.,

Professor of Physiological Chemistry in the University of Michigan, Member of the State Board of Health.

About one year ago, and after two years of close investigation, the writer succeeded in isolating from some samples of cheese, which had produced alarming symptoms in many persons, a highly poisonous ptomaine, to which the name tyrotoxicon (cheese poison) was given. The effects of this poison were demonstrated repeatedly upon some of my students, who kindly offered themselves as subjects of experimentation, and upon myself. These were found to agree closely with those observed by the physicians who treated the persons made sick by eating of the cheese. There were reported to the Michigan State Board of Health about 300 cases. The most prominent symptoms were dryness and constriction of the fauces, nausea, retching, vomiting and purging.

The vomited matter was frothy and the stools watery. In some there were evidences of marked nervous depression. Although in many the condition seemed alarming, all finally recovered..

A report of the discovery of tyrotoxicon in cheese will be found in *Zeitschrift für physiologische Chemie*, B. x., Heft 2; also in the Annual Report of the Michigan State Board of Health, for the year 1885.

Last November a student brought to me a four ounce bottle partly filled with milk which had stood tightly closed with a glass stopper for about six months. From this I succeeded in isolating the same poison. It was recognized by its crystalline appearance and by its effect upon myself. It was presumed that this milk was normal in composition when first obtained; but of this we could not be certain.

I then put several gallons of normal milk in perfectly clean bottles with glass stoppers and allowed these to stand in my work room. From time to time a bottle was opened and the test for tyrotoxicon was made. These tests were followed by negative results, until about three months after the experiment was begun. I then succeeded in getting the poison from one of the bottles. The method of testing for it was as follows:—The coagulated milk was filtered through heavy Sweedish filter paper. The filtrate was colourless and decidedly acid in reaction. It was rendered feebly alkaline by the addition of potassium hydrate, then agitated with ether. After separation the ethereal layer was removed with a pipette, allowed to run through a dry filter paper to remove a flocculent, white substance which floated in it, and then allowed to evaporate spontaneously. If necessary this residue was dissolved in water and again extracted with ether. On the evaporation of the ether the tyrotoxicon was recognized by its crystalline appearance, by its odour, and by placing a small bit on the tongue. As the ether takes up some water, there is usually enough of the latter left after the spontaneous evaporation of the ether to hold the poison in solution, and in order to obtain the crystals, this aqueous solution must be allowed to stand for some hours in vacuo over sulphuric acid.

From one half gallon of the milk there was obtained quite a concentrated aqueous solution of the poison after the spontaneous evaporation of the ether. Ten drops of this solution placed in the mouth of a small dog three weeks old caused, within a few minutes, frothing at the mouth, retching, the vomiting of frothy fluid, muscular spasm over the abdomen, and after some hours watery stools. The next day the dog seemed to have partially recovered, but was unable to retain any food. This condition continuing for two or three days, the animal was killed with chloroform. No examination of the stomach was made.

* From the 'Proceedings of the Michigan State Board of Health,' July. Communicated by the author.

It may be remarked here that I have elsewhere pointed out the necessity of using pure ether for these extractions, as some samples of ether contain an irritating, ptomaine-like substance.

June 13, 1886.—I received from Dr. Henry B. Baker, Secretary of the Michigan State Board of Health, a pint bottle about two thirds full of melted ice cream, with the request that I analyse it, as some eighteen persons had been seriously affected by eating of it. Dr. Baker also sent some of the vanilla which had been used as flavouring. It was thought that the poison would be found in the vanilla, because some lemon ice cream furnished at the same gathering had not affected those who ate of it. As the readiest means of deciding this my assistant, Mr. Novie, and myself took at first thirty drops each of the vanilla extract. No ill effects following this, Mr. Novie took two teaspoonfuls more, with no results. This settled the question of the poisonous nature of the vanilla more satisfactorily than could have been done by a chemical analysis.

We then added some distilled water to the cream and, after thorough agitation, filtered it. The filtrate was tested for tyrotoxicon by the method already given. The aqueous solution, after the spontaneous evaporation of the ether, was given to a cat. Within ten minutes the cat began to retch, and soon it vomited. This retching and vomiting continued for two hours, during which time the animal was under observation, and the next morning it was observed that it had passed several watery stools. After this, although the cat could walk about the room, it was unable to retain any food. Several times it was observed to lap a little milk, but on doing so it would immediately begin to retch and vomit. Even cold water produced this effect. This condition continuing, after three days the animal was placed under ether and its abdominal organs examined. We certainly expected to find marked inflammation of the stomach. But we really did find the stomach and small intestines filled with a frothy, serous fluid, such as had formed the vomited matter, and the mucous membrane very white and soft. There was not the slightest redness anywhere. The liver and other abdominal organs seemed to be normal.

It should be remarked that this cat was about two months old. Attention is called to this, because young animals are affected by this poison much more readily than older ones. It requires a comparatively large amount of the poison to cause any marked symptoms in an old cat.

After having made these experiments I received from Dr. R. C. Moffitt, of Lawton, Mich., the following letter:—

"*Lawton, Mich., June* 21, 1886.

"Dear Doctor:—I understand from Professor Chas. Lawton, of this place, that the cream sent to Lansing, for examination, has been forwarded to you, so I write to give you the particulars. About two hours after eating the cream every one was taken with severe vomiting, and after from one to six hours later with purging. The vomit was of a soapy character, and the stools watery and frothy. There was some griping of the stomach and abdomen, with severe occipital headache, excruciating back-ache and 'bone' pains all over, especially marked in the extremities. The vomiting lasted for two or three hours, then gradually subsided, and everybody felt stretchy, and yawned in spite of all resistance. The throats of all were œdematous. One or two were stupefied; others were cold and experienced some muscular spasms. A numb feeling, with dizziness and momentary loss of consciousness, was complained of by some. Temperature was normal, and pulse from 90 to 120. Tongue, dry and chapp d. All were thirsty after the vomiting subsided, and called for cold water, which was allowed in small quantities, with no bad results. After getting out no one of the victims was able to be in the hot sun for several days, and even yet (about ten days after the poisoning) the heat affects myself. I attended twelve persons, besides being sick myself, and all were affected in pretty much the same way. Several complain yet of inability to retain food on the stomach without distressing them. The man who made the cream took a teaspoonful of it, and he vomited the same as those who ate a whole dish, but not so often nor for so long a time. All are affected with an irresistible desire to sleep, which can scarcely be overcome. Even yet some of us feel that drowsy condition, with occasional occipital headache. "Yours fraternally,

"R. C. Moffitt, M.D.'

It will be seen from the above that the symptoms produced in the persons agree closely with those observed in the cat. Cases of poisoning from ice-cream are by no means rare, and I hope that those who have the opportunity will not fail to test for tyrotoxicon. In the report of the Brooklyn Board of Health for 1885, an instance is given of the poisoning of more than one hundred persons from ice-cream, sent out from one restaurant. The chemist was unable to detect any mineral poison. The injurious results were attributed to the use of decomposed gelatin; but no gelatin of any kind was used in the Lawton cream. Other cases occurring in New York and Brooklyn have been attributed to the employment of artifically prepared vanillin for flavouring; but the vanilla extract used in the Lawton cream was not poisonous, as has been shown.

As I write this, I notice in the daily papers the report of the fearful poisoning from ice-cream, near Leamington, N.J. The papers state that the poisonous substance is arsenic, but how this has been determined is not given. I suppose that arsenic has been named from the symptoms. If it be true that the cream was made from milk brought in by the quart or gallon, by those participating in the festivities, the chance of mixing some milk containing the germ, which must produce the poison, with the good and thus contaminating the whole, was as favourable as it could well be. Of course, if a chemical analysis shows the presence of arsenic the question is settled; but in all similar instances chemical analysis has demonstrated the absence of mineral poisons.

The circumstances under which tyrotoxicon develops require further study. As has been shown above it may develop in normal milk, kept in a clean bottle for three months; but it is evident that in some instances it appears much earlier. The production of the ptomaine is in all probability due either directly or indirectly to the growth of some micro-organism. In the cheese Dr. Sternberg found a new micrococcus; but whether or not there is any relation between this organism and the poison remains to be determined. In the cheese, milk and cream, in all of which I have found the poison, there was present more or less butyric acid, and it may be that there is some intimate relation between butyric acid fermentation and the production of the poison. Some years ago Selmi obtained a ptomaine which resembles coniine, and pointed out that it might be formed by the action of butyric acid on ammonia, thus:—

$$2\,C_4H_8O_2 + NH_3 - 2\,H_2O = C_8H_{15}N,$$
(Butyric acid.) (Ammonia.) (Coniine.)

or thus:—

$$2\,C_4H_8O_2 + NH_3 + 2H - 4\,H_2O = C_8H_{15}N.$$

In like manner other fatty acids may react with decomposing nitrogenous substances, forming alkaloidal bodies. Tyrotoxicon has no special resemblance, so far as is known, with coniine, but the possibility of these alkaloidal substances being formed in this way is worthy of mention. T. Lauder Brunton, in referring to the writer's discovery of tyrotoxicon, states that from the action of the substance he would infer the presence of two poisons. This is altogether possible. The writer not been able to obtain the poison as yet in quantities sufficient to enable him to make an ultimate analysis of it. But that it is a chemical body produced by fermentation there can be no doubt.

If there be any doubt about the poison being produced by fermentation the following experiment would seem to clear it up.

June 26.—I took two samples, of one pint each, from a bottle of milk which had already undergone the lactic acid fermentation. These samples were placed in clean glass graduates. To one, a piece of the solid portion of the poisonous custard about the size of a filbert, and which had been washed with distilled water, was added. To the other no addition was made. These samples stood side by side for forty-eight hours. Both were then tested for tyrotoxicon. The one to which no addition was made gave no crystals, no odour, and when given to a cat produced no effect. The one to which the addition had been made yielded crystals which had the odour of tyrotoxicon, and which, when given to a very large old cat, produced frothing at the mouth and retching, but no vomiting or diarrhœa, and the next day the animal was able to eat food and seemed to have recovered. I am quite certain that had this been administered to a young animal the result would have been more marked.

It is well known that milk, while undergoing the lactic acid fermentation, does not possess any such poisonous properties as those belonging to tyrotoxicon. There is no evidence then that the poison is connected in any way with the ordinary decomposition of milk. The following extracts from a letter just received from the maker of the Lawton cream shows that the attention given to the milk and vessels was all that could be desired :—

"The milk of which the cream was made was fresh and sweet morning's milk, only reserving with it the cream of the milk of the night before from the same cows. The milk is kept in a cool, clean milk cellar. The custard was made about noon that day and immediately afterwards the process of freezing was begun. The vessels were all thoroughly cleaned. There was no possibility of any impurities adhering to them, for they were scalded, wiped and dried before being used. The only ingredients used were the milk, cream, eggs, sugar (best granulated) and the flavouring.

"The lemon cream was frozen first, then taken out, put into the packers and packed solid with ice and salt. Then the vanilla cream was frozen in the same manner. I used the best Jennings's extract, about the usual quantity, not in excess. The cream was eaten in the evening by many people of the village. All of those who ate of the vanilla cream were made sick, and none of those who ate of the lemon cream suffered any inconvenience.

"Now, the milk was the same in both, milked from the same cows the same morning that the cream was made, so that there was no difference in the custard used in making the vanilla cream and the lemon cream, but it turned out that the one made people sick and the other did not.

"We have continued making cream since in the same manner without the least change of the ingredients or the apparatus, except that we have not used vanilla extract, but lemon and pine-apple, and it has been freely eaten and no one has been made sick by it.

"Clearly in my mind the milk does not account for the trouble. One thing further : of course the cream which you examined has been made since June 9, and may have undergone changes which would result in generating the poison referred to in the papers [certain newspaper accounts of the finding of the poison], and which would not have been found in the cream had it been examined when fresh.

"If there is anything further that I can furnish you in regard to facts or circumstances in connection with this ice-cream, I will be willing at any and all times to give the fullest information possible. Hoping to receive the correct analysis soon,

"I remain yours respectfully,

"J. W. Johnson."

That the poison which I found in the cream was the same as that which affected the people cannot be doubted after comparing the symptoms produced in the cat with those observed by Dr. Moffitt, and as has been stated the experiment on the cat was made before I received the letter from Dr. Moffitt. The cream was made on June 9, and the poison separated on the 14th.

I wrote to Mr. Johnson asking several questions, which he has kindly and fully answered. As the nature of the questions is shown in the answers, I will simply give the answers :—

"(1.) The milk from all the cows was mixed together in the making of the custard."

"(2.) The custard for the lemon and vanilla was all one custard ; made and mixed before the extracts were put in."

"(3.) We had previously used the same brands of extracts (Jennings's best), both lemon and vanilla, with no bad results."

"(4.) The food of the cows in the morning and evening consists of oats and corn, ground together and fed dry, with clover hay. I have never seen anything suspicious in the pasture or food. There is a running stream of water, coming from a spring, in the pasture. There is plenty of shade. At evening the cows are driven from the pasture and placed in the stable or yard, according to the season. The stable and yard are open for inspection at any time. My residence is in the centre of the village, and the board of health would not allow me to stable and yard my cows there if there were any bad odours during the summer."

"(6.) The teats are thoroughly washed before each milking."

After receiving the above details concerning the making of the cream, the following experiment was made :

July 8.—To one quart of night's milk a piece of the solid portion of the Lawton cream, about the size of a filbert, was added. This residue had been left in the filter paper ever since the analysis of the poisonous cream, June 14, and it was on June 8 that the first milk for the preparation of the Lawton cream was collected. This dried and hardened lump was crumpled into the milk, which was placed in a clean tin pan and set in a cool cellar. July 9, to a quart of morning's milk, another small bit of the infected material was added, and this milk was also placed in the cellar. At 1 p.m. both portions of milk were poured into a clean earthenware jar, and four fresh eggs beaten, and one pint of granulated sugar were added. The whole was thoroughly agitated, then allowed to stand at the temperature of the room until 4 p.m., when it was placed in the ice-box of a refrigerator, surrounded by ice and here kept until 7 a.m., the next morning, July 10. Then three ounces of the custard was stirred up with distilled water, filtered, the filtrate rendered alkaline and agitated with ether. The residue on the evaporation of the ether was dissolved in a little water and given to a kitten about two months old. Immediately the kitten manifested the symptoms of poisoning by tyrotoxicon, which have already been described. I began the analysis of this custard in the morning before having my breakfast, and getting a little on my finger in carrying the jar, I tasted of it. Within a very few minutes I was nauseated, and ten minutes after taking it I vomited. The prompt action of so small a quantity was probably due to the condition of my stomach. At 2 p.m. of the same day I took one teaspoonful of the custard. Within thirty minutes there was marked nausea and some violent retching, but no vomiting. At 3 p.m. the symptoms having abated, I took a tablespoonful more of the custard. At about 3.30 I began to vomit freely. The nausea continued for about an hour. After this there would be passing sensations of sickness. At 8 p.m., while visiting a patient, I was taken very suddenly and sharply with nausea and griping pains in the abdomen. I again vomited and had one watery stool. After this there was no further

trouble. The occipital headache, mentioned by Dr. Moffitt in his letter, was very marked for some hours after taking the custard. It consisted of sharp, lancinating pains which were confined wholly to the occiput. The nausea was peculiar. I cannot say that there was pain in the stomach. A sickening taste would be felt in the mouth and a peculiar, very sickening odour, which I recognized as that of the isolated poison, would intensify the nausea. The throat and mouth seemed filled with a sticky, tenacious mucus. In short, the effects on these parts resembled those which I have experienced from an over-dose of atropia.

I think that this experiment explains the poisonous nature of the vanilla cream. The fermentation going on in the custard, and probably begun in the milk, was arrested in that part flavoured with lemon by the freezing which was begun immediately. But while the lemon cream was being frozen that part of the custard which was to be made into vanilla cream continued to ferment, and before the freezing process was begun enough of the poison was generated to seriously affect those eating of it.

It should be remarked that in the custard which I made there was nothing peculiar in the taste. It was sweet and pleasant. But while it was not at all acid to the taste, it gave a decidedly acid reaction as tested by litmus, and was not amphoteric in reaction, as cow's milk frequently is.

It is possible that the presence of the large amount of albumen in the custard, from the eggs, hastened the fermentation. I believe that makers of cheese have found by experience that a large amount of albumen in cheese renders decomposition more easy.

How the special germ which produces the poison found its way into the Lawton cream I cannot say; but that it was either present in the milk or was contained in the eggs used, I think cannot now be doubted.

Tyrotoxicon and Cholera Infantum.—I desire to call attention to the great similarity between symptoms of poisoning by tyrotoxicon, and those of cholera infantum. I am aware of the fact that the term "cholera infantum" is used by many in referring to almost any summer diarrhœa of children; but restricting the term to the violent choleraic diarrhœa, as is done by Smith and other best authorities on the subject, we shall find its similarity to poisoning by tyrotoxicon very marked.

The suddenness and violence of the attack, the nausea and vomiting without marked tenderness of the abdomen, the character of the stools, the great thirst, the severe pain in the back of the head, the nervous prostration, and the tendency to deep sleep, are all observed in both. Again, the white, soggy appearance of the mucous membrane of the stomach of the cat corresponds exactly with obsarvations in children after death from cholera infantum. Cholera infantum, as is stated by Smith, "is a disease of the summer months; and, with exceptional cases, of the cities." Thus, the disease occurs at a time when decomposition of milk takes place most readily. It occurs at places where absolutely fresh milk often cannot be obtained. It is most prevalent among classes of people whose surroundings are most favourable to fermentative changes. It is most certainly fatal at an age when there is the greatest dependence upon milk as a food, and, when, on account of the rapid development of intestinal follicles, there is the greatest susceptibility to the action of an irritant poison, and when irritative and nervous fevers are most easily induced. If all these facts be taken into consideration, along with the experiments which have been detailed, and which show the readiness with which the poison can be generated, it will certainly seem at least probable to any one that tyrotoxicon may be a cause of cholera infantum. A little dried milk formed along the seam of a tin pail, or a rubber nipple, tube or nursing bottle not thoroughly cleansed, may be capable of generating, in a large quantity of milk, enough of the poison to render it highly harmful to children. The high temperature observed in children with cholera infantum, and which has not been observed in adults poisoned by tyrotoxicon, may be caused by the continued production of the poison in the child's intestine, by the continued administration of milk, and by the greater susceptibility of the sympathetic nervous system in children.

If this causal relation does exist between tyrotoxicon and cholera infantum, a knowledge of it will aid us, not only in the preventive, but in the curative, treatment of the disease. The first thing to do in the treatment of the disease is to absolutely prohibit the further administration of milk, either good or bad, because the fermentation going on in the intestine would simply be fed by the giving of more milk, even if that milk be of unquestionable purity. I would suggest that some meat or rice preparation be used for food, though experience will soon give us valuable information on this point.

A germ which forms a poisonous ptomaine by its growth in milk may be wholly harmless when placed in a meat or rice preparation.

Secondly, mild antacids should be administered, because the poison, so far as our information goes, is produced only in acid solutions. The great value of the chalk mixture in the treatment of the disease is well known.

Thirdly, theoretically at least, the employment of small doses of some disinfectant would be of benefit. I find that there is considerable difference of opinion in the profession as to the use of small doses of calomel in this disease.

Fourthly, the use of opium in some form is consistent with the theory.

And lastly, the administration of stimulants, brandy and ammonia, to counteract the depressing effects of the poison, already formed and absorbed, should be practised.

All of these, save the first recommendation, have been practised in the treatment of the disease empirically; but the first—absolute discontinuance of the use of milk—I regard as of prime importance.

Of course, it will be understood that attention to securing fresh air, and to other hygienic measures is also desirable.

It is altogether probable that an amount of the poison which would escape chemical detection, might be sufficient to produce poisonous effects in children.

NEW RECIPES FOR COMPOUND EXTRACTS OF FLOWERS.*

BY G. H. DUBELLE, PH.D.

These extracts are fictitious or imitative, being made up of a variety of other extracts, essences and volatile oils. Each odour is distinctive, natural, delicate, and permanent.

Acacia.

	Parts.
Extr of acacia	750
Extr. of orange flowers	120
Extr. of jasmin	60
Extr. of tuberose	60
Tr. of ambergris	10

Alpine Violet.

	Parts.
Extr. of violets	640
Tr. of orris	160
Extr. of acacia	120
Extr. of rose	40
Tr. of ambergris	38
Conc. ess. of bitter almond	2

* From the *Druggists' Circular*, August.

Cape Jasmin.

	Parts.
Extr. of jasmin	880
Tr. of vanilla	80
Tr. of ambergris	40

Carnation Pink.

	Parts.
Triple extr. of rose	450
Extr. of orange flow.	200
Extr. of acacia	200
Tr. of vanilla	100
Conc. ess. of clove	50

Coronilla.

	Parts
Extr. of tuberose	300
Extr. of rose	300
Extr. of jonquil	200
Ess. of neroli	100
Tr. of vanilla	60
Tr. of ambergris	40

Damask Rose.

	Parts.
Triple extr. of rose	580
Ess. of rose geranium	200
Tr. of santal	200
Tr. of musk	20

Daphne.

	Parts.
Extr. of orange flow.	780
Extr. of rose	100
Tr. of vanilla	100
Tr. of ambergris	20

Fiji Islands Flowers.

	Parts.
Triple extr. of rose	300
Extr. of tuberose	200
Extr. of violets	200
Ess. of ylang ylang	200
Extr. of acacia	50
Tr. of patchouly	50

Florida Flowers.

	Parts.
Extr. of orange flow.	300
Extr. of violets	200
Extr. of rose	150
Tr. of vanilla	100
Tr. of tonka	100
Tr. of vetivert	100
Tr. of ambergris	48
Oil of santal	2

Flowers of Erin.

	Parts.
Triple extr. of rose	410
Extr. of jasmin	260
Extr. of violets	260
Tr. of vanilla	40
Tr. of patchouly	30

Flowers of Japan.

	Parts.
Triple extr. of rose	260
Tr. of patchouly	260
Tr. of vetivert	180
Extr. of jasmin	120
Extr. of acacia.	120
Ess. of verbena	60

Flowers of India.

	Parts.
Extr. of acacia	500
Extr. of rose	200
Extr. of tuberose	100
Extr. violets	100
Extr. orange flow.	50
Tr. of patchouly	50

Flowers of Italy.

	Parts.
Triple extr. of rose	460
Extr. of jasmin	200
Extr. of violets	200
Extr. of acacià	100
Tr. of ambergris	20
Tr. of musk	20

Flowers of Mexico.

	Parts.
Triple extr. of rose	250
Extr. of orange flow.	250
Extr. of acacia	120
Extr. of violets	120
Tr. of vanilla	120
Ess. of ylang ylang	100
Conc. ess. of bitter almond	40

Forest Rose.

	Parts.
Triple extr. of rose	520
Extr. of acacia	160
Ess. of neroli pet.	160
Ess. of rose geranium	150
Ess. of citronella	10

Hawthorn Blossom.

	Parts.
Extr. of jasmin	390
Extr. of tuberose	390
Extr. of rose	195
Oil of bergamot	18
Oil of petit grain	5
Oil of rose geranium	2

Heliotrope.

	Parts.
Tr. of vanilla	600
Triple extr. of rose	250
Extr. of orange flow.	100
Tr. of ambergris	40
Conc. cess. of bitter almond	10

Henna Flowers.

	Parts.
Triple extr. of rose	250
Extr. of rose	250
Ess. of rose geranium	250
Tr. of santal	100
Extr. of orange flow.	90
Extr. of violets	60

Honeysuckle.

	Parts.
Triple extr. of rose	250
Extr. of violets	250
Extr. of tuberose	250
Tr. of vanilla	125
Tr. of tolu	122
Ess. of neroli	2
Conc. ess. of bitter almond.	1

Hovenia.

	Parts.
Triple extr. of rose	980
Oil of lemon	16
Oil of neroli	2
Oil of cloves	2

Hyacinth.

	Parts.
Triple extr. of rose	300
Extr. of orange flow.	200
Extr. of violets	200
Extr. of acacia	200
Tr. of vanilla	100

Jaqueminot Rose.

	Parts.
Triple extr. of rose	600
Ess. of rose geranium	200
Extr. of orange flow.	100
Tr. of ambergris	80
Tr. of musk	20

Jonquil.

	Parts.
Extr. of jasmin	380
Extr. of tuberose	380
Extr. of orange flow.	200
Tr. of vanilla	40

Kew Garden Flowers

	Parts.
Ess. of neroli pet.	300
Extr. of acacia	150
Extr. of tuberose	150
Extr. of jasmin	150
Ess. of rose geranium	150
Tr. of ambergris	50
Tr. of musk	50

Lebanon Cedar.

	Parts.
Alcohol, 80°	700
Triple extr. of rose	250
Oil of cedarwood	50

Lily of the Nile.

	Parts.
Extr. of tuberose	400
Extr. of acacia	200
Tr. of vanilla	120
Extr. of jasmin	100
Extr. of orange flow.	100
Extr. of rose	78
Conc. ess. of bitter almond	2

Lily of the Valley.

	Parts.
Extr. of tuberose	400
Extr. of rose	200
Extr. of acacia.	200
Extr. of orange flow.	100
Extr. of jasmin	98
Conc. ess. of bitter almond	2

Magnolia.

	Parts.
Triple extr. of rose	500
Extr. of orange flow.	250
Extr. of tuberose	125
Extr. of violets	122
Conc. ess. of bitter almond	2
Conc. ess. of citron	1

Maiglœckchen.

	Parts.
Extr. of tuberose	600
Extr. of acacia	200
Extr. of jasmin	100
Ess. of neroli	95
Oil of bitter almond	5

May Flowers.

	Parts.
Tr. of orris	460
Triple extr. of rose	320
Extr. of jasmin	160
Tr. of ambergris	40
Oil of neroli	6
Oil of lemon	6
Oil of cedrat	6
Oil of cinnamon	2

Meadow Flowers.

	Parts.
Tr. of tonka	300
Ess. of rose geranium	300
Extr. of rose	200
Extr. of orange flow.	100
Tr. of orris	40
Extr. of jasmin	20
Extr. of acacia	20
Tr. of musk	20

Mignonette.

	Parts.
Extr. of reseda	930
Tr. of ambergris	50
Tr. of tolu	20

Moss Rose.

	Parts.
Triple extr. of rose	630
Extr. of orange flow.	200
Tr. of ambergris	100
Tr. of musk	70

Musk Rose.

	Parts.
Triple extr. of rose	600
Extr. of rose	200
Tr. of musk	150
Tr. of ambergris	50

Myrtle Blossom.

	Parts.
Triple extr. of rose	390
Tr. of vanilla	190
Extr. of tuberose	190
Extr. of orange flow.	190
Extr. of jasmin	40

Narcisse.

	Parts
Extr. of tuberose	550
Extr. of jonquil	230
Tr. of tolu	110
Tr. styrax	110

New Mown Hay.

	Parts.
Tr. of tonka	280
Extr. of rose	280
Extr. of orange flow.	140
Extr. of jasmin	140
Ess. of rose geranium	140
Extr. of acacia	20

Night Blooming Cereus.

	Parts.
Triple extr. of rose	250
Extr. of jasmin	250
Tr. of benzoin	200
Extr. of tuberose	100
Tr. of tonka	100
Tr. of ambergris	100

Opoponax.

	Parts.
Extr. of acacia	270
Extr. of tuberose	270
Extr. of jasmine	200
Extr. of violets	80
Extr. of rose	60
Tr. of benzoin	60
Tr. of musk	60

Orange Blossom.

	Parts.
Alcohol, 80°	900
Tr. of musk	60
Extr. of jasmin	20
Oil of neroli	15
Oil of bergamot	4
Oil of sweet orange	1

Patchouly.

	Parts.
Alcohol, 80°	990
Oil of patchouly	8
Otto of rose	2

(*To be continued.*)

The Pharmaceutical Journal.

SATURDAY, AUGUST 21, 1886.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THERAPEUTICS AND PHARMACOLOGY AT BRIGHTON.

IN noticing last week the opening meetings of some of the sections of the British Medical Association, only a brief reference could then be made to the address delivered by Dr. LAUDER BRUNTON as President of the Section of Pharmacology and Therapeutics, having for its subject the Relationship which exists between Chemical Constitution and Physiological Action. Dr. BRUNTON commenced his address by saying that as in paleontology there were four stages—the Paleolithic age, in which remains show that man used as implements rough stones rudely chipped into shape, the Neolithic or polished stone age, the Bronze age, and the Iron age,—so in therapeutics there has been an age in which crude drugs were used; next an age of galenical preparations, extracts, tinctures, etc.; then an age of definite chemical salts and alkaloidal principles; and lastly a constructive chemical age of manufactured chemical compounds. The treatment of disease by the first three classes of agents has been conducted on empirical principles; the use of the last is based on scientific ground. For practical purposes all four are still employed, but Dr. BRUNTON thinks gradual and steady advance is being made in the fourth stage of treatment. Taking for an illustration the flesh-hooks used by the sons of ELI, at Shiloh, the speaker compared the contents of the cauldron to the human body, the handle of the hook to a base and the barbed end to a halogen in a chemical substance. He then pointed out that much would depend on the length of the handle (the atomic weight of the base), as well as on the length and nature of the prong (the halogen, its atomic weight and constitution), as to whether the priest would be successful in catching the desired piece of meat and securely withdrawing it. A handle like the base sodium (23) might be too short; it might be more manageable if like potassium (39), but it might be too long if like rubidium (85). These handles, he said, might be pronged respectively with chlorine (35), bromine (80), or iodine (127), the action of combinations of the base with the first being comparatively weak compared with those of the last. He next showed that the flesh-hook might not be limited to one, or even two prongs, but it might be like a trident, and even have two or more barbs on each prong. In this way some of the simple and the more complex organic compounds were passed under view, the effect of replacing certain atoms by molecular groups being shown, and how this affected the physiological action of the original compound. Dr. BRUNTON gave examples of the aromatic series, which he said were generally antiseptics, and showed how the difference in physiological action of the isomers pyrocatechin, resorcin and hydroquinone might be logically inferred from their chemical constitution or different linking of their atoms. Next he referred to the antipyretics thallin, kairin and antipyrin, and said that these substances were the results of attempts to produce bodies having a specialized action; they being antipyretics having little action on the nervous system or circulation. In addition, the relationship between the constitution of the hypnotics chloral, paraldehyde and urethane and their physiological action was pointed out.

The first paper read in the section was on "Lanolin," by Dr. OSCAR LIEBREICH, of Berlin, who introduced this substance into medical use. As has been before mentioned in this Journal, it is prepared from suint, and consists of the cholesterin fats of sheep's wool. The professor said that by an improvement in its manufacture it is now supplied entirely free from saponifiable fats. In an anhydrous condition it is dark brown and semi-translucent, while the commercial hydrated preparation is opaque and pale yellow coloured, and he showed experimentally how the former, by its great power of absorption, takes up water upon being simply triturated with it, and then appears paler and opaque. A discussion followed, in which it was stated that where absorption of a medicament by the skin is required lanolin has great advantages over lard and petroleum ointments. It can be mixed with fats and oils, and if required to be applied to hairy surfaces it should be thinned with oil to the consistence of a liniment. Dr. MACKEY said he had found lanolin useful as the basis of an ointment of iodide of potassium in the painful joints of rheumatic gout; also for applying crysarobin and mercury. But these preparations should be used only one-half the strength usual when other vehicles are employed, else a revulsive action is produced. In psoriasis lanolin alone removes the scaly eruption if rubbed in persistently.

A paper on "Hamamelis" was read by Dr. SHOEMAKER, of New York, who, from clinical experience, said he could highly recommend the drug for all kinds of passive hæmorrhage. Given internally it controlled hæmoptysis, hæmatemesis, hæmatura, varicose veins and the mucous discharges of diarrhœa, leucorrhœa and gonorrhœa. The preparation he prefers is the fluid extract of the United States Pharmacopœia in doses of 20 minims to a drachm

or more; smaller doses and weaker preparations are of little service. Dr. Isambard Owen read the Report of the Collective Investigation Committee on this drug, which reported favourably on its use; all the pharmaceutical preparations being considered active, and in only one case had it been stated that it produced worse effects than occasional sickness or headache. Dr. Mackey, of Brighton, read a paper in which it was stated that resorcin given internally for gastric catarrh, gastric ulcers, intestinal catarrh, and in ulcerated and discharging mucous surfaces, had proved of great service. Dr. Carter, of Liverpool, read a paper on "Antipyretics."

Dr. Spender, of Bath, opened what proved to be an interesting discussion on analgesics or anodynes. He recommended that the drug employed to relieve pain or procure sleep should be administered in small doses frequently repeated. Dr. Brown Sequard took part in the discussion of this paper, and described some interesting experiments made on animals, and others on himself and his assistants. He has found that on passing a stream of carbonic acid or chloroform vapour into the larynx of a dog, while respiration of pure air is kept up through an opening into the trachea, when the larynx of the animal comes fully under the influence of the analgesic all sensibility to pain is lost, and a wound made in any part of the body during this state of laryngeal analgesia is not felt. He, in fact, claims to have discovered the centre of sensibility or feeling in this organ; the other senses are unimpaired—movement, hearing, and sight are unaffected. He further described the experiments he has made in applying this discovery practically. In the lower animals analgesia can be readily produced by passing carbonic acid into the larynx during the act of expiration, without opening the trachea, but this is not practicable in the case of man. Still he had succeeded in bringing himself under its influence in about thirty minutes by an arrangement whereby carbonic acid was inspired during the latter part of the act of inhalation, in which case it only affected the larynx and bronchial tubes without entering the lungs; but its effect was exceedingly disagreeable and it had to be abandoned. A better means of producing this laryngeal analgesia has still to be devised. Dr. Liebreich followed, referring more especially to the action of anæsthetics as analgesics. He said that those containing Cl_3 in the molecule—trichlorated fluids, like chloroform and chloral—produce their first action on the brain, next on the spinal cord, and lastly on the heart. Dichloride of ethidene, a bichlorated body, exercises its third action on the medulla oblongata, not on the heart. Butyl chloral, another bichlorated substance, affects first the brain and then the medulla oblongata only.

Dr. Stephen Mackenzie read a paper on the value of Cannabis Indica in a certain class of headaches in which he recommended its continued use and the pushing of the dose if necessary. Dr. Jessop, of London, speaking of the use of cocaine in ophthalmic practice, pointed out its twofold action as a local anæsthetic and as a mydriatic or pupil dilator. In iritis its addition to atropine aids the mydriatic action of the latter and allays the pain. According to Dr. Jessop nothing stronger than a two per cent. solution should be used for the eye, and it should be freshly prepared or kept in boric acid solution.

Dr. Mitchell Bruce described a case showing the value of morphine in diabetes. He found it reduced the amount of sugar daily eliminated from 4000 grains to *nil* if administered by the mouth; as much as seven grains of the acetate were given daily, in conjunction with a strictly diabetic diet. Tried hypodermically on the same case the results were much less satisfactory; 768 grains of sugar continued to be eliminated daily when drowsiness was complained of, three grains of the morphine salt being at this time injected per diem. He considers the value of morphine in diabetes has been overlooked in the preference now given to codeine in treating it. He still thinks that crude opium is to be preferred to either alkaloid for out-patient practice. Elderly persons, it was stated, stand large doses of codeine in this disease much better than the young.

Mr. St. George, of Lisburn, read a paper on the use of Manaca in rheumatoid arthrites. This Brazilian drug, the root of *Franciscia uniflora*, Pohl, is known as mercurio vegetal. It is reputed to be diuretic, diaphoretic, purgative and antisyphilitic. The fluid extract in doses of twenty minims three times a day was used with very partial success.

On Terebene the Collective Investigation Committee reported that it has considerable power in diseases affecting the air passages, especially if given in full doses. It relieves asthma, hay fever and winter cough; it also moderates the catarrh of phthisis and acts as a disinfectant to the sputa. Gastric irritation has been stated to have occurred in some cases from its use, but no other untoward effects were reported to have been produced by it. A paper by Professor Victor Horsley and Dr. Felix Lemon was read on the "Action of Ether on the Laryngeal Muscles, Vocal Cords," etc.

Dr. Rendall exhibited specimens of Barégine or Glairine, a mixed unctuous and saline substance, having a sulphuretted odour, obtained from the waters of Aix-les-Bains. The special virtues of this water in massage are attributed to this substance.

Up to the time of the close of the meeting of the Association no invitation had been received from any town for the meeting next year, though there were several invitations for the year after. It was therefore left to the Council to decide upon the place of meeting in 1887.

We are informed by the Honorary General Secretaries to the British Pharmaceutical Conference, that in addition to the list published in our last week's issue, the following papers will be read at the Birmingham meeting :—

15. The Correlation of Studies in Botany and Materia Medica. By Professor Hillhouse, M.A., F.L.S.

16. Ulexine, its Extraction, Characters, and Tests. By A. W. Gerrard, F.C.S.

17. Note on the Preparations of Nux Vomica in the British Pharmacopœia. By N. H. Martin, F.L.S.

18. The Preservation of Nitrite of Ethyl. By J. Williams, F.I.C., F.C.S.

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It is pretty well decided that the meeting of the British Association for the year 1887 shall be held in Manchester, and on the 13th inst. a meeting of the pharmacists of the city and district was held in the Memorial Hall to consider the advisability of inviting the British Pharmaceutical Conference also to hold its annual meeting there next year. After some explanations had been given it was resolved that a cordial invitation should be given and that Messrs. Woolley and Benger should be appointed as delegates to represent the Manchester pharmacists at the meeting a fortnight hence in Birmingham and to give expression to the resolution. An influential local committee has been formed, and Mr. Benger has been asked to act as honorary secretary *pro tem.*

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At the opening general meeting of the British Medical Association last week it was announced that the residue of the lease of the building recently occupied by the Briton Medical and General Insurance Company, at the corner of Agar Street, Strand, had just been purchased and the premises would be fitted up as the future London office of the Association.

* * *

The interesting lecture by Professor Lodge on the Electrical Deposition of Dust and Smoke, which was published *in extenso* in last week's Journal, concluded with some suggestions for the practical application of the observations described. From the report of the Chief Inspector of Alkali Works, etc., just issued, we learn steps are being taken to estimate the value of those suggestions, and that experiments on a very large scale have been set on foot for testing the efficacy of a current of high tension electricity in arresting the fumes from lead smelting operations. A case is referred to in the Report that surpasses any mentioned by Professor Lodge as illustrating the difficulty with which this is at present effected. It is that of a lead smelting works in Wales where a flue or culvert of the enormous length of three miles has been erected to give the fumes an opportunity of settling; yet after passing through the whole distance a considerable quantity of metallic fume passes out into the surrounding air. In another case, where lead rich in gold and silver was being treated the fume escaping from the chimney was tested and found to be carrying away the precious metals to the value of £3000 a year; the larger portion of this is, however, now saved. Flour mills, where usually as much as 3 per cent. of the flour is lost as dust, cement works, cotton and wool works are other possible fields for the application of Professor Lodge's observations. The black smoke from chimneys Mr. Fletcher would not deal with by this method, the proper remedy for that being their avoidance by securing more perfect combustion of the fuel.

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Other interesting notes are to be found in this Report. Notwithstanding all the improvements that have been carried out in bleaching powder works the escape of chlorine is still the subject of much complaint. In some instances it has been ascertained that the air escaping from the works contained as much as 100 grains of chlorine per cubic foot and the average of the whole Newcastle district is as high as 12 grains, although air containing more than 2½ grains to the cubic foot is foul enough to cause great annoyance for a considerable distance. It would appear that the principal source of this chlorine is the residual gas which remains unabsorbed after the powder is finished and escapes when the chamber is opened. With the object of overcoming this nuisance, in the works of the Newcastle Chemical Company the pipes which connect the chambers with each other and with the chlorine stills are now so arranged that they work in series, so that while the first or strong chamber may revel in excess of chlorine, the unused gas passes into a second or third chamber, meeting there fresh lime by which it is absorbed. The result is not only an economy in chlorine, of which the discharged air contains not more than a trace, but it has been found practicable to produce a bleaching powder of the unusual strength of 39 per cent. So that once more the convenience of the public and the interests of the manufacturer have proved to be compatible.

* * *

Among the drugs offered for sale this week there were noticed marking nuts (*Semecarpus anacardium*), cashew nuts (*Anacardium occidentale*), carnauba wax, long nutmegs and mace (*Myristica malabarica*), the seeds of *Jatropha curcas*, 233 cases of Japanese camphor oil, and large liquorice root from Bagdad. The mace and nutmegs have very little taste and no aroma, and it is difficult to understand to what purpose they can be applied, the price at which they are bought, chiefly it is believed by Americans, hardly allowing a profit if used simply for the extraction of the fat they may contain. Japanese star anise still appears in the market, but cubebs evidently continue to be scarce, since some of the packages offered consist of very young and shrivelled fruits, and others almost entirely of the spikes which bear the fruits. From the large quantity of camphor oil offered it seems probable that a commercial use has been discovered for this article.

* * *

The report for 1885 on the Government Botanical Gardens at Saharumpore, near Meerut, by Mr. J. F. Duthie, contains some interesting information as to acclimatization experiments. Attention has been paid to the cultivation of henbane and taraxacum, with the result that the crops are now sufficient to supply the demands from the medical depôts. Three hundred jalap tubers, obtained from the Nilghiris, multiplied in one season to upwards of two thousand, besides yielding some seed that has produced healthy little plants. Cuttings taken from the stem a little above the crown of the tuber have also been successful.

British Medical Association.

THE ANNUAL MUSEUM OF THE BRITISH MEDICAL ASSOCIATION AT BRIGHTON.

Probably no town in the kingdom offers such convenient quarters for holding the meetings of the British Medical Association as Brighton does in its Pavilion buildings. Shade of the "first gentleman in Europe"! How different the purpose for which those buildings have just been employed from that for which he used them. In what is now the Corn Exchange, a hall 200 feet by 50 feet, formerly the Riding School, adjoining the Dome of the Pavilion, was held the annual Museum of the Association, the weekly corn market on Thursday being assigned another room.

The Museum was in three Sections. Section A., foods, drugs, etc., comprised more than half the number of exhibits. Section B., books, instruments and appliances, and Section C., each about one-fourth. It is only, however to the exhibits in Section A. that we propose to refer.

A specialty was made of prepared, peptonized and other compound nutrients. Extract of malt and compounds containing it were exhibited by various makers, well known to our readers, the Maltine Company, Hoff, Allen and Hanburys, and Burroughs, Wellcome and Co. The last firm showed a "Solution of Cod Liver Oil in Extract of Malt," and claimed to demonstrate its perfect solution by the microscope. The old makers, Loeflund and Co., exhibited some good malt compounds. Their Cremor Hordeatus is exceedingly palatable and recommended as a substitute for cod liver oil; their Kindermilch, or infant's food, rich in fat and, without addition of cane sugar or starch, composed of condensed milk blended with an extract of wheat, seems also a good preparation. A new competitor in this field was Paterson's Extract of Malt, exhibited by the Phœnix Chemical Works, Glasgow; the odour and flavour of this was excellent, and it is said to be rich in diastasic power. Prepared from it was exhibited a series of digestive biscuits, rusks and bread by John Montgomerie, of Glasgow. In making these part of the starch of the flour is changed by being mixed with the malt extract and water and kept for some time at a suitable temperature; the yeast being probably added to another portion of flour and water, to form dough to mix with the above before baking. These biscuits seemed to be appreciated by visitors. Messrs. Hill and Son also exhibited some malted nursery biscuits. Benger's well-known digestive ferments were well displayed, together with an essence of rennet recently introduced. Of extract and essence of beef, concentrated beef tea, and peptonized preparations, those of Brand and Co., George Mason and Co., Johnston's Fluid Beef Company, Liebig's Extract of Meat Co., Van Abbot and Son, Savory and Moore, Walker, Troke and Co., Sellers, Edge Brothers (Lion Brand) and Cibil's Fluid Extract of Beef were exhibited; the last judged, by sample, is very appetizing and free from burnt taste. Fairchild's preparations of trypsin, pepsin in scales, etc., were exhibited by Burroughs, Wellcome and Co. Barff's Kreochyle and Boroglyceride, the Aylesbury Dairy Co.'s Koumiss preparations and Artificial Human Milk, and Dr. Koch's Meat Peptone, were displays that attracted attention.

Of pure chemicals and official pharmaceutical preparations there was but a poor display. Cocaine and its salts were exhibited by McKesson and Robbins, Howards and Sons, Savory and Moore, Corbyn and Co., and Martindale. The last exhibitor showed a fine specimen of anhydrous hydrochlorate of cocaine, in pure white, pearly crystals. Messrs. Howard also exhibited by Messrs. Glaisyer and Kemp a series of fine cinchona alkaloids and their salts. Messrs. T. and H. Smith and Co. showed opium alkaloids and their salts, together with purified jalap resin and scammony resin, in white powder, also aloin.

Messrs. Mackey, Mackey and Co. exhibited a large collection of chemical syrups, liquors, and scale preparations; these more particularly illustrated combinations with cerium. Messrs. Corbyn, Stacey and Co. showed a series of fluid extracts, crude drugs, and a sparkling wine of coca. Messrs. Christy and Co. exhibited poisoned arrows, impregnated with the poison of the upas (*Antiaris toxicaria*), alvelos milk (for cancer), camphor oil, kola nuts, dried papaw milk, Persian rose-water in original bottles of quaint shape, strophanthus seeds from various species, and jambul seeds (*Syzygium Jambolanum*), which are said to arrest the formation of sugar in diabetes. Burroughs, Wellcome and Co. had a large display of their specialties and others for which they are agents, among which were lanolin and preparations made with it, lanolin cold cream, etc. Allen and Hanbury's exhibited a selection of their specialties; and Savory and Moore, per Mr. Billing, a collection well illustrating theirs, including infant's food, peptonizing preparations, coca cigarettes, solid liniments of belladonna, aconite, camphor, etc. Gibbons and Son, Manchester, showed their salve sticks, suggested by Dr. H. G. Brooke, composed of the medicament combined with cacao butter, or lanolin and yellow wax. Herr Beierrsdorf, Altona, showed specimens of Unna's plasters for skin diseases; J. Bell and Co., London, samples of medicated cotton wool, impregnated with iron, iodine, boric acid, etc. Of coated pills there was only a moderate display, considering that Brighton is the home of coated pills. These were shown by Messrs. Cox and Co., Schieffelin and Co., Warner, and McKesson and Robbins. Of antiseptics the display also was not large. That of the Sanitas Company attracted attention, and Martindale's specimens of iodoform, and its suggested colourless substitutes iodol, iodo-salicylic acid, and di-iodo-salicylic acid merited notice. Mr. Martindale also exhibited chloride of methyl liquefied by compression into copper cylinders, for producing local anæsthesia, and as a revulsive in sciatica, neuralgia, pleurisy and pneumonia; a series of petroleum ointments; salol, terpin-hydrate, terebene, and the new hypnotics, hypnone, paraldehyde and urethane. Of local interest, Messrs. Barton Brothers exhibited their well-known toilet preparations, glycerine cream and dentifricium; also a series of liquid extracts of sarsaparilla, on which the present official preparation was founded. Mr. E. F. Salmon, Hove, showed some iron syrups and pearls of aloin. Parke, Davis and Co. showed some fluid extracts, coated pills, and Semple's atomizing inhaler; this was exhibited vaporizing compound tincture of benzoin in a fine cloud. Aerated waters were exhibited by Schweppe and Co., among which coca and quinine waters formed novelties. Schacht and Co. showed the Kronenquelle aperient water; Feltoe and Co., lime juice, and the Apollinaris Co. their specialties.

Much of the success of the Museum was due to the indefatigable labours of Dr. Mackey and Mr. Savage, junior.

Proceedings of Societies in London.

ROYAL INSTITUTION OF GREAT BRITAIN.

Certain Properties Common to Fluids and Solid Metals.*

BY PROFESSOR W. CHANDLER ROBERTS-AUSTEN, F.R.S., M.R.I.,
Chemist of the Mint, Professor of Metallurgy, Normal School of Science and Royal School of Mines.

In one of the beautiful discourses, delivered in the early part of the last century, which grace the annals of the French Academy of Sciences,† Réaumur observes that industrial art, like nature, has its marvels, which we often fail to notice because they are constantly before us.

The extraordinary ductility of metals appeared to him to involve one of the deepest secrets of nature, and although he held that in his time science was hardly in a position to explain more fully than the old philosophers did, the cause of this property of bodies, it was nevertheless possible to see better than they what advantage art has gathered from the power of leading and guiding metals by hammering or by traction, and from this point of view both art and nature seem, he says, to rival each other in furnishing us with remarkable facts. Réaumur then, with singular clearness, defines the conditions under which metals prove to be ductile. The relation between the behaviour of solid metals and fluids has long been recognized, not merely in the sense that atomic motion is common to solids and fluids, and that therefore "everything moves and nothing remains," but apart from theory there is much experimental evidence as to the properties that are common to fluids and solid metals, the characteristics of which, at first sight, seem widely separated. Let me remind you of the elementary definition of the two states, *solid* and *liquid*. A solid has a definite external form which either does not change, or only changes with extreme slowness when left to itself, and, in order to change this form rapidly, it is necessary to exert a more or less energetic effort. A liquid, on the other hand, can be said to have no form of its own, as it always assumes that of the containing vessel, the mobility of its particles is extreme, its resistance to rupture is very small, and its free surface is always a plane when the mass is left at rest. Then there is the colloid condition, which intervenes between the liquid and crystalline solid state, extending into both, and probably affecting all kinds of solid and liquid matter in a greater or less degree. The colloid or jelly-like body does present a certain amount of resistance to change of shape. Such a substance is well imitated by a skin of thin india-rubber filled with water. Another illustration is probably afforded by iron and other substances which soften under heat, and may be supposed to assume, at the same time, a colloid condition. Lastly, there is the gaseous condition of matter, with which we have but little to do at present.

We are in the habit of regarding metals as typical solids. I hope to trace this evening the analogies of their behaviour under certain conditions with that of fluids, and the following list shows the order in which I propose to group the properties common to fluids and solid metals :

1. Rejection of impurities on solidification.
2. Surfusion.
3. Flow under pressure.
4. Changes due to compression.
5. Absorption of gases.
6. „ liquids.
7. Diffusion.
8. Vaporization.
9. Surface tension.

* Address delivered at a Weekly Evening Meeting, Friday, March 26.

† 'Histoire de l'Academie Royale des Sciences,' 1713 (vol. for 1739, p. 199).

The transition from the liquid to the solid state is marked by the same phenomena in the case of many metals, as is observed in certain fluids, and I must dwell on this very briefly as leading up to the relations between solid metals and fluids, which come more definitely within the title of the lecture.

Water on passing from the liquid to the solid state undergoes a partial purification, the ice first formed being sensibly more free from colouring matter or suspended particles than the water from which it separates.

Many metals on freezing similarly eject impurities. In the case of alloys, saturated solutions, of one metal in another, appear to be formed, and excess of metal ejected, a fact which is being studied with much care by my colleague, Dr. Guthrie. The prominent facts are perhaps best illustrated by reference to a frozen mixture of copper, antimony, and lead. The results of some experiments conducted in my laboratory by my assistant, Dr. E. J. Ball, show that when a molten mixture of these metals is solidified, a definite atomic alloy of copper and antimony, which possesses a beautiful violet tint, first forms, and, after saturating itself with lead, up to a certain point, it ejects the rest of the lead, driving it to the centre of the mass so as to form a sharp line of demarcation, the outer circle of which represents violet, and the inner grey, presenting a direct analogy to the ice, which is comparatively colourless, first forming from coloured water. Then there is another remarkable analogy between the freezing of certain fluids and the solidification of some metals. Water may, as is well known, be cooled down to $-8°$ C., without solidification, but agitation immediately determines the formation of ice, and at the same time a thermometer plunged in the water rises to zero. Faraday stated, in 1858, that fused acetic acid, sulphur, phosphorus, many metals and many solutions,* would exhibit the same effect. Tin also may be cooled to several degrees below its solidifying point without actually freezing, and Dr. Van Riemsdijk,† of Utrecht, has observed that a globule of gold or silver, in a fused state, will pass below its solidifying point without actually solidifying, but the slightest touch with a metallic point will cause the metal to solidify, and the consequent release of its latent heat of fusion is sufficent to raise the globule to the melting point again, as is indicated by a brilliant glow which the button emits, a beautiful effect which I hope to show you.

It may be well also to remind you incidentally that a minute variation in composition is sometimes sufficient to lower the melting point of a metal or alloy, as is instanced by the addition of $\frac{2}{10}$ per cent. of silicon to standard gold, which, as you will observe in the case of this strip of the alloy, softens in the flame of a candle, or at about the melting point of zinc, 412° C., although the melting point of standard gold, free from silicon, would be over 1000° C.

Now to pass to solid metals. It is the common experience of us all, that a counterfeit shilling, consisting principally of lead, does not "ring" when thrown on a wooden surface. In 1726 Louis Lemery observed that lead is under certain conditions almost as sonorous as bell-metal.‡ He communicated the fact to Réaumur, who, being much struck by it, investigated the conditions under which lead becomes sonorous, and submitted the results to the French Academy.§ He pointed out that in describing a body which is not sonorous it is usual to say that it is as "dull as lead," an expression which has become proverbial. "Nevertheless," he adds, "under certain conditions, lead has a property both novel and remarkable, for it emits surprisingly sharp notes when

* Faraday, 'Experimental Researches in Chemistry and Physics,' p. 379.

† Dr. Van Riemsdijk, *Ann. de Chim. et de Phys.*, t. xx., 1880, p. 66.

‡ Hoefer, 'Histoire de la Chimie,' t. ii., p. 374.

§ 'Histoire de l'Academie Royale des Sciences,' Anné 1726 (vol. for 1728, p. 243).

struck with another piece of lead." He showed that it was necessary that the lead should be formed by casting into a segment of a sphere, that is, mushroom-shaped, as in the specimens of lead exhibited. The lead must be free from prominences, and must be neatly trimmed. The effect is less marked if the lead be very pure than if ordinary commercial lead be used, but it is only a question of degree.

Réaumur showed that the sonorous lead might be rendered dull by hammering it. Here is lead from the same sample of metal as that from which the sonorous mass was cast, but it has been flattened out, and you will observe that it is "dull." I think his remarks have been overlooked in late years. He was led to the belief that in cast lead there must be an arrangement of the interior of the mass which the hammer cannot impart, because lead fashioned by hammering into the same form as the sonorous cast mass is dull, and, more important still, he held that the fibrous and granular structure of the lead is modified in a manner which makes it probable that the sound is due to the shape of the grains, and to the "way in which they touch each other"; further, the blows of the hammer not only change the arrangement of the fibres, but they alter the shape of the grains, "the round grains are rendered flat, they are compelled to elongate and fill the interstitial spaces which previously existed between them. The particles are no longer free to vibrate, hence the lead is dull." These remarks derive additional interest if we compare them with the observations in Professor Osborne Reynolds's most important lecture on 'Dilatancy in Granular Matter,' recently delivered here. We shall also, I think, see that this description of Réaumur's shows that he fully appreciated the theoretical importance of the kind of facts depending on the transfer of metallic matter from one position to another, which we now consider to be characteristic of the "flow" of metals; at any rate I have thought it well to make Lemery's experiment the starting point of the rest of the remarks I have to offer you.

A solid may be very brittle, and may yet, if time be given to it, flow from one point to another. This stick of sealing-wax was supported at its ends, and it has in a few weeks bent at the ordinary atmospheric temperature, although at any given point of its flow it would have been easy to snap it with a slight application of force. This much thinner strip of pure lead of the same breadth as the sealing-wax, also bends at the ordinary temperature with its own weight, the ends being supported. Sir William Thomson has pointed out that a gold wire sustaining half the weight which would actually break it, would probably not rupture in a thousand or even a million years, that is to say, there would be no "flow" ending in disruption; if, however, force be suitably applied, metals will flow readily. First, let us examine the case of a metal under force applied so as to compel it to flow through a hole, and I would point to the analogy of an ordinary viscous fluid. This vessel containing treacle is provided with a cylindrical hole in its base, and on the removal of the plug which now closes it, the treacle will flow out, the end of the stream being rounded. If a similar vessel be filled with lead, it will, at the ordinary pressure, remain there, but if pressure be applied, the lead will prove by its behaviour that it is really a viscous solid, as it flows readily through the orifice; the end of the jet is rounded, and, as has been shown by the beautiful researches of the late M. Tresca, of Paris,* all the molecules which compose the original block place themselves in the jet absolutely as the molecules of a flowing jet of a viscous fluid would. If the metal has a constant "head," as it would be termed in the case of water, that is, if the vessel be kept filled with solid lead up to a certain level, then you have a continuous stream, the length depending on the constancy with which the "head" and the pressure are maintained. If, on the other hand, the head is diminished so that nearly all the solid lead has been allowed to flow away, you have a folding of the jet, and vertical corrugations, exactly such as would characterize the end of the flow of certain other viscous fluids, and finally the jet forms a distinct funnel-shaped tube, concentric with the jet. It is also seen that when the formation of these cavities takes place, the jet is no longer equal to the full diameter of the orifice, the formation of the contracted vein is manifest, and a new analogy is thus obtained between the flow of solids and liquids. The application of this fact, that solid metals flow like viscous fluids, is of great importance in industry, and the production of complicated forms by forging or by rolling iron and steel and other metals, entirely depends on the flow of the metal when suitably guided by the artificer. The lines of flow in iron may be well shown by polishing a surface of the metal, and by submitting it to the action of a solution of bichloride of mercury, which etches the surface, or better, to the slow action of chromic acid solution, as suggested by Sir Frederick Abel, the result in either case being, that any difference in the hardness of the metal, or in the chemical composition, or want of continuity, caused by the presence of traces of entangled slag, reveals the manner in which the metal has flowed.

A very striking illustration of the importance of the flow of metals, when used in construction, is afforded by some observations of Mr. B. Baker, in a recent paper on the Forth Bridge.* He says, "If the thing were practicable, what I should choose as the material for the compression members of a bridge, would be 34 to 37-ton steel, which had been previously squeezed endwise, in the direction of the stress, to a pressure of about 45 tons per square inch, the steel plates being held in suitable frames to prevent distortion." He adds, "My experiments have proved that 37-ton steel so treated will carry as a column as much load as 70-ton steel in the state in which it leaves the rolls, that is to say, not previously pressed endwise. . . . . At least one half of the 42,000 tons of steel in the Forth Bridge is in compression, and the same proportion holds good in most bridges, so the importance of gaining an increased resistance of 60 per cent. without any sacrifice in the facility of working, and safety belonging to a highly ductile material can hardly be exaggerated." I need not point to the extreme interest, in connection with my subject, of these remarks from so distinguished an authority.

The very ancient mechanical art of striking coin is wholly dependent on the flow of metals. There is a popular belief that the impression imparted to discs of metal during coinage, is merely the result of a permanent compression of the metal of which the disc is made. Striking a coin, however, presents a case of moulding a plastic metal, and of the true flow of the metal, under pressure, into the sunk portions of the die. I once heard Mr. Ruskin say: "You stamp the figure of the cow on a pat of butter; why do you not impress the bee on honey?" Simply because honey is not plastic and is too viscous, and it flows at the ordinary atmospheric pressure. This medal, struck from a series of discs, will serve to show, when the discs are separated, the way the metal flows into the deepest portion of the die. If the alloy used be too hard, or if the thickness of the metal required to flow be insufficient, the impression will always be defective, no matter how many blows may be given by the press. In Mr. Browning's well-known poem, 'The Ring and the Book,' there is a subtle recognition of the viscous nature of very pure gold, which

* These researches extend through a long series of memoirs; those relating to the flow of metals are well summarized in the 'Proc. Inst. Mech. Engineers,' 1867, p. 114, and in the report of the Science Conferences held in connection with the Loan Collection of Scientific Apparatus (Physics and Mechanics), London, 1876, p. 252.

* *Journ. Iron and Steel Inst.*, vol. ii., 1885, p. 497.

he characterizes as "the oozing of the mine," while, with regard to the manufacture of the ring, he shows :

"Since hammer needs must widen out the round
And file emboss it fine with lily flowers,"

that this is only possible because gold behaves like the honey to which he compares it. I have chosen this reference to Browning because I happen to have a coin of "the great Twelfth Innocent," the Pope of the poem I have cited, and this coin has scars on its surface which prove that there was not quite enough metal to flow into the depths of the die.

If one side of a coin be ground away so as to leave a flat surface, and if the disc be then struck between plain polished dies surrounded by a steel collar, so as to prevent the escape of the metal, the impression on the disc will be driven through the thickness of the metal, and will then appear on both sides. In industrial art the property of flow of metals is very important. The "spinning" of articles in pewter is a familiar instance.

The production of complicated forms, like a jelly mould, from a single sheet of copper under the combined drawing and compressing action of the hammer, is a still more remarkable case.

The flow of metals is illustrated very curiously in one phase of Japanese art metal work, of which, however, it is now so difficult to obtain native examples, that I have been obliged to prepare, with the aid of skilful artificers in the Mint, the few specimens I have to submit to you. I allude to the metal work in banded alloys to which the Japanese give the name of Moku-me, or "wood-grain." In its preparation thin layers of copper, precious metals, and various alloys, are soldered in superposition like the leaves of a book; through these layers holes are drilled to varying depths in the thickness of the metal, or trenches are cut in it. The mass is then hammered flat until the hole or trenches disappear, and the result is contorted bands, of some complexity, and often possessing much beauty, especially when the colour of the metal is developed by suitable chemical treatment and polishing. A similar effect may be produced by beating up the metal from one side, and filing the other flat. The structure depends on the flow of the respective metals of which the mass is composed, and behaviour of the components of the system, and suggests one of the most marked facts in experimental hydrodynamics, namely, the difference in the way in which water flows along contracting and expanding channels. The sinuous lines the metal assumes in the preparation of Moku-me resemble the beautiful illustrations devised by Professor Osborne Reynolds, to show the flow of water.

We have hitherto only considered the flow of metals when submitted to compression, let us now examine the effect of traction. When a viscous metal, such as iron or soft steel, is submitted to stress by pulling its ends in opposite directions, it stretches uniformly throughout its length ; there is in such a solid, a limit in the application of the stress up to which the metal, if released, will return to its normal length ; this point is the limit of elasticity. Directly, however, this limit is reached, the metal begins to stretch, and at first it stretches in a very singular way, without an increase of load ; when the limit of elasticity has been passed, the metal continues to stretch with increased load until it gives up resisting and breaks. The limit of elasticity of a solid body marks the moment at which the body begins to "flow" under the influence of the force to which it is submitted. There are many materials which do not stretch when their limit of elasticity is reached : in very hard steel, for instance, the breaking point and the limit of elasticity practically coincide. Further, it must be observed that every minute variation in composition is sufficient to change the property of a body, and to cause what was a viscous body to break close to the limit of elasticity. A most remarkable instance is presented by certain alloys of gold and copper. Standard gold, such as is employed for British gold coin, which contains 9167 parts of gold in 10,000 parts, breaks with a load of 18 tons to the square inch. Its limit of elasticity is reached at $1\frac{3}{4}$ tons per square inch, but it elongates 34 per cent. before it breaks. If this standard gold has only the $\frac{1}{2000}$th part of lead added to it, it becomes very brittle, and breaks with a stress of about $5\frac{1}{2}$ tons to the square inch, instead of 18 tons borne by the original pure standard gold, and as it does not elongate sensibly it cannot be said to flow at all. A remarkable difference in the property of the alloy, standard gold, is therefore caused by the addition of only the $\frac{1}{2000}$th part of lead. In order to understand this it will be necessary to trace the analogy between fluids and solid metals still further, and to ascertain what takes place when metals, in a roughly granular state, are submitted to compression, under conditions in which the escape of the compressed metal is, as far as possible, restrained. I must, therefore, turn to what I believe to be the most important work relative to the molecular constitution of metals which has been done for many years, namely, the researches of Professor Walthère Spring, of the University of Liége, whose labours have since 1878 been devoted to the study of the effect of compression on various bodies.* The particles of a metallic powder left to itself at the ordinary atmospheric pressure, will not unite ; by "augmenting the number of points of contact in a powder," the result may be very different. The powders of metals may weld into coherent blocks. Let us appeal to his own experiments.

The metallic powder is placed under a short cylinder of steel in a cavity in a steel block divided vertically, held together by a collar, and placed in a chamber of gun-metal, which may be rendered vacuous. The pressure is applied to a cylindrical rod passing through the stuffing-box. Under a pressure of 2000 atmospheres on the piston, or 13 tons to the square inch, lead in the form of filings becomes compressed into a solid block in which it is impossible to detect the slightest vestige of the original grains, so that lead filings weld into a block identical with that obtained by fusion. Under a pressure of 5000 atmospheres the lead no longer resists the pressure, but flows as if it were liquid through the cracks of the apparatus, and the piston of the compressor descends to the base of the cylindrical hole driving the "flowing" lead before it. This result in the case of lead is hardly unexpected, for Bolley† showed in 1849, that lead prepared in a particular way, so as to be in a state of fine division, may be converted under a powerful press into a flexible plate, or may be made to receive a sharp impression. The more interesting results were obtained by Spring with crystalline metals. Bismuth is, as is well known, very brittle and crystalline, yet fine powder of bismuth unites under a pressure of 6000 atmospheres into a block very similar to that obtained by fusion, having a crystalline fracture. The density of compressed bismuth is 9·89, identical with that of metal which has been fused. The table shows the amount of pressure required to unite the powders of the respective metals:—

	Tons per square inch
Lead unites at	13
Tin „	19
Zinc „	38
Antimony unites at.	38
Aluminium „	38
Bismuth „	38
Copper „	33
Lead flows at.	33
Tin „	47

(*To be continued.*)

* *Bul de l'Acad. Royale de Belgique*, [2], t. xlv., No. 6 1878. [2], t. xlix., No. 5, 1880. See also subsequent papers in the same publication, in the *Bull. Soc. Chim.*, Paris, and in the *Deutsche Chemische Gesellschaft* (Bildung von Legirungen durch Druck), b. xv., p. 595.

† Liebig u. Kopp. *Jahresb.*, 1849, p. 278, quoted by Dr. Percy, 'Metallurgy of Lead,' 1870, p. 9.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Pharmacists and the Prescriptions of Medical Men.

Sir,—A few days ago an incident occurred in the establishment with which I am connected which so appropriately illustrates the subject of Mr. Mee's letter in the current number of the Journal that it may be worth while relating it.

A prescription was handed in with the request to dispense it immediately, the first two items in which were:

Ac. hydrocyan. dil. . . . . ℥iiss
Liq. morph. acet. . . . . ♏45

to be made up, in conjunction with other less important ingredients, to a six ounce mixture, a twelfth part for a dose every two hours. It will be noticed that the dose of ac. hydrocyan dil. prescribed was 12½ minims, very considerably in excess of the maximum B.P. one.

The question was, "What was to be done?" Of course the first thought was to communicate with the doctor, but to do so immediately was out of the question.

The medicine was wanted at once, and the patient, an excitable kind of person, would have imagined all sorts of frightful things, had the dispensing of it been delayed.

Now on looking at the prescription, obviously the first idea that presented itself was that the respective quantities of the two ingredients had been reversed. But was it justifiable to dispense the prescription on this assumption? The question is a difficult one, nor is the course taken under the circumstances offered as a solution of the difficulty, as in every instance of the kind likely to arise it is probable that there may be special circumstances connected with it, to influence the decision of the pharmacist.

Ultimately the prescription was dispensed, the dose of hydrocyanic acid being reduced to 4 minims, and that of the morphine left as ordered. The prescription was detained upon some pretext, and forwarded to the prescriber, with a letter stating what had been done, and expressing the hope that he would approve of it. A very courteous reply was received, thanking us, and approving of our action, also stating that the assumption as to the reversing of the two ingredients was correct.

The above is narrated as an illustration of a difficulty that may occasionally arise. With regard to the general conduct of the pharmacist in reference to the prescriptions of medical men there can be no doubt that the subject is one of extreme delicacy, and no definite regulations can by any possibility be laid down as to the course to be followed in any particular case. Unquestionably the course suggested by Mr. Mee, in the first paragraph of his letter, is the correct one to adopt, and should peculiar circumstances arise, requiring special consideration, I think that the remembrance of the duty he owes to the prescriber, to the patient, and especially to himself, will be likely to influence every honourable pharmacist in coming to such a decision as shall best accord with the responsibility of his position. Above all things he should refrain from adversely criticising a prescription in the presence of the patient, such conduct being alike presumptuous and injudicious. If it should be thought that this last caution is unnecessary, I can only say that personal observation has convinced me of the reverse.

T. Edward Barrass.

78, *The Broadway, Ealing, W.*

Borneo Products.

Sir,—I have read with much interest the remarks in your issue of the 17th ult. upon the exhibits in the North Borneo Court at the Colonial Exhibition.

With regard to the preservation of gutta-percha and india-rubber trees, I beg to enclose the report of a meeting held on the subject in my office at Sandakan last December.

With regard to edible birds' nests, you state that there are two varieties of the white sort shown, the first quality collected before the eggs were laid, the second after. I do not think, however, that the laying of the eggs has anything to do with the qualities of nests exhibited; some caves always yield better qualities than others, even though a brood of young birds may have been reared in them. Although there are only these two sorts of white nest mentioned, there are in reality many other qualities, ranging from 400 dollars a picul up to 2000 dollars. The third quality you speak of, black, probably the product of another species of swiftlet, ranges in price from 80 dollars to 150 dollars a picul (and not 1000 dollars.)

I only know of one case where a cave—and that a very small one—is quite close to the sea. Of the others, some are close by the seashore, others further inland, and some in quite the centre of the country. I do not, in fact, think that there is any connection at all between the swiftlets and the sea, as seems generally to be supposed is the case, but believe that they build simply wherever they find convenient caves, quite irrespective of any other consideration.

The reason of the high price attached to Borneo camphor by the Chinese is said to be on account of its value for embalming; it is even sometimes used by the natives themselves for this purpose. I look upon this explanation with some suspicion however, as I was not before aware that the Chinese ever did embalm their dead.

Southover Grange, Lewes. W. B. Pryer.

Answer to Dispensing Query.

Sir,—I should be glad if you would insert the following reply to "Pharmakos" in Dispensing Query, p. 120, *Pharmaceutical Journal*, Aug. 7.

No. 1. The theoretical idea is to introduce the quinine, in order to mitigate the lowering effects of iodide of potassium upon certain patients, but very frequently the two are given together in certain complaints, more especially in sciatica and rheumatism.

No. 2. The aromatic spirit of ammonia dissolves the quinine sulphate, but on the addition of water, sulphate of ammonia remains in solution, while pure quinine is precipitated, the result of the entire mixture being that while iodine and sulphate of potassium and ammonia remain dissolved, the quinine floats at the top in flakes which render the mixture unpresentable without the addition of some mucilage.

No. 3. Scarcely, if you follow the doctor's literal instructions; but mucilage may always be used in such cases at the discretion of the dispenser.

No. 4. Dissolve the quiniæ sulph. in the spts. ammon. arom. Mix the mucilage (½ oz.) with the syrup and about 6 drachms of water, in a measure, and add gradually to the quinine and ammonia, after shaking together. Then add more water to about 3 ounces, and lastly add the iodide of potassium dissolved in about an ounce of water.

The mixture should have a "Shake the bottle" label on.

93, *Westborough.* Dispenser.

Correction to the British Pharmacopœia.

Sir,—I do not think it has been already noted that spiritus ammoniæ aromaticus has not been added to the list on p. 494 of substances tested with the volumetric solution of oxalic acid, although it is so directed on p. 379.

Market Square, Dover. J. F. Brown.

E. J. Millard.—The seeds forwarded are those of *Erythroxylon Coca*. We are not aware that the seeds of the coca plant have ever been examined for alkaloid.

J. W. E. Berry.—We are unable to give you any information respecting the subject of your inquiry. The book was certainly not issued in parts with the *Pharmaceutical Journal*.

Misunderstanding.—We are insufficiently acquainted with the circumstances to warrant us in offering an opinion.

W. Howie.—Many thanks for your letter, which shall have careful consideration.

E. Gifford.—Melilotus cœrulea. Used in Switzerland to flavour cheese. It has been used in medicine as an anodyne, diuretic and diaphoretic.

Communications, Letters, etc., have been received from Messrs. Mussellwhite, Gifford, Rednall, R. H., W. B. B., I. O. U., A. P., Minor, Major, Silex, Hermes, Outon, Reform.

"THE MONTH."

In the unofficial report of Messrs. Crookes, Odling and Tidy on the water supply of London during the month of July, further information is given as to the results of their experiments as to the persistence of bacterial life in water (see before, p. 85). The set of experiments now described were all made with sterilized distilled water, which was infected with about 1 part in 150 of its bulk of peptone fluid loaded with an active sporeless growth of splenic fever bacillus. It was found that when a culture fluid was sown with some of this water within two hours of it being infected there was invariably on incubation an abundant and characteristic growth of the bacillus, from which further growth could be set up. If three or four hours elapsed after the infection of the water before it was used for sowing the culture fluid the results were irregular, there being sometimes a growth of the bacillus and sometimes none. When the sowing was delayed six hours and from that up to forty-three hours after the infection of the water it was always barren of results. It is pointed out that the addition to the distilled water of so large a proportion of peptone fluid, equal to at least 2 parts of organic nitrogen in 100,000, brought it into a condition, as compared with Thames water, eminently favourable for the life and growth of micro-organisms, but that nevertheless the introduced bacillus was not able to undergo development or even to maintain its existence more than a few hours.

Whilst observers in this country are thus working out the bacterial history of water, Dr. Miquel is rendering a similar service in respect to air, and has issued a report on the microscopic organisms occurring in the air around the Observatory of Montsouris, south of Paris (*Nature*, Aug. 5, p. 318). The conclusions drawn, of course, apply absolutely to that neighbourhood only, but they may be thus summarized—(1) that an increase of bacterial organisms in the air generally takes place when the barometric pressure is high; (2) a large increase in the number occurs in the summer, but a sustained high temperature causes a manifest lessening in their number; (3) the maximum number of organisms present in the air corresponds always with a low hygrometric condition of the atmosphere; (4) a maximum number occurs frequently during a calm, or when the wind is travelling slowly; (5) the greatest number of maxima occur during the blowing of a north-east wind (which passes over Paris) and the least number with a south-west wind; and (6) when the amount of ozone in the air is large the number of microbes present is small. In experiments extending over five years the average number of organisms in a cubic metre of air observed is estimated to have been—in winter, 260; in spring, 495; in summer, 650; in autumn 380: the mean average being 445. The month with the lowest average (165) was February; that with the highest (700) was July. Passing from Montsouris to the city of Paris a very different state of the atmosphere is found. During four years the average number of organisms in a cubic metre of air taken from the rue de Rivoli was 3480, the minimum here also being in February and the maximum in July. The number was much lower in 1884 than in 1881 and this, which is attributed to better scavengering, was coincident with a lower death-rate from zymotic diseases. Some observations made during a visit to London in 1884 gave good results as compared with Paris, the average in June being only 240. The difference is attributed by Dr. Miquel to the nearness of London to the sea, and to the moderate height of the houses, which allows the wind to exercise a purifying influence. The possible variations dependent upon conditions may be illustrated by the statement that air taken from the Hôpital de la Pitié in Paris contained 97,000 organisms in a cubic metre, whilst air from over the Atlantic Ocean or a high mountain is either quite free from them, or contains at most an average of one in a cubic metre.

The extent to which the digestive function of the stomach, so far as this can be represented by an artificial gastric juice, is influenced by the administration of certain medicines has been the subject of further experiments by Dr. Petersen, of St. Petersburg (*Pharm. Post*, Aug. 21, p. 572). The artificial digestive liquid used consisted of one gram of pepsin to a litre of water, with ten grams of hydrochloric acid added and the conclusions were drawn from the action of 450 c.c. of this liquid upon 20 to 40 grams of dried albumen both in the presence and the absence of the medicines. It was found that alcohol in the proportion of 5 per cent. scarcely influenced the peptonization, but above that quantity retarded it more and more until it was stopped by 10 per cent. Antipyrin had no effect upon the digestion in quantities of 2 to 2·5 grams, and more than that only slightly retarded it. Potassium iodide and bromide, in quantities of 1 to 2 grams hindered the digestion slightly. Organic salts of iron scarcely affected the peptonization, but ferrum redactum and inorganic salts of iron hindered it. Calomel in doses of 0·3 to 1·0 gram slackened the peptonization in only a slight degree, and the same was observed of sodium arsenite, but sodium salicylate in doses of 2·5 to 5 grams distinctly retarded the action, as also did sodium and magnesium sulphates in even moderate doses. Chloral hydrate not in excess of 1 gram was without action; but 1·5 gram had a strongly retarding influence. Sodium chloride did not seem to affect the peptonization one way or the other, either in large or small quantities.

"Antifebrin" is the trivial name chosen for still another addition to the list of antipyretics, which is said to have given very satisfactory results in the medical clinic of Professor Kussmaul, of Strassburg (*Pharm. Post*, Aug. 21, p. 572). Antifebrin does not, however, appear to be a newly discovered body, like other recently introduced antipyretics, but is said to be identical with phenylacetamide, or acetanilide ($C_6H_5.C_2H_3O.HN$), prepared as far back as 1853 by Gerhardt (*Annalen*, lxxxvii., 164), by the action of aniline upon acetylchloride or anhydrous acetic acid. It occurs as a pure white odourless crystalline powder, producing a slight burning sensation on the tongue, melting at 113° C., and distilling unchanged at 292° C. In cold water it is almost insoluble, but it is more soluble in hot water, and freely soluble in alcohol and alcoholic liquids, such as wine. It possesses neither basic nor acid properties, and is not readily attacked by most reagents. Experiments on dogs and guinea-pigs are said to have shown that it is non-poisonous in relatively large doses. The clinical experiments were made on twenty-four fever patients, the antifebrin being administered in doses of from one-fourth of a gram to one gram, suspended in water, enclosed in wafers, or dissolved in wine, but

at present the quantity of two grams in twenty-four hours has not been exceeded. It is stated that in promptness, duration and extent of its action one-quarter of a gram of antifebrin corresponds to one gram of antipyrin, over which it has also an advantage in respect to price. No objection to it was made by the patients, and their condition between the exacerbations of fever was good. Should the claim thus put forward on behalf of phenylacetamide be confirmed it will establish a point of some theoretical interest. Hitherto the compounds credited with febrifuge properties have either belonged to the class of phenols, such as carbolic acid, hydroquinone, resorcin, salicylic acid, or have been bases, as kairin, antipyrin, thallin, quinine, etc. Antifebrin is a neutral body, far removed in chemical composition from either of those groups.

Tribromide of allyl is another compound that has only had its possible use in medicine discovered after a period of years. It was first prepared by Wurtz in 1857 (*Ann. de Chimie*, li., 91) by the reaction of iodide of allyl on one and a half times its weight of bromine, and is a colourless liquid, soluble in ether, boiling at 217° C., and having a specific gravity of 2·436. According to Dr. de Fleury (*Archives de Pharm.*, Aug., p. 352) this compound has been employed with good effects in hysteria, asthma, angina pectoris, and infantile convulsions. It was administered in capsules each containing five drops, two to four capsules being given daily, or subcutaneously in doses of two to four drops dissolved in one or two cubic centimetres of ether.

In the therapeutic column of the *Medical Chronicle* (August, p. 400) Dr. J. Leech calls attention to the fact that some of the urethane that is now being sold as of English make has a disagreeable mousey odour, like that of acetamide, and forms when dissolved in water a nauseous solution, whereas when properly made it has no unpleasant smell or taste. Dr. Leech adds that German samples seen by him were free from this objection. English manufacturing chemists must evidently look to their laurels.

Dr. Ipaak, of Brussels, recommends the use of chloroform as an hæmostatic in dentistry. The solution used consists of two parts of chloroform in one hundred of water (*British Journ. Dental Science*, August, p. 704). The use of chloroform applied to the crown of the tooth on cotton-wool to deaden the pain caused by the pressure of the forceps on the sensitive dentine has therefore the double advantage, since a hæmostatic action will also be obtained.

The conclusions arrived at by Stutzer concerning the innocuousness of saccharin when taken into the human body have recently been confirmed by Professor E. Salkowski (Virchow's *Archiv*, cv., p. 46), and Professor Dreschfeld, of Owens College, Manchester, has ascertained that when given in diabetes it does not affect either the quantity of urine or of sugar passed. It has scarcely any retarding effect on the digestion of either proteids or carbohydrates, and in two cases of acid dyspepsia it was found to relieve some of the troublesome symptoms. It has also been found that added in small quantities it increases the diastatic action of malt in presence of sugar (*Journ. Soc. Chem. Industry*, July, p. 422).

It seems strange that any new physiological action should be discovered in such a well-known drug as calomel. Dr. Jendrafsik, of Buda Pesth, however, states that he discovered accidentally that it produced a powerfully diuretic effect in a case of dropsy, and that he has since then tried it in a number of cases and always with success. He gives 3 grains three or four times in twenty-four hours (*Ther. Gaz.*, p. 471).

Dr. R. L. Hinton, of Arkansas, directs attention in the *Therapeutic Gazette* (August, p. 489) to the value of cocaine hydrochlorate to relieve pain and tenesmus in dysentery. He administered it in the form of an injection of 2 or 3 drachms of a 4 per cent. solution, with the most successful results.

In a paper lately read before the Southern Medical Society of Edinburgh, Mr. R. Pollock speaks favourably of the styptic action of a distilled preparation of hamamelis, stating that in several cases of hæmoptysis it speedily checked the hæmorrhagic tendency and in a case of cystitis with profuse hæmaturia a 25 per cent. injection of the liquid in warm water speedily checked the bleeding. He attributes the good effect to a "volatile oleo-resin combined with gallic acid." This testimony as to the value of hamamelis conflicts somewhat with previous statements by other writers (*Pharm. Journ.*, [3], xvi., p. 1087), but tends to show that there is in it a volatile oil which probably acts like that of turpentine, *Solidago odora*, etc., as an astringent to the blood-vessels (*Practitioner*, p. 138).

Dr. F. S. Halsey (*Therap. Gaz.*, August, p. 442) describes several cases in which he has used *Piscidia erythrina* with success. He remarks:—"I have found it to be an excellent hypnotic and anodyne, and in no one case in which I employed it has it failed to relieve pain and induce sleep. One great advantage said to be connected with it is that patients after taking it awake with none of the unpleasant after effects which opium induces."

M. Houdé (*Répertoire*, August, p. 374) directs attention to the properties of *Thuja occidentalis*, which has long been used by homœopaths in the treatment of syphilitic growths and warts. He states that it is now given in France with equal success by allopaths in doses of thirty drops of the fluid extract, night and morning.

Polyporus officinalis, the larch or white agaric,* forms the subject of a lengthy paper in the *Archiv der Pharmacie*, by Dr. J. Schmieder. The more remarkable substances detected in this fungus are agaricol, $C_{10}H_{15}OH$; cholesterin, cetylic alcohol, an acid isomeric with ricinolic acid and having the formula $C_{18}H_{34}O_3$; several resins, an aromatic alcohol having the formula $C_9H_{18}O$, a nitrogenous body, probably an albuminoid, succinic acid and malic acid.

In a note on oil of cedar (see before, p. 821), the editor of the *American Druggist* (August, p. 159) remarks that this oil is not only derived from the shavings and refuse of lead pencil works, but also during the drying of the American cedar wood (*Juniperus virginiana*). He states also that essential oil obtained from the white cedar, *Cupressus thuyoides*, has been sold as oil of cedar. He remarks, moreover, that the price lists of wholesale dealers give an "oil of Florida cedar" at a wholesale cost of one-third per pound more than the oil of American cedar. The cedar wood used in making cigar boxes is that of *Cedrela odorata* and, according to M. Bomrey, yields very little essential oil.

Dr. Bancroft, of Brisbane, who may be said to

* The term agaricus is now confined by fungologists to the fungi bearing spores on gills. In the Polyporei the pores line tubes, not gills.

have been the first to bring duboisia into notice as a mydriatic, still continues his investigations concerning the properties of the vegetation of Queensland. His most recent discovery appears to be that of a poison in three species of *Daphnandra*, a genus of plants of the natural order Monimiaceæ, an account of which was read before the Royal Society of New South Wales on June 2nd ult.

Mr. E. Collin contributes to the August number of the *Journ. de Pharmacie d'Anvers* a valuable paper on the means of detecting by the microscope the adulteration of tea and mate, and also points out the features by which coca leaves may be recognized under the microscope. The most frequent adulterations of tea leaves, according to Mr. Collin, are the leaves of *Epilobium angustifolium*, *Fraxinus excelsior*, *Sambucus nigra*, *Laurus nobilis*, *Prunus spinosa*, *Salix alba*, and *Populus nigra*, none of which, however, present the numerous sclerenchymatous phytocysts which are present in the tea leaf. The leaves of mate are said to be often adulterated with those of *Myrcia acris*, which are easily recognized by the presence of pellucid oil clots in the leaves.

In the *Répertoire de Pharmacie* (p. 363) Mr. E. Schmidt gives an account of the microscopic structure of the stem of *Euphorbia resinifera*, Bey., the species which yield "gum euphorbium."

A short time since in a communication to the Academy of Medicine, M. Lafon called attention to the differences in the characters of the substances supplied by manufacturers under the name "digitalin," and whilst claiming that the articles supplied by French makers correspond to the requirements of the Codex, of being freely soluble in chloroform, only slightly soluble in ether, and giving a green colour with hydrochloric acid, and are therefore really digitalin, implied that German makers always send out something else under the name. This charge has induced the firm of E. Merck, of Darmstadt, to issue a reclamation, containing some interesting information which may be worth putting on record. In the first place it is recalled that Schmiedeberg, in his classical research (*Pharm. Journ.*, [3], v., 741), showed digitalis leaves to contain: (1) digitonin, a substance resembling saponin in its properties, without the specific digitalis action, and soluble in water; (2) digitalein, an amorphous glucoside soluble in water; (3) digitalin (Schmiedeberg's), a crystallizable glucoside, insoluble in water; (4) digitoxin, insoluble in water, a non-glucoside, but passing under treatment with an acid without splitting off of glucose, into toxiresin; and (5) digitin, or passive digitalin, an inert crystalline body. These individual substances are said to occur in different proportions in commercial "digitalins," which would therefore vary accordingly in their therapeutic action. The principal commercial preparations are thus described:—(1) "Digitalin. pur. pulv.," or "German digitalin." Consists principally of digitalein, with some digitonin and digitalin. Digitalein, in consequence of its ready solubility in water is not cumulative in its action, and causes no irritation when subcutaneously injected. Freely soluble in alcohol, and insoluble in ether and in chloroform. (2) "Nativelle's crystallized digitalin." Physiologically extremely active. In fine white needles, bitter in taste, insoluble in water, ether and benzol, freely soluble in chloroform. Consists almost entirely of digitoxin, and is cumulative in its action. Typical of "French digitalin." (3) "Homolle's amorphous digitalin." White or yellowish-white, very bitter powder, slightly soluble in water and in ether, freely soluble in 90 per cent. alcohol and in chloroform. Consists principally of digitalin, with some digitoxin. (4) "Digitalin. pur. pulv. (Merck)." Yellowish-white powder, corresponding in its properties with No. 1. Merck also prepares (5) a "crystallized digitalin," identical with digitin, difficultly soluble in water, more readily in alcohol, and insoluble in ether and in chloroform; as well as (6) "digitoxin," the most poisonous of all the digitalis bodies, cumulative in action, crystallizing from alcohol in concentrically grouped needles, freely soluble in chloroform and in alcohol and sparingly soluble in ether. Further, the amorphous "digitalins" of the Codex and the Belgian Pharmacopœia are said to consist essentially of digitalin, with some digitoxin, and to correspond to Homolle's amorphous preparation.

Some interesting information concerning star anise and its oil, acquired during a residence in Tonquin, has been embodied in a thesis presented at the Montpellier School of Pharmacy, by M. Tambon. A portion of this was published anonymously, and quoted in this Journal last year (vol. xvi., p. 91.) M. Tambon now discusses other species of *Illicium*, and compares them with *I. anisatum*, histologically and chemically. He states that the poisonous fruit of *I. religiosum*, differs from the ordinary star anise in containing much less volatile oil, comparative distillations of three hundred grams of the two species of fruit having yielded from *I. anisatum* 18 grams of essential oil, and from *I. religiosum* 8 grams. The two essential oils may be distinguished, as pointed out by Eykman, by their behaviour towards a solution of chloral, the oil of *I. anisatum* being at first unaffected, and then assuming a beautiful red colour, whilst the oil of *I. religiosum* after remaining colourless for a time becomes a dirty yellow-brown colour. In this respect, however, the noxious oil resembles more closely oil of *Pimpinella anisum*; but it differs widely in specific gravity, which is given as 1·006. According to M. Tambon, the Chinese and the Annamites both adulterate oil of star anise, generally by the addition of a spirit prepared from rice, less seldom with arachis or cocoa-nut oil; but neither of these would present much difficulty in its detection.

Ginseng is a drug about which not a little has been written, but concerning which not much is known, at any rate not sufficient to explain the high estimation in which it is held by the Chinese. Another contribution to its literature has recently been made by Mr. Foulk, United States Consul in the Corea, from which country the most valued varieties are derived. Mr. Foulk says that the plant is cultivated in the Corea, and that the ginseng is of two kinds, the red ginseng (heng-lum) and white ginseng (pak-lum). Both kinds, however, are from the same plant, the white ginseng being the root simply washed and dried, and the red the root after having been submitted to a process of curing. This process consists in prolonged steaming and dyeing, cold water being dashed over it at the end of the operation, which solidifies the root, the fracture becoming glossy and brittle, while its colour is changed to a fleshy pink. The curing is a monopoly of the government, red ginseng not being an article of

ordinary trade, but the whole of the crop being carried to China, and the proceeds of sales going to the king. White ginseng is used enormously in the Corea as a strengthening and blood-purifying medicine, the natives preferring it to the red, which they say loses strength in the curing. The most esteemed ginseng should consist of the roots of wild plants at least thirty years old, and commands fabulous prices. Mr. Foulk says that from personal experience and observation he is satisfied that ginseng is an active strongly heating medicine, but caution is required in its use, as sometimes it causes boils and eruptions, sleeplessness, and flushing of the body. It is most commonly taken in the form of a concentrated infusion, but sometimes the sliced fresh root is eaten with honey. Notwithstanding the general impression among western nations that the virtues attributed to this drug are imaginary, Mr. Foulk thinks the evidence is in favour of the mystic value having been attached to it after its virtues had been practically ascertained. Some yellowish specimens that are met with occasionally appear to be imperfectly cured red ginseng.

The 'Drugs and Medicines of North America' has now attained to the second volume, the first part commencing with *Liriodendron Tulipifera*, L. It appears that this tree, known in the Western States as the yellow poplar, is in Ohio and Kentucky almost universally known simply as the poplar tree; hence in the American drug trade and by collectors the bark is always called yellow poplar bark, and this, in spite of the protestations of botanists that it bears no relation to the true poplars. Messrs. Lloyd call attention to the curious fact, well known to lumber men, that there are two varieties of the tree, one producing a white and the other a yellow heart wood, but they have not been able to satisfy themselves that the statement of Rafinesque is correct, viz., that the tree with white wood has acutely lobed, and that with the yellow wood obtusely lobed leaves. The yellow variety grows in damper situations than the white. It is, moreover, curious that the yellow wood lasts a long time, while the white rapidly decays. The bark of the two varieties is also said to be different. The substances which in nature serve to preserve timber probably deserve more investigation than they have yet received. Tulip tree bark appears to be very little used in the United States at present, but the instructive results obtained, both chemically and physiologically, through Messrs. Lloyd's energy in getting the assistance of first-class authorities, may probably lead to some valuable therapeutic use being found for it. The active principle appears to be an alkaloid, to which the name of "tulipiferine" has been given by the authors. The bark also contains an acrid resin, identical with the liriodendrin described by Emmet, as well as a yellow colouring matter and a volatile oil. The physiological properties of the alkaloid have been examined by Professor Bartholow. The practical outcome of his investigation is that tulipiferine will be found useful in cases where a tonic to the heart is required, and that in certain phases of cardiac weakness it will in all probability be peculiarly applicable. He considers that it will hardly be dangerous to use, because the cardiac muscle retains its irritability even when a lethal dose has been administered. Dr. E. M. Hall states that he has found the tincture useful in chronic intestinal catarrh. The only other drug described in the present number is magnolia bark, but the article will not be completed until the next part is issued.

Two years since, during the meeting of the Pharmaceutical Conference in Hastings, a paper by Mr. Hodgkin was read on china bicolor, Pitoya bark, or Tecamez bark, in which reasons were given for supposing that this long-known, but hitherto botanically unidentified bark is derived from a species of *Remijia*, for which the name *Remijia bicolorata* was proposed (*Pharm. Journ.*, [3], xv., 217). One reason was the histological resemblance of the bark to the "cuprea" barks, and another lay in the statement of the author that he had separated from a sample of the bark minute quantities of quinine, cinchonine, quinidine and amorphous alkaloid. As this chemical evidence was contrary to the experience of other chemists, including M. Pelletier, who first examined the bark, Dr. Hesse has reinvestigated the subject, and reports (*Annalen*, ccxxxiv., 375) that he has satisfied himself as to the complete absence of all the cinchona alkaloids from the bark in question. The only alkaloid observed was one occurring in the proportion of at most 0·1 per cent., which appeared to be nearly allied to the group A of the alkaloids obtained by Dr. Hesse from the bark of *Remijia Purdieana* (*Pharm. Journ.*, [3], xv., 772), and which he proposes to call "pitoyamine." He also failed to find the alkaloid described by Peretti under the name "pitoyine" and credited with a molecular weight exceeding that of any other known vegetable base. Dr. Hesse suggests that Mr. Hodgkin's results may have been vitiated by an accidental admixture of cuprea bark (*Remijia pedunculata*). Whilst admitting that there is a resemblance histologically between the china bicolor and cuprea barks, he evidently does not think it is so close as has been represented, and at present he considers it uncertain whether the china bicolor comes from a species of *Remijia*, or from a species of *Pinkneya*, as suggested by Karsten.

The action of peroxide of hydrogen on benzoic acid in the presence of sulphuric acid has formed the subject of a recent communication by M. Hanriot (*Comptes Rend.*, cii., 1250). He states that upon adding gradually to benzoic acid dissolved in five or six times its weight of sulphuric acid three times its weight of strong solution of peroxide of hydrogen (200 vols.), also dissolved in sulphuric acid, an energetic reaction takes place. The nature of this was ascertained by diluting the mixture with water and distilling the liquid in a current of steam, when at first unaltered benzoic acid passed over and then a mixture of benzoic and salicylic acids. If a weaker solution of peroxide of hydrogen be allowed to react on the sulphuric solution of benzoic acid at a temperature of about 200° C. phenol can be distilled over, but no salicylic acid. It may be, however, that the phenol is derived from the decomposition of salicylic acid at the higher temperature. Cinnamic acid treated in a similar manner yielded benzoic acid.

In a communication on the variations in the solubility of certain chlorides in presence of hydrochloric acid, presented by M. Engel to the Academy of Sciences, some months since (*Comptes Rend.*, cii., 619), it was stated that he had found approximately that the solubility of chlorides precipitated from aqueous solution by hydrochloric acid diminishes in the presence of that acid sensibly in the proportion of an equivalent of chloride less for each additional equivalent of acid, so that the sum of the equiva-

lents of acid and chloride remaining dissolved would be nearly constant. The correctness of this proposition has, however, been denied by M. Jeannel, who states he has found by experiment that with increasing proportions of acid there is a steady augmentation of the sum of the equivalents. Thus at a temperature of 0°, and taking the milligram as unity, in 10 c.c. of solution without any hydrochloric acid the potassium chloride dissolved was equal to 33·646 equivalents ; with 12·550 equivalents of acid present the chloride dissolved amounted to 23·137 equivalents, the sum of these equivalents being 35·687, while with 73·603 equivalents of acid present the potassium chloride dissolved was only equal to 1·950 equivalents, the sum of the equivalents in this case being 75·553. But if the equivalents of water present at the point of solution be reckoned as well as those of acid and chloride it would appear that a nearly constant figure is observed, especially for each chloride. Some slight variations were observed in a series of experiments made by M. Jeannel and these were somewhat intensified between the different chlorides ; nevertheless he believes the law might be formulated to read, " The solubility of chlorides that are precipitated by hydrochloric acid from their aqueous solutions varies, in presence of that acid, in such a manner that the sum of the equivalents of water, salt and acid forming the solution remain constant for the same temperature whatever may be the chloride or the proportions of the mixture."

The injurious effects following the presence of magnesia in portland and similar cements is well known, and have been attributed to the hydration of magnesium aluminate and silicate, with augmentation of volume, after the setting of the cement. It is known, however, that pure magnesia, without the intervention of silica or alumina, is capable of forming a hydrate of great consistence and durability. According to M. Lechartier (*Comptes Rend.*, cii., 1223) this hydration also is accompanied by augmentation of volume. He has also found that magnesia produced by the calcination of the carbonate at a temperature of 400° C. takes up water in a comparatively short time, but when calcined at a high temperature the magnesia remains at first unaffected in the presence of water, and only becomes hydrated after a time. When, therefore, the oxide in this condition occurs in a cement it behaves at first as an inert substance, but eventually takes up water, and augmenting in volume at the same time works mischief after solidity appears to have been attained.

About twelve months since, M. Millot, following up some work of Messrs. Bartoli and Papasogli (*Pharm. Journ.*, [3], xii., 970) announced that on electrolysing retort carbon purified with chlorine with a solution of ammonia, he obtained a black liquid from which by evaporation and exhaustion of the residue by alcohol he had succeeded in separating urea. In a more recent paper (*Comptes Rendus*, ciii., 153) he states that a further examination of the alcoholic extract revealed the presence, besides urea, of some derivatives that are usually obtained from it by the action of heat, such as ammelide, biuret and guanidine. He supposes that the urea and guanidine may originate from the reaction of nascent carbonic acid on ammonia, with the elimination of water; biuret from the reaction of carbonic acid on guanidine; and ammelide from the action of carbonic acid and urea upon biuret.

An interesting account of a visit to Chiriqui, the district whence the bulk of the so-called Jamaica sarsaparilla comes, is given by Mr. J. Hart in the *Gardeners' Chronicle*, pp. 140, 157, 200, etc. Among other things he mentions finding an anonaceous plant, probably a *Xylopia*, exhaling a perfume very like that of *Cananga odorata* (ylang ylang), and a tree known as the "samba gum tree," which yields on incision a creamy-looking yellowish sap which after a time becomes hard and resinous and then resembles the tenacious hog gum of Jamaica, the produce of *Symphonia globulifera*. He also met with a thin-coated cocoa-nut one-third larger than the ordinary kind, and which he thinks deserving of cultivation. The natives ornament their cheeks with paint made amongst other things from an oleoresin resembling elemi, yielded by a tree called "pontapee." This paint is prepared by burning the oleoresin and collecting the lampblack, a purpose for which it is doubtless well adapted.

At a recent exhibition at South Kensington by the British Beekeepers' Association, a little interest was imparted to the show by a display, amongst the exhibits, of the flowers most frequented by bees, such as lavender, golden rod, honeysuckle, clover, etc. The number, however, might easily have been increased, such flowers as the sunflower and the borage, which are great favourites with bees, not having been included (*Gard. Chron.*, August 14, p. 215). Dr. C. Spencer, writing to the *Indiana Farmer*, remarks that the first bee that deposits honey in a cell forms a sort of varnish, as it were, to the bottom of the cell. The lower edge of this film is lifted up by the succeeding bees, each depositing its honey beneath, the film acting as a kind of diaphragm, so that at any time during the filling the honey could be removed by a hypodermic syringe, leaving the diaphragm hanging in the cell (*Gard. Chron.*, July 31, p. 148).

Dr. Bonavia, in a letter to the *Gardeners' Chronicle* (July 31, p. 147), gives a glowing account of the beauty of the *Cassia fistula* tree, or "amiltas," as he calls it. When in bloom he considers it to be one of the sights of the Indian flora. An avenue of the trees in bloom would, he says, be worth a trip from any part of the world to see. When in full flower it is a perfect cascade of canary-yellow spray. He remarks that there are two varieties, one with bright green leaves throughout, which has flowers of a pale yellow, and the other with fine maroon-bronze leaves when young, but turning green later on, and bright canary-yellow flowers.

In a paper recently contributed by Dr. P. Penhallow to the *American Journal of Science*, on the movement of tendrils in *Cucurbita Pepo* and *C. maxima*, he states that the mechanism of this movement is due to three active bands of cellular tissue, traversing the whole length of the tendril. These, by their more rapid rate of growth, produce unequal tension of the various tissues and thus cause all the phenomena of torsion and circumnutation usually noticed. This rapidly growing tissue he has named " vibrogen." The bands are found one on the upper side of the tendril arm and one on each side, somewhat above the horizon of the major and transverse axis of the section. Each of these bands becomes more active in turn without regular order. The transmission of impulses is effected through continuity of protoplasm in the active tissues (*Gard. Chron.*, July 31, p. 146).

In a communication read before the Paris Academy of Sciences (*Comptes Rendus*, ciii., p. 357), M. Paul Maury points out that in the greater number of indigenous orchids the ovules are not fully developed when the pollen-masses are ripe, and consequently it is only the ovaries at the base of the inflorescence which usually have fertile ovules, these being probably fertilized by the pollinia of the upper flowers. This slow development of the ovules may, he thinks, account for the remarkable tendency to hybridize, manifested by many genera of orchids.

If the French are not good colonists they are at all events good scientific explorers. Already two collections of plants from the Congo have been received in Paris. These have been collected by Messrs. de Brazza and Pecile, and by Messrs. Thollon and Schwebisch, in the neighbourhood of Franceville, Brazzaville, Ossika, and the ports of Diélé, Léhéti, and Nganchon. Among these plants the Leguminosæ are the most numerous, and several of the plants found are common also to Brazil. Some of the species, such as *Camoensia* and *Genipa*, are remarkable for the size and beauty of their flowers. In a future contribution to the Paris Academy of Science M. Bureau hopes to be able to give some details concerning the uses and possible utilization of some of these plants (*Comptes Rend.*, ciii., 362).

There is now being issued in the *Revue de Botanique* a classified list of the new species of lichens discovered in Europe and described by Dr. W. Nylander from the year 1865 to 1886. Dr. Nylander's papers are so scattered and so difficult to procure that European lichenologists must feel grateful to the Abbé Hue, who has undertaken so useful a task as to present these papers in a form in which they can easily be referred to. The list includes also many well-known species, concerning which new chemical tests have been published by Dr. Nylander. The number of species reached in the July number is four hundred and twenty-three.

From the *Journal of Botany* (p. 245) we learn that among the collections acquired by the British Museum during the past year has been Colonel Beddome's herbarium of Indian plants, containing nearly ten thousand species, many of them being types which will be invaluable for purposes of reference to those studying Indian botany.

The June number of the *Botanical Gazette*, which is the "herbarium number," contains numerous articles on "specimens and specimen making," and "how to collect plants," by those who have evidently had experience in such matters, and will be found very useful to students competing for prize herbaria.

THE ACTION OF TIN ON THE ANIMAL ORGANISM.*

BY DR. T. P. WHITE.

The question as to whether tin possesses toxic properties or not has at various times been brought before the public, by accounts of accidental poisoning from the use of foods which have remained for some time in contact with that metal.

This fact led me to investigate the subject experimentally, and, though my work apparently may not decide the question, I think nevertheless it may not be devoid of interest.

It will be impossible, on account of their length, for me even to attempt to epitomize my experiments, so I will consider them in groups, giving my observations in each.

Until within the last few years, tin has been so contaminated with arsenic, lead and copper that the observations and experiments made are of comparatively little value.

Gmelin in 1777 made quite a number of experiments, using food that had been cooked and preserved in vessels made of that metal, and Orfila of Paris, 1826, experimented with the administration of the chloride of tin, both per orem and by intravenous injections. The caustic effect, however, of the drug was so prominent that all other action was completely overshadowed. Tin to-day is very extensively used in dyeing and in the fabrication of aniline colours, and perhaps in this way it is possible for it to produce serious consequences.

In order to assure myself of the properties of the metal it was first necessary to obtain a preparation which was at the same time non-irritating and easily assimilated. After many trials with one thing or another, I decided to use a carbonaceous preparation—the tin triethylacetate, the lead compound corresponding to which Harnach had so successfully employed (*Arch. f. Exp. Path. und Pharm.*, b. ix., s. 152).

I fabricated the drug myself according to the method used by Kuppel in the manufacture of the lead preparation (*Journal f. Prakt. Chemie*, lxxxi., p. 287). It has as formula $Sn(C_2H_5)_3C_2H_3O_2$, and contains 44·7 per cent. metallic tin. It consists of long, needle-shaped snow-white crystals, only sparingly soluble in cold, but readily forming a half per cent. solution in warm water, without any precipitate on cooling.

As this solution seemed too strong, causing induration and sometimes abscesses at the point of injection, I reduced it to 1·5 mgm. (1-40 grain) to the ccm. water, which occasioned no more local trouble.

The effects of the drug seemed to be divided into two sets, those occurring immediately after its exhibition, followed by a period when the animal was comparatively well; the second set then appeared, beginning sooner or later according to the size of the dose administered.

There was not nearly so marked and definite a difference between the effects of the compound and the individual effects of the metal as was noticed by Harnach in experimenting with lead triethylacetate, in fact, the later effects seemed to be only a continuation of the first, the entire period being quite short, lasting only from one to two days.

In consequence I was unable to decide what effects were due to the metal and what were due to the ethyl compound. In order to do so I duplicated my experiments, using another preparation, a double salt, the tartrate of sodic tin oxide (Weinsaures Zinnoxydul-natron), which I used as a proof or check on my former experiments. That the preparations I used were entirely free from other metals need hardly be mentioned, as I made them myself from the pure metal.

There was a remarkable difference in the effects of the two preparations, the double salt requiring much larger doses and longer time to produce an effect. I made some one hundred and fifty experiments on frogs, rabbits and dogs, extending over a period of eighteen months.

Frogs that had been given 1·5 mgm. (1-40 grain) were the following day completely paralysed, the heart beat extremely weak and was almost bloodless; the contractility of the muscles was notably diminished; even after death it remained intact.

After doses of 2·5 and 5 mgm. (1-25 to 1-12 grain) death ensued in eight to ten hours.

After subcutaneous injections of a quarter to a third of a grain (15 to 20 mgm.) of the double salt, death occurred on the fourth or fifth day, preceded by a gradually increasing paresis and paralysis, the voluntary muscular

* A paper read before the Cincinnati Academy of Medicine. From the *Druggists' Circular*, August.

apparatus retaining its irritability, though somewhat weakened; the blood supply of the heart being very much lessened, which remained after death in diastole.

Frogs to which I had administered every four days small doses of 1-12 grain (5 mgm.) died in from three to four weeks with almost exactly the same symptoms, only the muscular contractility seemed slightly diminished, which I think, however, was due more to disease than to any direct action of the drug.

From these experiments I concluded that on frogs tin was poisonous, and its chief effect was limited to the central nervous system, producing paralysis in all its circuit.

With regard to the muscles, even when continued for weeks, tin seems to have no direct effect as is the case with lead, but on the contrary there is considerable diminution in the heart power; most likely this is occasioned by the paralysing effect on the nervous system and is not due to any direct effect on the heart itself.

Rabbits immediately after an intravenous injection of 1-12 grain (5 mgm.) appear dazed and heavy, which soon passes off so that the animal appears well. In an hour or two there is profuse diarrhœa and colic, followed in a day or two by dyspnœa, a greatly increased reflex, clonic contraction of the extremities and the posterior muscles of the neck. When the injection has been given subcutaneously the feeling of languor is not near so marked, but the colic and the diarrhœa appear in about the same time.

Dogs of medium weight after an injection of 5-12 grain (25 mgm.) in the vena saphena, begin to howl, pass both water and fæces, which is followed in a few minutes by an intermission in respiration, and the heart beat is almost imperceptible.

After making use of artificial respiration for five or ten minutes the heart beat begins to improve, and soon respiration is again normal.

Within an hour after the injection the animal was seized with severe colic and diarrhœa; after a lapse of five or six hours the whole attack had apparently disappeared.

When the dose was large enough, death occurred on the third or fourth day.

The reflex is considerably augmented; the animal, though almost powerless, when touched or frightened would spring up and fall again into clonic convulsions. It will be readily observed that the mode of death and effects of the drug are almost identical on both animal species, with the exception of the symptoms immediately succeeding the administration of the metal, which are much more strong and pronounced on dogs, in which immediately after the administration paralysis of both heart and respiration was observed, which disappeared under the use of artificial respiration.

The second set of effects coincide in both animal species; they can be divided into symptoms on the part of the intestinal canal and of the central nervous-system.

There was always profuse diarrhœa and diuresis, accompanied by colic, which seemed more intense after the second injection. The intense pain was probably due to the severe peristaltic movement of the intestines, whose peritoneal covering had been rendered hyperæmic and irritable by the first injection.

The later symptoms which were noticed on the part of the nervous system can on the one hand be divided into paresis and paralysis, and, on the other, into clonic spasms of groups of muscles; which under certain conditions, would develop into convulsions. Consciousness, however, seemed always to be retained, even until death.

The *post-mortem* examinations were all about the same. Heart in diastole, blood thin and dark, lungs collapsed and hyperæmic, intestines and stomach soft and very hyperæmic, mucous membrane easily loosened, covered with mucus, and showed signs of inflammation; liver pale but more or less enlarged; urine found in bladder contained albumen.

After the experiments with the tin triethylacetate, I made some eighteen or twenty with the double salt to test their accuracy. Rabbits which had received too small a dose, quarter of a grain (15 mgm.) to produce a fatal effect, were simply attacked with stiffness and paresis of the legs, which after five or six days gradually disappeared, probably owing to the excretion of the metal.

As a rule, the day following the exhibition of the drug the animals appeared in perfect health, paralysis beginning on the third or fourth day.

Animals that had received larger doses were attacked proportionately sooner, with paralysis beginning in the hind legs, gradually increasing till death occurred in about the same way as occasioned by the ethyl salt, accompanied by clonic contractions of the muscles of the head and neck. Diarrhœa was more or less prominent in every case.

The autopsy elicited about the same result as already mentioned when speaking of the ethyl compound.

Having now firmly convinced myself of the toxic properties of the metal when given in a way that it could be easily taken up by the blood, I determined to begin a number of experiments in which the metal was administered per orem, so as to decide whether or not the metal would be absorbed in sufficiently large quantities to produce a characteristic effect. The experiments with the tin triethylacetate readily proved successful; after even small doses given daily, or proportionately larger doses every three or four days, the animals died of the symptoms already mentioned, after ten to fourteen days. It was, however, much more difficult with the double salt.

Rabbits which had received from four to six grains (·24 to ·36 grms.), given along at intervals, died usually in the third week, but dogs were not nearly so susceptible to its influence, the larger the animal the more difficult it was to produce an effect.

I first began with a dose of one-third of a grain daily, but no symptoms were noticeable, and I gradually increased the dose to over a grain daily. Even after some weeks a slight weakness of the hind legs only could be observed; the constant administration of such doses had impaired the digestion, the animal was very emaciated, so that I discontinued the drug. I supposed the failure was due to the non-absorption of the drug and tested the urine, which I had collected for a week, and found it contained one-third grain pure metal. I also found that quite a large part passed through the animal without being taken up by the system; on account of the diarrhœa it did not remain sufficiently long in the canal. On administering opium and bismuth along with it, the effect was much more pronounced.

I may here add that I used tin dissolved in muriatic acid; also attempted to use tin acted upon by different fruit acids, but in no way was I successful. The fruit acids, in the first place, had no effect upon the metal, and the muriatic acid solution produced some intestinal disorder, but in no case could I find even a trace in the urine or blood.

I, furthermore, thought it would be of no interest to decide by direct injection into the blood how rapidly the metal was taken up by the tissues and its excretion by the urine.

I have already remarked that in exhibiting the double salt a comparatively long time intervened before the effect was noticeable. This indicated that some time was necessary before a sufficiently large quantity had been absorbed by the tissues; in the meantime, of course, the salt remaining in the blood was partly excreted by the kidneys, and a time would arrive when the blood would contain none of the metal, which would be just as the effect was noticeable, before the reabsorption out of the tissues and the final excretion of the metal through the urine.

I injected into the jugular of a rabbit 1-12 grain

(5 mgm.) of the tin triethylacetate and bled the animal to death after forty-eight hours. The 52 ccm. blood was reduced to ashes, then treated with caustic potash, which was extracted with water and filtered, sulphuretted hydrogen gas was passed through the solution, but no sign of tin was present; the urine showed hardly a trace.

It can be readily seen that the ethyl compound was rapidly destroyed in the blood and taken up by the tissues, which explains why the effect was quicker and smaller doses required than in the case of the double salt.

I gave to several rabbits intravenous injections of from one-half to two-thirds of a grain (0·03 to 0·04 grms.) in the form of the double salt; the blood after four or five days, as soon as an effect was noticed, was examined for tin. In some none was found, but in others there was still a trace; in the urine already after twelve hours a small quantity could be detected.

In order to prove that the metal was really in the tissues, and if possible to discover which contained the highest per cent., I took the muscles, heart, liver and kidneys, and the brain, examining each in turn for their relative proportions of tin.

On the rabbit thus treated, as soon as a marked effect showed itself, to which I had injected half a grain (0·03 grm.) of tin, I found:

In 100 grms. muscles 0·0085 grms. tin = 0·0078 per cent.

In 60 grms. heart, liver and kidneys 0·005 grms. tin = 0·0083 per cent.

In 6 grms. brains, 0·0015 grms. tin = 0·025 per cent.

A sixteen pound dog, to which I had given 0·15 grms. tin in the form of the double salt, was bled to death on the fifth day, and the 340 grms. blood contained no trace of metal.

235 grms. liver contained 0·0024 grms = 0·0012 per cent.

41 grms. brain contained 0·001 grms. = 0·0024 per cent.

I made several other experiments, all of which terminated in about the same proportions.

When the effect begins, unless the drug is given daily, the blood contains no more of the metal, but part of it has been excreted, the rest absorbed by the tissues, the brain containing the largest per cent. The researches with both compounds elicited the same results, and there is no doubt but that the symptoms produced by the tin triethylacetate, except those which occurred immediately after the injection, are referable to the direct action of metallic tin. In both cases they may be divided into effects on the digestive tract and effects on the central nervous system. The first appear more intense on dogs than on rabbits, in which were observed nausea, vomiting, loss of appetite, thirst, and profuse diarrhœa, but never bloody passages.

The *post mortem* showed the intestines to be hyperæmic, the duodenum and stomach showed signs of severe catarrh, but in no place contained any bloody fluid. Jaundice was never observed.

To make a summary of the action of tin, from these investigations, we may accept that it has a direct action on the intestinal tract, inasmuch as it irritates the walls and produces increased peristaltic action.

The effects on the nervous system are, in the first place a paralysis, which probably depends principally on the spinal cord, for only in this way can we account for the general weakness of movement, particularly in the hind legs, the decrease of reflex sensibility after paralysis has commenced being most marked just previous to death, which was observed in all the experiments.

Beside the paralysing effect on the spinal cord, tin occasions an irritation of the nerve centres, both of the brain and medulla. This is decidedly noticeable on rabbits, in which there is considerable excitement of the sensorium, muscular tremor, sometimes increased to convulsions, and also in the derangement of respiration. The breathing is gradually increased in frequency, dyspnœa supervenes, and the animal dies from suffocation at the same time that paralysis gradually affects the cord. The pulse was irregular at first, mostly full and strong, but gradually decreased, both in strength and frequency; no direct paralysing effect on the heart could be ascertained.

All of my experiments with the metal, when acted upon by muratic, acetic or fruit acids, were decidedly unsuccessful, from which I conclude that tin, though possessing decidedly toxic properties when introduced into the blood, is entirely devoid of danger when taken internally in any form that could arise from being in contact with fruits or vegetables.

In the first place, I do not believe that the metal would at all be influenced by long contact, but even if it were, it would not be absorbed, but pass off with the excretions without producing an effect. The cases of accidental poisoning reported I attribute to the solder used in closing the can or impurities—arsenic, copper and lead—used in the composition of the metal, and not to tin itself.

NEW RECIPES FOR COMPOUND EXTRACTS OF FLOWERS.*

BY G. H. DUBELLE, PH.D.

(*Concluded from page* 152.)

These extracts are fictitious or imitative, being made up of a variety of other extracts, essences and volatile oils. Each odour is distinctive, natural, delicate, and permanent.

Peach Blossom.

	Parts.
Alcohol, 80°	560
Extr. of orange flow.	320
Extr. of jasmin	80
Conc. ess. of bitter almond	20
Oil of lemon	16
Balsam of Peru	4

Pond Lily.

	Parts.
Extr. of tuberose	400
Extr. of acacia	280
Extr. of jasmin	160
Extr. of violets	80
Tr. of vanilla	78
Conc. ess. of bitter almond	2

Prairie Flowers.

	Parts.
Extr. of tuberose	400
Extr. of orange flow.	200
Extr. of rose	100
Tr. of vanilla	100
Tr. of civet	100
Tr. of benzoin	50
Tr. of patchouly	50

Primrose.

	Parts.
Extr. of jasmin	910
Oil of bergamot	48
Oil of lemon	16
Oil of petit grain	16
Oil of cloves	4
Tr. of ambergris	6

Reseda.

	Parts.
Alcohol, 90°	640
Extr. of acacia	320
Tr. of musk	20
Balsam tolu	12
Oil of neroli	4
Oil of bergamot	2
Otto of rose	2

* From the *Druggists' Circular*, August.

Rinion Mountain Rose.

	Parts.
Triple extr. of rose	860
Extr. of acacia	100
Tr. of patchouly	40

Rondeletia.

	Parts.
Alcohol, 90°	900
Tr. of vanilla	30
Tr. of ambergris	25
Tr. of musk	23
Oil of lavender	10
Oil of bergamot	5
Oil of cloves	5
Otto of rose	2

Rose of China..

	Parts.
Triple ext. of rose	400
Extr. of tuberose	400
Ess. of verbena	100
Tr. of tonka	100

Rose of Kissanlik.

	Parts.
Triple extr. of rose	400
Ess. of rose geranium	300
Tr. of musk	200
Tr. of ambergris	100

Samoan Islands Flowers.

	Parts.
Extr. of violets	300
Extr. of jasmin	150
Extr. of acacia	150
Tr. of tonka	150
Tr. of musk	120
Extr. of rose	110
Oil of neroli petale	10
Oil of bergamot	5
Oil of citron	5

Sandwich Islands Flowers.

	Parts.
Extr. of rose	250
Extr. of tuberose	200
Extr. of orange flow.	150
Extr. of jonquil	100
Extr. of violets	100
Ess. of ylang ylang	100
Tr. of ambergris	90
Oil of bergamot	10

Sierra Nevada Flowers.

	Parts.
Ess. bouquet	280
Triple extr. of rose	200
Extr. of jasmin	200
Extr. of reseda	200
Tr. of ambergris	80
Tr. of civet	40

Soudan Flowers.

	Parts.
Extr. of acacia	320
Extr. of jasmin	160
Extr. of rose	160
Extr. of orange flow.	160
Extr. of tuberose	160
Tr. of civet	30
Ess. of bitter almond	10

Southern Flowers.

	Parts.
Extr. of jasmin	380
Extr. of rose	200
Extr. of jonquil	100
Extr. of orange flow.	100
Extr. of Span. elder	100
Extr. of violets	100
Tr. of ambergris	10
Tr. of civet	10

Spring Flowers.

	Parts.
Triple extr. of rose	500
Extr. of violets	400
Extr. of acacia	60
Tr. of ambergris	30
Oil of bergamot	10

Summer Blossom.

	Parts.
Tr. of vanilla	320
Extr. of rose	170
Extr. of tuberose	170
Extr. of acacia	170
Ess. of neroli petale	168
Oil of bitter almond	2

Sweet Briar.

	Parts.
Triple extr. of rose	670
Extr. of acacia	160
Extr. of orange flow.	160
Oil of neroli petale	5
Oil of verbena	5

Sweet Pea.

	Parts.
Extr. of tuberose	320
Extr. of rose	320
Extr. of orange flow.	320
Tr. of vanilla	40

Tea Rose.

	Parts.
Triple extr. of rose	500
Ess. of rose geranium	250
Tr. of santal	120
Extr. of orange flow.	65
Tr. of orris	65

Tropical Almond Blossom.

	Parts.
Extr. of jasmin	420
Ess. of ylang ylang	420
Ess. of bitter almond	100
Tr. of ambergris	60

Thousand Isles Flowers.

	Parts.
Extr. of jonquil	200
Extr. of rose	200
Extr. of tuberose	150
Extr. of orange flow.	150
Extr. of acacia	150
Tr. of vanilla	148
Oil of bitter almond	2

Tulip.

	Parts.
Extr. of tuberose	380
Extr. of violets	380
Extr. of rose	180
Tr. of orris	58
Ess. of bitter almond	2

Verbena.

	Parts.
Alcohol 80°	970
Oil of lemon	20
Oil of lemongrass	5
Oil of orange	5

Victoria Regia.

	Parts.
Extr. of tuberose	360
Extr. of acacia	270
Extr. of jasmin	180
Extr. of violets	90
Tr. of vanilla	90
Ess. of bergamot	8
Ess. of bitter almond	2

Violet.

	Parts.
Extr. of acacia	400
Extr. of rose	200
Extr. of tuberose	200
Tr. of orris	198
Ess. of bitter almond	2

Volcameria.

	Parts.
Extr. of violets	360
Extr. of tuberose	360
Extr. of rose	160
Extr. of jasmin	80
Tr. of musk	40

Wallflowers.

	Parts.
Triple extr. of rose	260
Extr. of orange flow.	260
Extr. of acacia	120
Tr. of vanilla	120
Tr. of orris	120
Ess. of bitter almond	120

White Rose.

	Parts.
Triple extr. of rose	300
Extr. of rose	250
Extr. of violets	250
Extr. of jasmin	125
Tr. of patchouly	75

White Lilac.

	Parts.
Extr. of tuberose	730
Extr. of orange flow.	200
Ess. of ylang ylang	35
Tr. of civet	33
Ess. of bitter almond	2

Wild Flowers.

	Parts.
Triple extr. of rose	350
Tr. of tonka	180
Extr. of violets	90
Extr. of acacia	90
Extr. of orange flow.	90
Extr. of tuberose	90
Tr. of musk	90
Oil of citron	20

Wild Rose.

	Parts.
Extr. of rose	550
Extr. of acacia	150
Extr. of orange flow.	150
Triple extr of rose	146
Oil of neroli pet.	2
Oil of verbena	2

Wintergreen.

	Parts.
Triple extr. of rose	360
Extr. of acacia	160
Ess. of neroli pet.	160
Tr. of vanilla	80
Tr. of vetivert	80
Tr. of ambergris	80
Ess. of lavender	80

Winter Rose.

	Parts.
Triple extr. of rose	600
Ess. of rose geranium	240
Extr. of violets	80
Extr. of jasmin	80

Woodland Flowers.

	Parts.
Triple extr. of rose	470
Tr. of tonka	300
Tr. of orris	100
Extr. of jasmin	50
Extr. of acacia	50
Tr. of musk	25
Oil of rose geranium	3
Oil of neroli pet.	2

Wood Violet.

	Parts.
Extr. of violets	640
Extr. of acacia	120
Extr. of rose	120
Tr. of orris	118
Ess. of bitter almond	2

Ylany Ylang.

	Parts.
Extr. of violets	380
Extr. of acacia	160
Extr. of tuberose	160
Tr. of musk	160
Tr. of tonka	120
Oil of orange	15
Oil of neroli pet.	5

Yosemite Flowers.

	Parts.
Triple extr. of rose	400
Extr. of violets	200
Ess. of ylang ylang	100
Tr. of vanilla	100
Tr. of tonka	100
Tr. of ambergris	100

Isle of Wight Flowers.

	Parts.
Tr. of santal	400
Triple extr. of rose	300
Extr. of violet	200
Tr. of vetivert	100

THE COMPOSITION AND SOLUBILITY OF STRYCHNINE CITRATE.

BY FRANK H. FISCHEDICK.

Although a considerable number of the salts of strychnine have been prepared and described, no statements whatever relating to the citrate could be found in any of the chemical works at my command. In order, therefore, to determine its composition and characters the following investigation was undertaken.

In preparing this salt pure strychnine sulphate was dissolved in distilled water, the alkaloid precipitated from this solution by means of ammonia water, collected upon a filter, and washed until the washings no longer gave any reaction with barium chloride. A portion of citric acid was then dissolved in hot distilled water, and to this solution an excess of the freshly precipitated strychnine was added, and the mixture digested on a water-bath until the alkaloid ceased to be dissolved. The solution, which still retained an acid reaction, was filtered while hot, evaporated, and set aside to crystallize.

The salt was found to crystallize in two distinct forms. The one, which we may designate as No. 1, was in the form of small, thin, micaceous plates, placed one above the other, transparent, and having a pearly lustre. The other form, which we may designate as No. 2, was composed of small, needle-shaped crystals, radiating from one point to form silvery-white cones, which appear fan-shaped when seen from the side.

For determining the water of crystallization a small portion of the air-dry salt was carefully weighed, and heated in an air-bath to 120° C. until a constant weight

was obtained. The dried salt was then dissolved in water, the solution transferred to a separating funnel, a slight excess of ammonia water added, and the mixture shaken with successive portions of chloroform, until the aqueous liquid, after acidulation, no longer gave any reaction with alkaloidal reagents. The chloroform solution was then allowed to evaporate spontaneously in a small, weighed capsule, and the residue dried at 100° C. until of constant weight.

I. Analysis of crystals No. 1.

(*a*) 0·5892 gram of the salt lost upon drying at 120° C., 0·0463 gram of water, corresponding to 7·85 per cent., and afforded 0·3745 gram of strychnine, or 77·68 per cent.

(*b*) A second analysis gave 7·846 per cent. of water and 77·70 per cent. of strychnine.

Calculated for $(C_{21}H_{22}N_2O_2)_2C_6H_8O_7.4H_2O$	Found. *a.*	*b.*
$C_{21}H_{22}N_2O_2$ = 77·67 per ct.	77·68 per ct.	77·70 per ct.
$4H_2O$ = 7·72 per ct.	7·85 per ct.	7·84 per ct.

II. Analysis of crystals No. 2.

0·256 gram of the salt lost upon drying at 120° C., 0·011 gram of water, corresponding to 4·29 per cent., and afforded 0·1905 gram of strychnine, or 77·75 per cent.

Calculated for $(C_{21}H_{22}N_2O_2)_2C_6H_8O_7.2H_2O$	Found.
$C_{21}H_{22}N_2O_2$ = 77·67 per ct.	77·75 per ct.
$2H_2O$ = 4·02 per ct.	4·29 per ct.

These two salts are thus seen to be acid salts, or di-strychnine citrate, and the solutions possess an acid reaction. The only difference in their composition is that one contains four molecules of water of crystallization, while the other contains but two molecules.

An attempt was then made to prepare a neutral salt, or the tri-strychnine citrate, by the direct combination of three molecules of strychnine with one molecule of citric acid. For this purpose 2·004 grams of pure strychnine were dissolved in chloroform, and 0·42 gram of citric acid was dissolved in alcohol, the two solutions then thoroughly mixed and allowed to evaporate spontaneously. Upon evaporation a granular residue was obtained, which, when treated with hot distilled water, separated pure strychnine. The solution was then filtered from the precipitated alkaloid, and, upon evaporation, afforded crystals of an acid salt, corresponding in composition to that designated as No. 2, as shown by the following analysis :

0·155 gram of the salt lost upon drying at 120° C., 0·005 gram of water, corresponding to 4·35 per cent., and afforded 77·62 per cent. of strychnine.

Calculated for $(C_{21}H_{22}N_2O_2)_2C_6H_8O_7.2H_2O$	Found.
$C_{21}H_{22}N_2O_2$ = 77·67 per ct.	77·62 per ct.
$2H_2O$ = 4·02 per ct.	4·35 per ct.

A commercial specimen of strychnine citrate, which was in the form of a white powder, and, even when magnified, showed no crystalline structure, was examined with the following result. Upon drying at 120° C., it lost 6·108 per cent. of water, and the anhydrous salt then afforded 79·153 per cent. of strychnine. The neutral strychnine citrate, containing three molecules of the alkaloid, corresponds to 80·57 per cent. of strychnine. It would seem probable from the amorphous character of the commercial salt and the larger amount of strychnine which it contains that it is prepared by direct evaporation of a combination of alkaloid and acid, since the above experiments have indicated that even when sufficient alkaloid is present to form theoretically a neutral salt, upon the addition of water strychnine is separated, and from the resulting solution only the acid salt crystallizes.

The solubility of the crystallized salt in water and alcohol was subsequently determined, for which purpose the salt designated as No. 1 was employed. At 15° C. 1 part of the salt dissolves in 45·5 parts of water and in 114·83 parts of alcohol.

PILOCARPINE.*

BY E. HARDY AND G. CALMELS.

The authors have analysed the following compounds of pilocarpine : the nitrate, $C_{11}H_{16}N_2O_2,HNO_3$, which forms rhombic lamellæ, very soluble in water but less soluble in alcohol ; the platinochloride,

$$(C_{11}H_{16}N_2O_2)_2,H_2PtCl_6,$$

which forms somewhat soluble quadratic prisms and lamellæ ; the modified platinochloride,

$$(C_{11}H_{16}N_2O_2)_2PtCl_4,$$

a very soluble, crystalline, yellow powder ; the aurochloride, $C_{11}H_{16}N_2O_2AuCl_3$, formed in slender needles when the pilocarpine is in excess ; the aurochloride, $C_{11}H_{16}N_2O_2,2AuCl_3$, obtained in microscopic needles when the auric chloride is in excess, both this and the previous compound forming viscous oils when heated in presence of water, and combining with only one equivalent of hydrogen chloride ; the acid aurochloride,

$$C_{11}H_{16}N_2O_2,HAuCl_4,$$

obtained in needles by adding a limited quantity of auric chloride to solution containing free hydrochloric acid ; the acid diaurochloride, $C_{11}H_{16}N_2O_2,2HAuCl_4$, obtained in needles or right rectangular prisms by adding excess of auric chloride in presence of hydrochloric acid ; the mercurochlorides, which crystallize in slender needles and are very soluble in acids, and the hydrochloride, which forms a gummy mass. Pilocarpine itself is a viscous substance, very soluble in alcohol and water, slightly soluble in cold ether or chloroform, more soluble on heating, and readily soluble in ether or chloroform mixed with alcohol. Pilocarpine does not act on carbonates, but with alkaline hydroxides it forms compounds which are decomposed by carbonic acid. These facts point to the presence of an internal anhydride. Pilocarpic acid does not exist in the free state. The copper salt, $(C_{11}H_{17}N_2O_3)_2Cu$, is a slightly soluble green powder, and the silver salt forms a curdy precipitate. Free pilocarpine forms with silver nitrate two compounds, $AgNO_3,C_{11}H_{16}N_2O_2$, and $(AgNO_3)_2,C_{11}H_{16}N_2O_2$, which crystallizes in needles. The constitution of pilocarpine is represented by the formula

$$C_5H_4N\beta\cdot CMe\begin{array}{l}<\text{—CO—}\\ \text{NMe}_3\end{array}>O.$$

Pilocarpidine.—The substance produced by the action of nitric or hydrochloric acid on pilocarpine or by boiling pilocarpine or its salts with water in presence of air, is pilocarpidine, $C_8H_4N\beta\cdot CMe(NMe_2)\cdot COOH$. Its salts are similar to those of pilocarpine ; they are gummy substances decomposed by carbonic anhydride, soluble in water and alcohol of 90°, but insoluble in absolute alcohol if they are dry. The copper salt is green, the silver salt crystallizes in a mass of small needles. The hydrochloride is soluble in water and crystallizes badly from an acid solution ; it is a gummy substance which crystallizes slowly from alcohol in scales with a prismatic structure. The aurochloride, $C_{10}H_{14}N_2O_2,HAuCl_4$, is obtained in right rectangular prisms by adding pilocarpidine hydrochloride gradually to an acid solution of auric chloride, and allowing the liquid to evaporate spontaneously. In solutions containing no free acid, the aurochloride, $C_{10}H_{14}N_2O_2,AuCl_3$, is formed. The platinochloride, $(C_{10}H_{14}N_2O_2)_2,H_2PtCl_6+2H_2O$, is formed in lamellæ by adding the hydrochloride to an excess of platinum chloride solution. If these crystals are dissolved in a large quantity of cold water and allowed to recrystallize in the cold, the platinochloride separates in large yellow lamellæ, similar to those of naphthalene. If crystallization takes place in a warm solution, small red prismatic crystals of the composition

$$(C_{10}H_{14}N_2O_2)_2,H_2PtCl_6+H_2O$$

separate. This second modification is also obtained by heating the dehydrated salt.

* From *Compt. Rend.*, cii., 1116–1119. Reprinted from the *Journal of the Chemical Society*, August.

The Pharmaceutical Journal.

SATURDAY, AUGUST 28, 1886.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE GERMAN APOTHEKER-VEREIN.

THE fifteenth annual general meeting of the German Apotheker-Verein has just been held at Düsseldorf, on the Rhine, and has been marked by the same agreeable characteristics that we have described on former occasions. Not only as an opportunity for the transaction of matters of business affecting the pharmaceutical community, but as affording an inducement to travel and join in friendly intercourse, these meetings are of considerable importance for those engaged in the practice of pharmacy in Germany, and the progressive increase in the numbers by which they are attended sufficiently testifies to the general appreciation of the benefits to be derived from them. The meeting at Düsseldorf this year was remarkable for the large number of visitors, many of whom were accompanied by their wives and daughters or other female relatives, for whose entertainment ample provision was made in the shape of concerts, garden parties, etc. As is generally the case there was also an exhibition of pharmaceutical apparatus, preparations, drugs, etc., for which great facilities were offered by the locality where the meeting was held.

In the address of welcome published in the special journal of the exhibition opportunity was taken of referring to the very general tendency there is among the followers of every kind of occupation in Germany to associate themselves together, and to meet periodically with the special object of common advancement. The belief was expressed that these corporations and congresses have contributed largely to the consolidation of German unity, and to the material benefit of the country. A general aspiration to work for the common good is thus excited, and a bond of union created which is of beneficial effect in regard to industrial efforts in the same way as the national military organization has contributed to ensure the defence of the country. It is indeed true that German industries have now reached a degree of development which could scarcely have been dreamt of some few years ago, and in regard to chemical and medicinal preparations, the indications of that progress are not by any means the least that are to be noticed. As an illustration of this fact it was mentioned in the address of welcome that, according to a recent report of the Handelsarchiv upon the supply of chemical and pharmaceutical preparations to Japan, it is the intention of Japanese authorities to require that all such articles for medical use shall come from Germany, and it was suggested that the reason for the decision was the greater purity and trustworthy character of the German preparations as compared with others. We think it is probable that some of our readers may be able to take a different view of this matter, and, for our own part, we must state that there is great reason for believing unwholesome competition on the part of traders in ostensibly English goods has had much to do with the production of any unfavourable impression as to the relative merits of English and German products. But, however that may be, the fact above reported by the Handelsarchiv has been associated in a congratulatory manner with the projected establishment of a direct line of ships between Germany and Japan, as being likely to lead to a considerable development of trade with that country, and to supplant much of that which has been done by England. It will, at least, be evident that an important addition may be made to the competition which has of late pressed so heavily on all classes of traders, and it will also be evident that the maintenance of credit and reputation for supplying articles of good quality is a point of at least as great importance as the possibility of being able to tempt customers by a slightly lower price than others can see their way to. Above all, it must not be forgotten that the general repute of English traders and manufacturers is sometimes unjustly prejudiced by individuals who merely carry on trade with England. An instance of this kind of recent occurrence is spoken of in Germany at the present moment with no uncertain terms of denunciation, but with apparently little appreciation of the fact that the enterprise in question had nothing English about it, but the locality of its promotion.

The exhibition was a great attraction to the visitors, who numbered on Monday evening upwards of 350, and afterwards were increased to nearly 500. The opening was carried out in the usual form by Dr. BRUNNENGRAEBER, the President of the Verein, after an address of welcome had been delivered by Dr. BAUSCH, the chairman of the Local Committee. The number of exhibitors was upwards of one hundred and forty. It cannot be said that there was anything especially novel to mention, but there was an excellent display of the various novelties which have been introduced lately, among which may be mentioned, hypnone, urethane, thallein, and their preparations; lanolin and icthyol, salicylic salts and ethers, among which salol figured prominently. Among these exhibits, the names of E. MERCK, TROMMSDORF, and the Badische Anilin Fabrik were specially noticeable as exhibitors. A very large and multifarious exhibit by Mr. JACOBI, of Elberfeld,

occupied a considerable space in the centre of the hall. Among the various articles shown by him, compressed tablets were conspicuous, this form of administration being used for a large number of medicinal preparations. Many of these tablets are sold in the ordinary way by retail, but tablets containing nitroglycerine and similar substances can only be supplied on the order of a medical man. Messrs. LOEFLUND, who are well known for their milk preparations, exhibited in addition to those hitherto made, milk concentrated without any addition of sugar, which they are about to introduce commercially, and it is probable that it will go far to remove the objections that exist against the condensed milk containing sugar.

The first sitting of the general meeting of the Verein took place on Tuesday, the 17th inst., under the presidency of Dr. BRUNNENGRAEBER. After the minutes of the previous general meeting had been confirmed, Dr. WEISS, on behalf of the Government, and Dr. FEISTEL, on behalf of the municipal authorities, officially welcomed the members to Düsseldorf, while Dr. BAUSCH spoke on behalf of the local committee in a manner which showed that its efforts to fulfil the duties of hospitality had been exerted beyond the ordinary limits. The business at this sitting was for the most part of a special character, and the only point of general interest to be noticed was the resolution to recommend that cocaine should be added to the list of substances that could not be sold without compliance with with certain restrictive regulations.

The second meeting, held on Wednesday, was devoted chiefly to scientific addresses, the first of which, on the present position of the chemical study of alkaloids, was delivered by Dr. SCHMIDT, of Marburg. Dr. BECKURTS, of Brunswick, then dealt with the subject of ptomaines, and Dr. VULPIUS, of Heidelberg, with thallin. Of more special pharmaceutical interest was the address delivered by Mr. SCHLICKUM on the necessity for testing the purity of pharmaceutical preparations.

Mr. BELLINGRODT'S account of the extraction of mercury from the zinc ore smelted in the neighbourhood of Oberhausen excited very general interest. Something like four tons of the metal are now obtained annually from this source instead of being wasted, as was formerly the case. A description was given of the roasting ovens by which this saving is effected and a further advantage gained by the sulphur of the zinc ore being at the same time turned to account for making sulphuric acid without producing the deleterious effects on vegetation which are commonly noticeable in the vicinity of zinc smelting works. The report of the Pharmacopœia Committee presented by the Chairman, Mr. SCHLICKUM, gave an account of the work that had been done during the past year, and it was stated that this had received official recognition by the publication of the results in the gazette of the Health department. After the election of officers, the determination of Munich as the place of meeting next year, and the settlement of some few other details the business was brought to an end. In the evening the members of the Verein dined together at the Tonhalle, and on the following day there was an excursion by special train to Königswinter for the purpose of visiting the Drachenfels and other points of interest in the Seven Mountains.

THE BRITISH PHARMACEUTICAL CONFERENCE.

BY the courtesy of Mr. CHARLES THOMPSON, the Local Secretary to the Conference, we are enabled to print the following programme and time table of the proceedings at Birmingham next week:—

Monday, August 30.

8 p.m. RECEPTION by the PRESIDENT and other officers of the Conference, after which Mr. BICKLEY'S party will give a selection of glees, songs, etc.

Tuesday, August 31.

9 a.m. EXECUTIVE MEETING.

10 a.m. FIRST MEETING of the Conference. The PRESIDENT will deliver an ADDRESS. The reading and discussion of papers will then commence.

1 p.m. LUNCHEON at the Grand Hotel, which is only a short distance from the Mason College.

2 p.m. SECOND MEETING of the Conference.

4 p.m. CONVEYANCES will be ready to convey members to various works, including the Mint, GILLOTT'S Pen Works, ELKINGTON'S Electro-plating and Art Metal Works, etc., etc.

7.30 p.m. CHEMISTS AND DRUGGISTS' TRADE ASSOCIATION DINNER. Gentlemen wishing to be present should communicate with the Secretary, Mr. W. F. HAYDON, 23, Burlington Chambers, New Street. Tickets 5*s.* each, without wine.

Wednesday, September 1.

10 a.m. THIRD MEETING of the Conference.

1 p.m. LUNCHEON at the Grand Hotel.

2 p.m. FOURTH MEETING of the Conference.

4 p.m. CONVEYANCES.

8 p.m. CONCERT and SOCIAL MEETING at which gentlemen only will be present.

Thursday, September 2.

8.45 a.m. EXCURSION. A special train will leave Snow Hill, arriving at Stratford-on-Avon at 9.40 a.m. The members will then be conducted to SHAKESPEARE'S Birthplace, the Church and Theatre.

12.10 p.m. Train leaves for Leamington.

1 p.m. Luncheon at Leamington.

2.30 p.m. Conveyances through Stoneleigh Park to Kenilworth, returning *viâ* Guy's Cliff and Warwick Castle to Leamington. Those members of the party who wish to return to Birmingham by an earlier train than the special may do so with the excursion ticket.

Members who intend to take part in the proceedings are recommended to remit at once to the Local Secretary, Mr. C. THOMPSON, Stratford Road, Sparkbrook, Birmingham, if they have not already done so, the sum of 15*s.*, for a set of the coupons for the luncheons, excursion, etc. The production of the tickets I. and III. will enable the holder to take

advantage of the special arrangements made with the railway companies, and travel to and from Birmingham, within a radius of fifty miles, at a single fare for the double journey. The Midland Railway has also issued a special notice offering to provide saloon carriages, with lavatory accommodation, for parties of seven or more first-class passengers, or to reserve the exclusive use of a first-class compartment for parties of not less than four ; but for either of these arrangements application must be made beforehand to Mr. NEEDHAM, Superintendent, Derby.

In addition to the titles of papers published in previous numbers, notice has been received of the following :—

19. Note on the Pure Terebenes of Commerce. By W. LASCELLES SCOTT.

20. Vinum Ipecacuanhæ. By J. C. SHENSTONE.

21. Salol. A New Antiseptic. By J. MOSS, F.I.C.

22. Cinchona Cultivation in South America. By DAVID HOWARD, F.I.C., F.C.S.

ALLEGED SYNTHESIS OF QUININE.

AN obviously absurd paragraph appeared in the *Morning Post* last Tuesday, and has gone the round of the daily papers, as the announcement of a "Remarkable discovery" of the synthetical production of quinine. The present sensitive condition of the quinine and cinchona bark market may have been some reason for the attention that it has received and the reference made to Messrs. HOWARDS AND SONS will no doubt have contributed to that result. There does not, however, appear to be any real foundation for the statement in question, and Messrs. HOWARDS request us to make known that although Dr. CRESSWELL HEWETT announced to them some months ago that he had discovered a process for the synthetic production of quinine, he entirely failed to convince them that he had really done so. It may be regarded as certain that some day quinine will be made synthetically, but whenever that chemical problem is solved there will still remain the equally important question whether it can be done at such a cost as to admit of being utilized. If that should be the case it is probable that the fact will not be communicated through the medium of a sensational newspaper paragraph, such as that which has just caused some commotion in the City and has perhaps helped to bring down the price of quinine still further.

On Tuesday afternoon, September 7, or just six days after the British Pharmaceutical Conference, the American Pharmaceutical Association will commence its thirty-fourth annual meeting at Providence, Rhode Island. The first session will be held at 3 p.m., and at 8 p.m. there will be a Reception tendered by the local association. On Wednesday there will be two sessions, and on Thursday two more, and while these are going on the ladies will be taken to see the sights of the neighbourhood. On Wednesday evening there is to be a theatrical entertainment at the Opera House, and on Thursday evening a varied entertainment, consisting of a lecture by Professor P. W. Bedford and readings, recitations, and music. On Friday there will be a water excursion to Newport. The price of the tickets has been fixed at three and a-half dollars.

British Medical Association.

THE CONNECTION BETWEEN CHEMICAL CONSTITUTION AND PHYSIOLOGICAL ACTION.*

BY THOMAS LAUDER BRUNTON, M.D., F.R.S.,

Lecturer on Materia Medica and Therapeutics at St. Bartholomew's Hospital.

The meeting of the British Medical Association is not for mutual instruction only; it is also for recreation ; and probably many members of this Association will utilize the opportunity which a meeting at the seaside, like the present one at Brighton, affords them of indulging in that excellent occupation for an idle man, of watching the waves on the seashore, and speculating how far each of them will come. If one have only half-an-hour to spare, it is difficult to say whether the tide is ebbing or flowing; it is only by watching for a longer time that one can be certain that the water is really moving in one direction or another. Probably, a great part of the charm which this occupation possesses is due to the resemblance which one involuntarily traces between the ebb and flow of waters and that of human affairs—individual, national, or racial. The life a single man is very short in comparison with the history of race ; and it is often very difficult to say whether mankind is advancing or retrograding, unless we compare his condition at epochs widely removed from one another.

On doing this we find a general consensus of opinion, to the effect that civilization has steadily advanced ; and this advancement is usually divided into four stages, characterized by the nature of the tools or weapons employed. In the first, or Paleolithic age, man employed weapons or tools of flint roughly chipped into shape and unpolished. In the next, or Neolithic age, the implements consisted of stone, but they were polished. The next age is characterized by the employment of bronze as a material, and the fourth and highest stage by the employment of iron. These stages are not all marked off from one another, for we find them together in the same country or in different countries. Thus, the age in which at present we live is recognized as the Iron age, on account of the large employment of that metal ; but we find that in various countries stone, more or less rudely fashioned, is still used in the manufacture of weapons or tools. For example, when I was in the Colonial Exhibition lately with Mr. Norman Lockyer, he pointed out a kind of threshing implement, such as is now used in Cyprus. It consists of a flat board, in the under side of which are embedded a number of stone celts exactly like those made by prehistoric man, and perhaps used by him for a similar purpose as well as for axes. In the same way that we recognize four stages in the development of the implements used by man in the arts or in warfare, we may, I think, recognize four stages in the development of the implements he has used in the treatment of disease. In the first stage crude drugs were employed, prepared in the roughest manner, such as powdered cinchona or metallic antimony. In the next stage, these were converted into more active and more manageable forms, such as extracts or solutions, watery or alcoholic. In the third stage, the pure active principles, separated from the crude drugs, were employed, *e.g.*, morphine and quinine. In the fourth stage, instead of attempting to extract our medicines from the natural products in which they are contained, we seek to make for ourselves such substances as shall possess the particular action we desire. Now, just as we find stone and iron implements occasionally used together in the same country, so we find that drugs belonging to the different stages men-

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* Address delivered at the opening of the Section of Pharmacology and Therapeutics, at the Annual Meeting of the British Medical Association held in Brighton, August, 1886.

tioned are used at the same time. For example, we may find crude powders, alcoholic extracts, and pure alkaloids all contained in the same pill. Nay, more, we may sometimes give to the patient in addition to all these, a medicine made artificially. But while this condition still exists, we notice that crude drugs are being less and less used, and their place is gradually being taken by pure active principles. We may say, then, that we are passing at present from the Stone age into the Bronze age of Pharmacology; and may, indeed, be said to be just entering on the Iron age. This age may be said to have begun about twenty years ago, when the researches which my predecessor in this office, Dr. Fraser, made with Professor Crum Brown upon the connection between physiological action and chemical constitution, inaugurated a new era in Pharmacology. They found that, by modifying the chemical constitution of strychnine, they could also alter its physiological action, and convert it from a poison which would tetanize the spinal cord, into one which would paralyse the motor nerves.

We might perhaps date the beginning of this age from Blake's attempts to show that a connection exists between the form in which various bodies crystallize, and the mode in which they act upon an animal body. Richardson, too, had observed that, amongst various compounds of carbon, certain differences existed in physiological action which might be supposed to correspond to differences in their chemical composition. And at the same time that Crum Brown and Fraser were making their experiments, Schroff in Vienna and Jolyet and Cahours in France had independently arrived at somewhat similar conclusions. Nevertheless, I think we may fairly say that it was the experiments of Crum Brown and Fraser which fairly started pharmacology in the new direction in which it has since been steadily advancing. It would be impossible for me to enter at all fully into the recent development of this branch of research, but I think it may be both interesting and useful to try to give you a short and popular account of the chief points already made out; and, in doing so, I may perhaps be excused for using, almost to the extent of abusing, similes which are not precisely exact, but which may be useful in giving you a rough idea of a somewhat complicated subject.

We have all heard of the "flesh-pots" of Egypt; but I find that everybody is not acquainted with the "flesh-pots of Shiloh," though "good little Samuel" has probably been frequently held up before us as an example to be followed, and possibly the naughty sons of Eli as an example to be avoided. When these sons of Eli were priests in Shiloh, their custom was, when any man offered a sacrifice, to send their servants with a "flesh-hook" of three teeth, in his hand, which he struck into the pan, or kettle, or cauldron, or pot; and all that the flesh-hooks brought up, the priest took for himself.

It is obvious that what the priest's man brought up would depend very greatly on two things, viz., the contents of the pot and the nature of the hook—whether it were large or small, sharp or pointed, single-pronged or many-pronged. It is obvious, too, that a very slight alteration of the points, by the judicious application of a file or whetstone, might considerably influence the savouriness of the priest's dinner. With the small pots that they were likely to have in Shiloh, it would not matter much what the nature of the handle was; but it would matter very greatly if the priests had to go fishing in the brazen sea of Solomon; for there, with a short handle, they might not be able to reach the tit-bits in the middle, and if the handle were too long, they might go plunging their hooks about the opposite side of the vessel, with the same result as if their handle were too short. Now, in the drugs which we use in medicine, we may find a certain analogy with these flesh-hooks, some part of the drugs being comparable to the hooks, and others to the handle. Perhaps the analogy would be even more correct if we were to regard the hooks as having moveable points, which could be taken off and replaced by others of a different form or sharpness. If we take alkaline salts as an example, we may regard the base as the handle, and the halogen as the hook; and by modifying either of these, we may alter the parts of the body affected and the manner in which they are affected. We might, indeed, compare chloride of sodium, in which we have the chlorine attached to sodium, with the low molecular weight of 23, to a hook with so short a shank that did not reach the big joints lying in the middle of the cauldron; while, potassium, with a molecular weight of 39, was just long enough to do this; and rubidium, with a molecular weight of 85, was so long as to go plunging about on the other side. In fact, we find that this is very nearly what occurs in the muscles of the animal body after the administration of the chlorides of sodium, potassium, or rubidium; for, while potassium chloride is a powerful muscular poison, the action of sodium and rubidium chlorides on the muscles is very slight.

We have seen what changes would follow alterations in the shank of our flesh-hooks; now let us see the effect of altering the prongs. If we put on a small one like chlorine it may go dragging about catching everything, but bringing out nothing; a bigger one, like bromine, may lay hold of a lung or a brain; and a bigger one still, like iodine, may lay hold of a big joint. Now what we find in the body seems to be somewhat similar. The chlorides circulate in the blood without producing any marked alteration beyond that which is due to the substance with which the chlorine is combined. The bromides attack the brain and nerve-centres, and the iodides tend more especially to affect the muscles and the glands.

It is evident that another important factor besides the sharpness of the hooks is the number of prongs, and the three-pronged hook seems to be the generally effective one. Now in pharmacology there is one substance, nitrogen, which appears sometimes to have three, and sometimes five prongs, or affinities, as chemists term them, and it is a substance having a very general and powerful influence over the body. When combined with hydrogen in the form of ammonia or of ammoniacal salts, it affects nerve-centres, motor nerves, and muscles, tending first to stimulate and then to paralyse them. But as we would expect, the effect of the ammonia is modified by its combination with iodine, chlorine and bromine; and we find that while the ammonium-chloride generally attacks the spinal cord and causes irritation, ammonium-iodide paralyses the motor nerves and muscles.

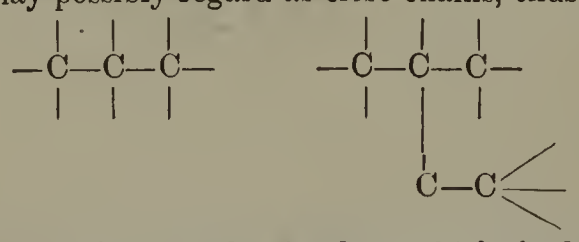
When nitrogen has oxygen combined with it in place of hydrogen, so as to form nitrous acid, its action is exerted more especially upon the blood and blood-vessels, so that it causes the blood to become chocolate-coloured, and the blood-vessels to dilate. This power of dilating the vessels is sometimes exceedingly useful in the treatment of disease; and we have been enabled to vary the action of our drugs so as to attain, to a great extent, the end we desire, by our knowledge that the action depends upon the nitrous acid, and not on the substance to which the acid may be attached; or, to return to our own comparison, the effect depends on the nature of the hook rather than on the kind of shank to which it is attached. Thus where rapid dilation is desired we use nitrite of amyl; but where a slower and more prolonged action is desirable, we employ nitrite of soda or nitroglycerine.

In some useful tools we have the two ends serving different purposes: one end for example being a hammer and the other end a claw for extracting nails; and we can easily imagine a flesh-hook constructed on the same principle, one end, let us say, having the prongs widely apart, and the other the prongs close together. With such a hook, it is evident that the viands which were fished up would be different according as one or other end was put into the pot, for the close prongs would bring up delicate little pieces which would simply slip through the wide ones. If we carry our illustration a step further and suppose this hook to consist of two parts attached to

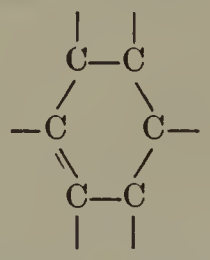
one another by certain prongs while others were left free' we can see that if only one prong were left free in each part, but these prongs were of different shapes, the pieces obtained by the man using it would be of a different kind, according as the prong belonged to one end or the other. Now we seem to find something of this sort in the union of nitrogen with carbon. Carbon is a substance with four affinities, while nitrogen appears sometimes to have three and sometimes to have five. When the nitrogen and the carbon are united in such a way that four affinities and each are connected together, leaving one free affinity or prong belonging to pentad nitrogen, thus, —N≡C, the compound is exceedingly poisonous: whereas, when the free affinity or prong belongs to the carbon, and the other three affinities are joined to triad nitrogen, thus, —C≡N, the compound is comparatively innocuous.

This fact shows us how very important the nature of the free affinity in the compound is in regard to physiological action.

We have just pictured to ourselves an instrument of two parts, joined together by small hooks, and consisting, in fact, of two links. In this instrument the links differ a good deal from each other; but one link—namely, carbon—has a great power of uniting with itself, so as to form long chains, straight or branching. It also forms what we may possibly regard as close chains, thus—

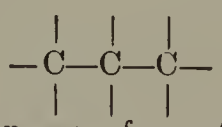


so stiff as to act the part of a shank, to which single hooks or long open chains may be attached. We may represent it graphically thus—

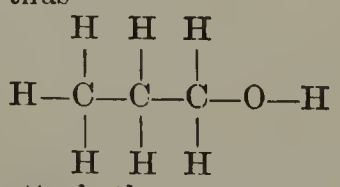


Now, if any of Eli's successors wanted to fish in Solomon's brazen sea with hooks attached to a flexible chain instead of to a stiff shank, the results of his fishing would not only depend on the hooks he used, but on the length of the chain, on the kind of chain, single or branching, and on the position of the links to which the hooks were attached.

Now, in the series of chemical substances to which alcohol belongs, we have an illustration of the modifications in physiological action which are produced by the length of the chain, the kind of chain, and the position of the hooks. The links, in the case of alcohol, consist of carbon atoms attached to each other by one affinity, so that each terminal atom, or link, has three affinities, or prongs, and the intermediate links have two each unattached, thus—

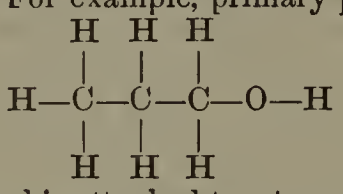


We may regard one prong of one terminal link as furnished with a sharp point, to which we give the name of hydroxyl, while all the others are furnished with blunt hydrogen points, thus—

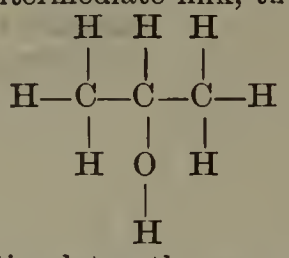


All the alcohols attack the nerve-centres, and paralyse the brain, the spinal cord, and the centres of organic life in the medulla oblongata. In large doses they all produce death, and the longer the chain the more deadly do they become, until the chain is so heavy that it can hardly be used at all, or, in other words, till the alcohol becomes so solid that it will not readily enter the body and produce its toxic action,

If we fix the sharp hydroxyl on one of the intermediate links, instead of the end one, we would naturally expect that it might simply scratch the pieces of meat instead of pulling them out, as it might do if it were attached to the terminal link; and this is exactly what we find in the case of alcohol. For example, primary propyl alcohol—

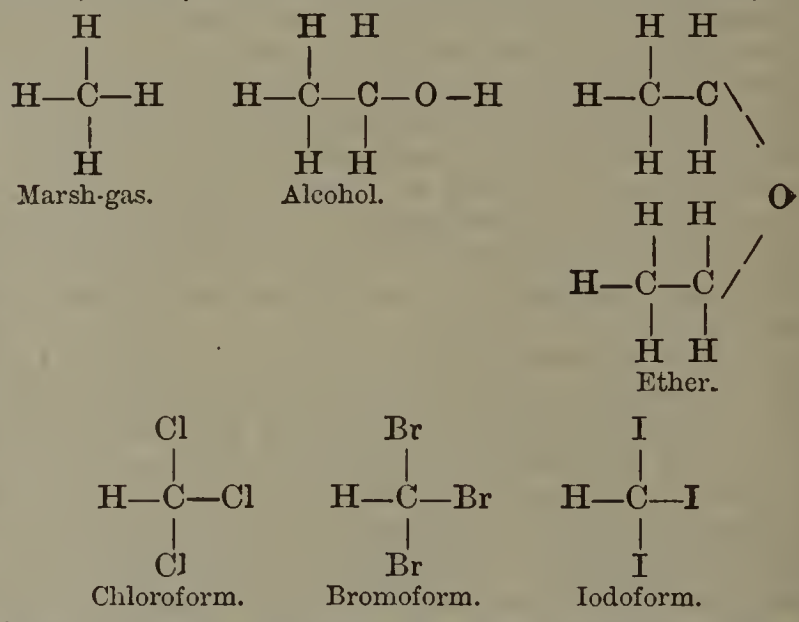


where the hydroxyl is attached to a terminal link, appears to produce steadily increasing paralysis of the nerve-centres; but secondary propyl alcohol, where the hydroxyl is attached to an intermediate link, thus—



scratches up or stimulates the nerve-centres before it paralyses them (Efron Pflüger's *Archiv*, Band xxxvi., 1467).

The whole of the carbon compounds, formed on the principle of an open chain, appear to have an action more or less like that of alcohol, though these are modified by the nature of the substances which "tip," as it were, the free affinities of the carbon links. Thus, marsh-gas, alcohol, either, chloroform, bromoform and iodoform,

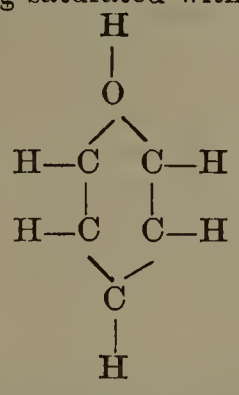


all tend to paralyse nerve-centres, and to exert an anæsthetic action; but the chlorine in the chlorform tends to make the substance paralyse the heart more quickly than marsh-gas, alcohol, or ether, which contain hydrogen alone, or hydrogen and oxygen; and in iodoform the effect of the carbon is to a great extent swamped by the iodine.

It is to Liebreich's recognition of the fact that similar carbon compounds possess a similar anæsthetic action, that we owe the discovery of chloral. The knowledge of the depressing action on the heart of chlorine in such compounds led Schmiedeberg and Cervello to search for a hypnotic substance which should not contain chlorine, with the result that paraldehyde has been added to our therapeutic *armamentarium*; and the stimulant action of ammonia led Schmiedeberg to introduce a new hypnotic, urethane, which, like chloral, will produce sleep, but, instead of weakening, will stimulate the heart, and is thus admissible in cases where chloral might be dangerous.

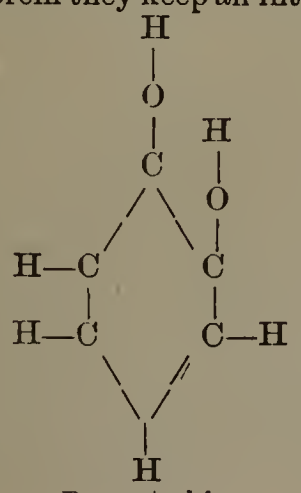
Let us now turn to the other class of carbon compounds in which the atoms are arranged so as to form a close chain, or, as we may call it, a stiff nucleus or shank, to which either single hooks or open chains may be attached. This group of carbon compounds is termed the aromatic

series. The substances belonging to it differ from those of the open chain or fatty groups, inasmuch as they tend to stimulate the nerve-centres, and produce convulsions or spasms before paralysing them. But the most marked property which they possess appears to be their power of reducing temperature, and of destroying low forms of life, so that they act both as antipyretics and as antiseptics. We have seen that in the open chains of the fatty series of carbon compounds the increased number of links appears to increase the activity of the compound, and a condition which is similar, in some respects at least, is to be found in the aromatic series. For example, in phenol or carbolic acid, as it is usually termed, we have one hydroxyl terminal, just as in ordinary alcohol, the other carbon affinities being saturated with hydrogen.

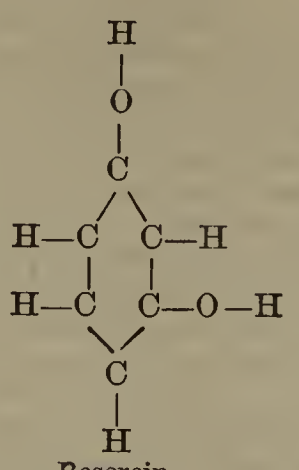


When these hydrogen atoms are replaced by methyl, the antiseptic power of the phenol is increased, and the increase appears to be in proportion to the number of methyl groups which are introduced into the compound. Turning again to our old illustration of the flesh-hooks, we might compare the benzene nucleus to the shank with six points, each of which might be armed either with a sharp hydroxyl hook, or with a blunt hydrogen one, or with a carbon chain. The more the blunt hydrogen hooks were replaced by chains the more thoroughly would they sweep the pot; and, in fact, we may say that the more chains there are instead of hydrogen, the more thorough is the antiseptic action of the compound.

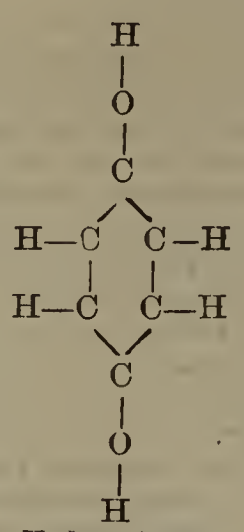
In the case of antiseptics, all that we want is to insure a thorough destruction of the microbes, which give rise to putrefaction or disease; but when we come to deal with antipyretics we have a more complicated problem before us, for we wish to reduce the temperature in man or the higher animals, while, at the same time, we have to avoid producing any marked action on the nervous system in the way either of spasms or paralysis, and also to avoid depressing the circulation and causing collapse. Now several bodies nearly allied to carbolic acid, and differing from it only in the fact that the benzene nucleus in them has two hydroxyl groups attached to it instead of one, as in carbolic acid, have a strong antiseptic power. These bodies are hydroquinone, resorcin and pyrocatechin; they all have an antiseptic action, but the strength of their action is very different, resorcin having only one-third of the strength of pyrocatechin, and only one-fourth that of hydroquinone. This difference in strength shows us here, also, how important the position of the hydroxyl groups is; because, in pyrocatechin they are close together, in hydroquinone they are as far apart as they can be, and in resorcin they keep an intermediate position.



Pyrocatechin.



Resorcin.



Hydroquinone.

But these bodies, perhaps from their simple structu appear to be adapted to attack all parts of the animal organization, and they are apt to affect the nervous system and circulation. In order to avoid these disadvantages, various attempts have been made to obtain bodies of a similar but more complicated structure, which should have a more specialized action, and would lower the temperature while leaving the nervous system and circulation unaffected. These attempts have been more or less successful, and we owe to them the introduction of three new remedies—kairin, thallin, and antipyrin. The former two, after a brief period of trial, have been found more or less unsatisfactory; but the latter is perhaps, upon the whole, the best antipyretic that we possess, reducing the temperature and, at the same time, having few disadvantages.

Salicylate of soda is nearly allied in chemical constitution to resorcin, and as a general antipyretic it is almost equal to antipyrin, and superior to it in cases of rheumatic fever. It is possible that we may still obtain antipyretics more powerful than any we yet possess, and specially adapted to the febrile conditions arising from different causes, for these antipyretics do not appear to be equally successful in different kinds of fever. Antipyrin is best in hectic fever, and salicylate of soda in rheumatic fever, but an antipyretic which will be thoroughly satisfactory in typhoid fever is still a desideratum.

I have said that antipyrin is generally free from any disagreeable action; but this is not always so, for it sometimes may produce collapse. This shows us that, in the action of all our drugs, we have two factors to consider, namely, the drug itself and the body into which we introduce it.

We have just been considering the alterations in physiological action which may be produced by changes in the chemical constitution of our drugs; but there is another factor which is perhaps more difficult to investigate, and still more important in the treatment of disease, namely, the condition of our patients. The failure of our drugs to produce the effects we desire is one of the most trying occurrences in medical practice. Thus, in fever, we sometimes find that drugs will not reduce the pulse as they do in non-febrile conditions, and digitalis in pneumonia sometimes appears to have lost its sedative action on the heart altogether. Some years ago I thought that possibly this might be due to the high temperature producing paralysis of the nervous apparatus which restrains the heart, and supposed that the peripheral ends of the vagus in the heart might be paralysed. I then made some experiments, which showed that I was wrong in this supposition.

Several years afterwards, my friend Dr. Cash and I made some further experiments, which showed that the failure of digitalis to slow the heart in febrile conditions is really due to paralysis of the regulating nerves of the heart; but the part of them which is paralysed by the heat is their roots in the medulla, and not their endings in the heart.

In other experiments which we made together, we

found that the muscle of a frog poisoned by barium could be restored to its normal condition by a high temperature, and also by the application of potash salts. It occurred to us that, if we could saturate the body of an animal with potassium, we should be able to render it proof against the poisonous action of barium. On trying this, we succeeded in rendering animals so far resistant to the action of the poison that they were alive and well after animals of similar size, but unprotected, had succumbed to the action of the same dose of poison, although we did not succeed in ultimately saving the animals.

But Dr. Cash has pursued this line of investigation far beyond the limits of our mutual research, and he has obtained results which seem to me to be amongst the most extraordinary and the most promising in pharmacology. Knowing, as he did, that corrosive sublimate was an exceedingly powerful disinfectant, it occurred to him that it might be more harmful to disease-germs than to the bodies of higher animals, and that he might be able, by the introduction of the poison into the body of an animal, to render it insusceptible to zymotic diseases.

A similar idea occurred to Koch, who injected corrosive sublimate into animals after previously inoculating them with anthrax; but his experiments failed, while Cash has proved successful by introducing the corrosive sublimate before inoculating with anthrax, and thus giving the drug the start of the disease. These experiments acquire an additional interest from the fact that M. Pasteur, although uncertain regarding the exact mode in which his process of inoculation for hydrophobia has brought about such satisfactory results, is disposed to think that the agent which prevents the disease is a chemical substance, and not a microbe.

When we look back for twenty years and see how far pharmacology has advanced since Crum Brown and Fraser's experiments directed it into a new path, we may hope that twenty years more may not only have greatly added to our stock of new remedies, but will have enabled us so to ascertain the condition of our patients that, either by the proper modification of a single remedy, by the proper admixture of remedies, or by proper changes in the food or surroundings of each patient, we may insure the action we desire, and we shall not have to feel, as we painfully do at the present, that our patients often die for lack of knowledge, not on our part, but on that of our art.

Nothing is more painful to a medical man than having to answer in the negative the agonized appeal "Oh, doctor, can you do nothing?" of those who see passing away friends who are dearer to them than their own life. It is because we medical men know the value of human life and the extent of human suffering; because we are called upon to prolong the lives of those whom not only their friends but their country and the world at large can ill spare; because we must, if possible, relieve pain sometimes amounting to extreme torture in the sufferers themselves, and felt hardly less keenly by their friends, that we consider it is not only permissible but is our imperative duty to gain the knowledge we require to attain our object, even though we sacrifice the lives of animals, and inflict upon them some pain, never wantonly, never carelessly, and almost always slight in comparison with what we often see our patients feel. Moreover, the lower animals suffer from disease as well as men, and we may hope that the advance of pharmacology will give us the means of relieving pain and prolonging life in them as well as in man.

Proceedings of Societies in London.

ROYAL INSTITUTION OF GREAT BRITAIN.

Certain Properties Common to Fluids and Solid Metals.*

BY PROFESSOR W. CHANDLER ROBERTS-AUSTEN, F.R.S., M.R.I.,
Chemist of the Mint, Professor of Metallurgy, Normal School of Science and Royal School of Mines.

(*Concluded from page* 159.)

We will endeavour to repeat M. Spring's results in the case of bismuth. It is necessary that the powder be perfectly clean and dry, if it be then submitted *in vacuo* to a pressure of 6000 atmospheres, it will weld into a crystalline mass.

We know that combinations are produced when certain bodies in solution are submitted to each other's action. But do solids combine? Is the alchemical aphorism that bodies do not react unless they are in solution, true? Experiment proves that such solution is not necessary. I have here two anhydrous salts, iodide of potassium and corrosive sublimate, and they are at the same time dry; when they are mixed together in this mortar, they unite, as is shown by the vermilion colour which is produced.

My colleague, Professor Thorpe, called attention to the importance of this fact at the meeting of the British Association at York, 1881. But do solid metals combine in the sense, that is, in which chemical combination is possible between metals, when submitted to each other's action? We know that metals do combine if they be fluid, and the extraction of gold and silver from their ores by amalgamation is moreover easy. It occurred to M. Spring that if there be a true union between the particles of a metallic powder, when submitted to great pressure, it ought to be possible to build up alloys by compressing the powders of their constituent metals, and he urged that the formation of alloys by pressure would afford the most conclusive proof that there is a true union between the particles of metals in the cold, when they are brought into intimate contact. Experiment proved that this reasoning was correct, for by compressing in a finely divided state, fifteen parts of bismuth, eight parts of lead, four parts of tin, and three parts of cadmium, an alloy is produced which fuses at 100° C. It is necessary, however, to compress the mixed powders twice, crushing or filing up the block obtained in the first compression, because the mechanical mixture of the constituent metals is not sufficiently intimate to enable a uniform alloy to be obtained by a single compression. The alloy we have thus produced fuses, you will observe, in boiling water, actually at 98° C., although the melting point of the most fusible of its constituents, the tin, is 228° C. I agree with Professor Spring in thinking that the formation of alloys by pressure affords the most complete proof which can be given of the accuracy of the views he has adduced. The formation of fusible-metal by compression leads me to deal with an objection which may, no doubt, have suggested itself to many of us. It may be urged that by compressing these metallic powders heat is evolved, and that this heat may be sufficient to produce incipient fusion in the metallic powders, or, at all events, may exert a material influence on the result obtained. This objection has been experimentally anticipated by Professor Spring. First, the compression is effected with extreme slowness, and therefore there can be no question as to the sudden evolution of heat, as would be the case if the powders were compressed by impact instead of by a slow squeeze; and to sum the matter up briefly, Spring calculates, taking an extreme case, that, if it be granted that all the work done in compressing the powders were actually translated into heat, it would only serve to heat a cylinder of iron 10 mm. in height and 8 mm. in diameter (the dimensions of cylinder

* Address delivered at a Weekly Evening Meeting, Friday, March 26.

produced in his apparatus), 40·64° C. In order that direct experimental evidence might not be wanting, Spring took the organic body phorone, a hard crystalline substance which melts at 28° C., and compressed it exactly as in the case of the metallic powders.* He took the precaution to place a shot of lead on the top of the powder before submitting it to compression : only imperfect union of the particles of phorone resulted. The conclusion of the experiment proved that the shot remained where it had been placed at the top of the column; and therefore the 28° necessary to melt the substance had not been evolved, for if it had the shot must have fallen through the fluid mass. I think, then, it is absolutely safe to conclude that, in the compression of bismuth, for instance, there can be no question of the evolution of the heat necessary for the fusion of the metal. There is, however, other evidence to which I may incidentally appeal. M. Spring has shown that by compressing powders together, chemical combination may be induced, and he has in this way produced arsenide and sulphide of zinc, sulphide of lead, and of bismuth, and arsenide of lead. These are not merely intimate mechanical mixtures. Take, for instance, the sulphide of magnesium produced by compression ; it is soluble in hot water ; treatment with dilute hydrochloric acid evolves sulphuretted hydrogen, which is not the case with mere mixtures of magnesium and sulphur. Further, Spring has shown that by pressure a body may be made to pass from one allotropic state to another. Plastic sulphur is, under a pressure of 6000 atmospheres, compelled to pass into the condition of octahedral sulphur, an allotropic state which possesses a greater density. And he points out that a solid metal (not powders of metal) may have cavities obliterated by pressure, but that matter cannot be permanently compressed by pressure, unless it can assume an allotropic state of greater density than the one it possesses at the moment of compression.† Now let me point to the evidence these experiments afford as to the relation between solid metals and fluids. Members of the Royal Institution will know that Faraday discovered, in 1850, that two fragments of ice pressed against each other will unite, tendency to their union being considerable when the fragments are near their melting point. We also know what splendid service the regelation of ice has afforded in the hands of Dr. Tyndall, in explaining the formation of glaciers. Ice owes its movement, not to viscosity, but to regelation, and the union of fragments of ice under compression is also due to regelation. The facts which have been appealed to, and the theories which have been formed, respecting the regelation of ice, are too well known to you to demand lengthy notice from me. I will only observe that bismuth, like ice, expands on solidifying, and although Faraday failed to establish the existence of a property similar to regelation in bismuth, an eminent engineer, Mr. Thomas Wrightson, to whom we owe a series of experiments on the fluid density of metals, has satisficd himself by experimental evidence, that regelation exists in bismuth. Now, in explaining Spring's results we are met by this difficulty ; the union of the particles of the metals cannot, in all cases, be due to viscosity, because viscous bodies are always capable of being stretched, and we find the welding taking place between the compressed powders of bodies such as zinc and bismuth, which, when submitted to traction, will not stretch. Spring therefore asks, "Is it possible that regelation may have something to do with the union of the powders ?" and he urges, "Is it safe to conclude that regelation is peculiar to water alone ?" "It is difficult to believe," he adds, "that in the large number of substances which nature presents to us, but one exists possessing a property of which we can find only minute traces in other bodies. The sum of our chemical and physical knowledge is against such a belief, and therefore the phenomenon of regelation may be pronounced in ice without being absolutely wanting in other bodies. To ascertain whether this is so it is necessary to submit various bodies to the conditions under which the phenomena can be produced." "What," he asks, "are these conditions ?" and he answers, "The pressure supported by the body, a certain degree of temperature, and time."

Helmholtz and Tyndall have shown that when the pressure is weak, the regelation of ice is effected slowly. Spring points out that nitrate of sodium and phosphate of sodium, in powder, left to themselves in bottles become coherent, and if the coherence in these and other chemical compounds is but weak, it is simply because the points of contact between the particles of powder are but few. If, on the other hand, metallic or other powder be submitted to strong compression, the spaces between the fragments become filled with the débris of the crushed particles, and a solid block is the result. Finally, it may be urged that this union of powders of solid metals under the influence of pressure, that is to say, the close approximation of the particles, can be compared to the liquefaction of gases by pressure. At the first view this comparison may appear rash or strained, but it is nothing if we accept the views of Clausius on the nature of gases and liquids. In a gas the molecules are free, but if by pressure at a suitable temperature the molecules are brought within the limits of their mutual attraction, the gas may be liquefied, and under suitable thermal conditions solidified. The mechanical pulverization of a metal merely detaches groups of molecules from other groups, because the mechanical treatment is imperfect, but the analogy between the solid and a gas has, in a sense, been established ; filing has coarsely gasified the mass, but pressure will solidify it as you have already seen.

It is possible that in some of the metallic blocks, the particles are not actually united by the pressure, which may, nevertheless, develop the kind of "mutual attraction" contemplated by Sir W. Thomson as existing between two pieces of matter at distances of less than 10 micro-millimetres.

There are two other properties which solid metals possess in common with certain fluids, to which I must briefly allude. The first is the power of dissolving gas, which metals in the solid colloid condition possess. I will not offer any experimental illustration on this point, because the work of Graham has been fully dealt with in this theatre by Dr. Odling, and I have, in a course of lectures recently delivered here, shown that just as solid palladium occludes hydrogen, so the alloy of rhodium and lead occludes oxide of nitrogen, which it gives up with explosive violence on heating *in vacuo*, suggesting an analogy with fluid nitro-glycerine. The last property I have to submit to you is the power which certain solid metals possess of taking up fluids, sometimes with a rapidity which suggests the miscibility of ordinary fluid substances. In reference to this I have found an interesting paper published so long ago as 1713, by the Dutch chemist Homberg.* "On Substances which penetrate and pass through Metals without melting them." He enumerates several substances which will pass through the pores of metals without disturbing the particles, and he points out that mercury penetrates metals without destroying them. Few of us are, I think, familiar with the rapidity with which mercury will pass through tin. Here is a bar, one inch wide and half an inch thick ; if a little mercury be rubbed lightly on it the mercury will in thirty seconds penetrate the mass, so that it breaks readily, although before the addition of the mercury the bar would bend double without any sign of fracture.

With regard to the vaporization of solid metals, time

* *Bull. Soc. Chim.*, Paris, 1884, t. xli., p. 488.

† "Sur l'elasticité parfaite des corps solides chémiquement définis." *Bull. Acad. Roy. Belgique*, [3], t. vi., 1883.

* *Mem. de l'Acad. Royale des Sciences*, 1713 vol. for 1739, p. 306).

will only permit me to remind you that Demarçay* has shown that *in vacuo* metals evaporate at much lower temperatures than they do at the ordinary atmospheric pressure, and he suggests that even metals of the platinum group will be found to be volatile at comparatively low temperatures. Merget† has shown that the solidification of mercury by extreme cold does not prevent the solid metal evaporating into the atmosphere surrounding it.

With regard to the remaining properties on my list, you will say, surely solids do not show any tendency to diffusion? I have shown‡ that in the case of molten metals the interdiffusion may be extremely rapid, but, with regard to solid metals, some experiments conducted by Sir Frederick Abel prove that carbon can pass from a plate of richly carburized iron to one of iron free from carbon, against which it is tightly pressed. This passage of carbon takes place at the ordinary temperature, and it is difficult to explain the transference of matter without admitting the presence of some action closely allied to the diffusion of liquids.

Finally, can we offer any evidence of surface tension in solid metals? There is only one experiment to submit to you illustrating a point I am still investigating. Some months since Mr. F. W. Fletcher, manager of the works of Messrs. C. Ash and Sons, the well-known dealers in the precious metals, pointed out to me an interesting property of a hard-drawn rod or thick wire of 13-carat gold; the gold being alloyed with silver and copper in the following proportions:—

Gold	54·17
Copper	33·33
Silver	12·50
	100·00

If such a rod be touched with a solution of chloride of iron or certain other soluble chlorides, it will, in a short time, varying from a few seconds to some minutes, break away, the fracture rapidly extending for a distance of some inches.

[The image of the rod was projected on the screen, and in a few seconds after the rod was touched with chloride of iron, it split close to the point of contact with the solution.]

This result may be attended with the absorption of gas, but, in any case, it would appear that in the hard-drawn rod the surface is in a state of tension, which is released by the action of the chloride.

The facts we have considered afford additional evidence as to continuity in the properties of all kinds of matter, and serve as a connecting link with the work of the past, the importance of which is too often overlooked. I trust it will be evident that the analogy of solid metals to fluids has an important bearing on the labours of those who are striving to advance science, to develop art, or to promote the industrial well-being of this country.

* *Comptes Rendus*, xcv. p. 183 (1882).
† *Ann. de Chim. et de Phys*, [4], xxv. p. 121.
‡ 'British Association Report,' 1883, p. 402.

Obituary.

Notice has been received of the death of the following:—

On the 28th of June, Mr. Thomas Bailey, Chemist and Druggist, Coventry. Aged 62 years.

On the 1st of August, Mr. John Richard Rennards, Chemist and Druggist, Helensburgh. Aged 78 years.

On the 9th of August, Mr. Robert Clarence Buckley, Chemist and Druggist, Todmorden. Aged 52 years.

On the 10th of August, Mr. Joseph Lewis, Chemist and Druggist, Nottingham. Aged 60 years.

On the 11th of August, Mr. Edward Christopher Lewin, Pharmaceutical Chemist, Boston, Lincolnshire. Aged 61 years. Mr. Lewin had been a Member of the Pharmaceutical Society since 1853.

On the 13th of August, Mr. Frederick Nicholson, Pharmaceutical Chemist, Tottenham, London. Aged 49 years.

On the 22nd of August, Mr. Charles Bayfield Miller, Chemist and Druggist, Blackheath, London. Aged 62 years.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Poisoned Arrows.

Sir,—Would you allow us to rectify a slight error which has occurred in the report of the Annual Museum of the British Medical Association at Brighton, given in your issue of the 21st inst., page 156. In referring to our exhibit you state "Messrs. Christy exhibited poisoned arrows, impregnated with the poison of the upas (*Antiaris toxicaria*)." The arrows in question were poisoned with the kombè arrow poison, the *Strophanthus kombè*, and not with the upas poison.

With reference to the poisoning of arrows by the natives, it is generally done by stripping the strophanthus pods of their outer covering and drying them in the sun. The seeds are subsequently pounded and mixed with clay, which clay is always red, and the mixture fastened to the arrow just above the barb by means of string.

Thos. Christy and Co.

155, *Fenchurch Street, London, E.C.*

W. G. Williams.—*Sedum Telephium.*

T. F. Walker.—(1) *Inula dysenterica.* (2) *Sanguisorba officinalis.* (3) *Serratula tinctoria.* (4) *Parnasica palustris.* (5) *Stachys palustris.* (6) *Scabiosa succisa.* (7) *Hypericum hirsutum.* The other parcel of which you speak has not yet reached us.

H. P. sends us his experience as to the danger which attends the acceptance of goods "on sale or return," unless the stipulation as to the time of return of the unsold goods is carefully complied with.

A. P.—When "chlorodyne" is ordered in a prescription chlorodyne should be used. The writer of a prescription may order tinct. chlorof. et morphiæ instead of chlorodyne, but a dispenser should not dispense it when chlorodyne is written.

A. Bale and *G. Marsh Jones* are thanked for their communications.

I. O. U.—Mr. Rosenwasser's views on percolation will be found in the Proceedings of the American Pharmaceutical Association, 1882, p. 519, and 1885, p. 399. He recommends the use of long, narrow cylindrical percolators, on the ground that "the quality of any fixed amount of percolate is dependent upon the length of the column of drug in the percolator, and that packing and other things being equal the longer the column the better the quality of the percolate."

J. F. Brown.—The same reading occurs in the original paper, and is evidently the result of an oversight.

A. W. F.—*Custard Powder.*—Beasley gives the following recipe:—Rub together gum tragacanth, 2 oz.; potato starch, 1 lb.; powdered turmeric, 2½ dr., with oil of bitter almonds, ½ dr., and essence of lemons, 1 dr. Linen glaze is made of starch, borax and water in varying proportions, the starch being sometimes broken up by boiling.

Silex has sent us a letter intended as a warning to assistants who may contemplate seeking engagements in continental pharmacies. It is to the effect that in order to avoid disappointment and even hardship, it is desirable to make full inquiries respecting the employer before entering into any agreement, and to have the terms of the agreement well-defined.

Communications, Letters, etc., have been received from Messrs. Rednall, Bedford, Collier, Forster, Haydon.

The Pharmaceutical Journal.

SATURDAY, SEPTEMBER 4, 1886.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE BRITISH PHARMACEUTICAL CONFERENCE.

WHEN it became known that the Conference would visit Birmingham in the course of its peregrinations, the central position of the great provincial town and the known organizing powers of its inhabitants would have warranted the prediction that the meeting would be an important one. The event has indeed fully realized the most sanguine expectations, for seldom has an opening meeting of the Conference consisted of a more representative assembly of pharmacists from all parts of the kingdom than that which listened on Tuesday morning, with deep interest, to the address of the President, Mr. THOMAS GREENISH. The meeting was inaugurated on Monday evening by a reception held in the Grand Hotel, Colmore Row, which proved to be a very pleasant and useful innovation, as it furnished an opportunity for many introductions and renewals of acquaintance at the earliest stage of the meeting. The sittings were held in the handsome Chemical Lecture Theatre of the Mason Science College, and the proceedings commenced at ten o'clock on Tuesday morning, with a hearty greeting from Mr. THOMAS BARCLAY, as the chairman of the local committee, which was supplemented by a graceful welcome from Professor TILDEN, who expressed the pleasure with which he met so many of his old pharmaceutical friends in that theatre. The list of delegates, which was a fairly long one, having been read, Dr. THRESH, one of the Honorary Secretaries, read the Annual Report. This document commenced by referring to the steps that had been taken to carry out the announcement made at Aberdeen as to the compilation of a General Index. The members were reminded that the index had been compiled and published and it was stated that the nominal price at which it has been issued will result in an encroachment on the cash balance. It next mentioned the satisfactory increase in the number of members in India and the colonies, which was attributed to the efforts of the various secretaries. The report alluded to the death since the last meeting of Mr. WILLIAM SOUTHALL, who filled the office of President of the Conference in 1880. Finally, it was mentioned with regret that Mr. SIDNEY PLOWMAN, who for five years has so energetically served the Conference as one of its Honorary Secretaries, had expressed his wish to retire from the office after the present meeting. The Financial Statement will be found on another page, and it will be seen that the items concerning the General Index make it rather difficult to ascertain the exact financial position of the Conference, but it would seem that the outstanding assets were very nearly the same on June 30 last as at the same date in 1885. On the motion of the PRESIDENT, seconded by Mr. SAVAGE, the report was adopted.

The Address of the President, the delivery of which followed the adoption of the report, will be found *in extenso* in another part of this Journal. It was somewhat ambitious in its tone, but for this it had the justification that two at least of the topics discussed are of vital interest to the future of pharmacy in Great Britain. In fact, in his choice of subjects the President seems to have been influenced by a profound dissatisfaction concerning the present condition of pharmacists in this island as well as—tell it not in Gath—considerable doubt as to whether the Conference has done, and is doing, all of which it is capable to ameliorate this condition. Only a few brief references were made to the past, avowedly on the ground that it presented so little that was cheering and so much that was discouraging. These references, however, included an expression of opinion that experience with the new Pharmacopœia during the last twelve months has shown that it does not represent the advance made by pharmacy since the issue of the previous edition; a suggestion that pharmacists do not as a body do all that might be done towards improving pharmacopœial processes, or working out the history of little-known drugs before they get into the hands of the "mystery mongers," followed by a hope that the projected research laboratory may remove that reproach; and an allusion to the benefits resulting from international gatherings, *à propos* of the International Pharmaceutical Congress in Brussels last autumn. The President then proceeded to develop the main theme of his Address, pausing by the way to utter, a little cynically, his reluctance to "throw a stone into so placid a pool of self-esteem," the subject being the necessity that the Conference should, if it desires to maintain its *raison d'être*, assume more active duties than it has hitherto done. Calling in the fixity of physiognomy at recent meetings, and the increase in the number of papers read in the absence of authors and not followed by discussion, as evidence that the Conference is getting into a rut, the possibility of this being due to the absence of non-technical subjects from the discussions was suggested. Reference was then made to the fact that the Address of the President of the American Pharmaceutical Association, which usually deals with more general topics, is handed over to a committee to consider such suggestions as it may contain and formulate any recommendations

respecting them that may be desirable for report at a subsequent sitting of the same meeting of the Association. It was thus evidently implied that a similar course might be followed with advantage by the British Conference, and the hint, as will be seen, was taken in respect to one subject. The President then introduced his first course of "food for active thought."

The non-existence of pharmacy for pharmacists in provincial towns; the rare glimpses many apprentices get at a prescription; the slight distinction to be observed in many cases between the business available to a qualified chemist and druggist and that of a drysalter: these evidently played the part of condiments, but were not intended as the dish itself. The evils exist, and their pungency is only too evident; but the remedies for the irritation caused by them is not so obvious. Of course, the more complete separation of medicine from pharmacy suggests itself; but the time for this seems yet far off. In the President's opinion, legislation in this direction must not be expected, and he has more hope in the skill of the pharmacist intensifying the distinction between dispensing in a pharmacy and dispensing in a surgery, and in the improved education of the medical practitioner. But one evil with which the President of the British Pharmaceutical Conference thinks that body might grapple is what he defines as "wholesale prescribing for the medical profession." The "factory-made" proprietary preparations which are perseveringly forced on the attention of the medical profession he looks upon as sapping the foundation of true pharmacy, and depriving the pharmacist of the legitimate practice of his calling. Without, therefore, discussing the therapeutic value of such preparations, he recognizes the continual prescribing of them by medical practitioners as indicating a want that pharmacists should lay themselves out to supply. He would therefore make it the business of the Conference, as soon as unofficial preparations of a certain type attain favour with the profession, to construct formulæ fairly representing them, and issue them as unofficial formulæ, which might be prescribed by medical men, with the addition of the letters "B.P.C." He believes that medical men would be willing, as it would be to their own interest, to prescribe preparations of a known composition rather than "nostrums" of which they know little or nothing, whilst it would then be within the power of every pharmacist to prepare such preparations within his own pharmacy.

Another dish of "food for active thought" provided by the President had reference to the still unsatisfactory and inadequate provision for pharmaceutical education in the provinces. It was pointed out that, notwithstanding all the labours of the past, pharmacists are still only very incompletely organized, and an opinion was expressed that the non-existence of suitable provision for supplying the wants of pharmaceutical students was not so much due to the insufficiency of the demand for sound education in pharmacy and the sciences allied to it as to the absence of adequate provision for focussing the demand in such quantities as to ensure its supply. For the organization of such demand and supply it was proposed that Great Britain should be divided into about fifteen districts, each of which should be under the supervision of a representative local committee, having for its business, among other things, the establishment of one or more educational centres in the district, care being taken to utilize, as far as possible, any existing university or college teaching. Statistics were quoted to the effect that eight hundred candidates present themselves annually for the pharmaceutical examinations, of whom nearly four hundred pass, as evidence that there should be ample material for so limited a number of educational centres to draw upon to make most of them self-supporting. But supposing there were centres for which assistance could be legitimately expected, it was pointed out that the Council of the Pharmaceutical Society might well be called upon to fulfil the promises that it has made under successive presidents, to render assistance when there is satisfactory organization. Looking about for suitable constituents for such committees, Mr. Greenish thinks these might be found in the local secretaries to the Pharmaceutical Society in each district; who would not only form strictly local and representative committees, but would just give that contact with that Society which in view of a probable demand for pecuniary assistance the Council might fairly require. Moreover, it was pointed out that such organizations would be extremely valuable for other purposes, and it was significantly added that probably the next political struggle in which pharmacists would find themselves as a body engaged would be for the existence of present rights rather than the extension of present privileges. Recognizing the necessity for something more than empty declamation as to wants, Mr. Greenish then proceeded, with the aid of maps that have been reproduced on pp. 196 and 198, to a description of the proposed divisions. From this it appeared that in England and Wales he suggests there should be twelve districts, and in Scotland three; the committees then, supposing that they included all the local secretaries in the respective districts, would in England and Wales, as a rule, number from twenty to thirty members, whilst in Scotland they would number about ten. Any approximate estimate as to the cost of carrying out such a scheme is of course out of the question without further inquiry; the figures quoted rather took the form of the outside possible cost to the Pharmaceutical Society, supposing it undertook the responsibility. Taking three hundred and fifty as the outside total under present arrangements, of the possible members of the committee, it was suggested that each committee might be limited in its expenture for travelling, etc., to twenty shillings per head

per annum, which would be covered by a sum of £350. Another estimate of £300 was arrived at by supposing that direct subsidies in aid of the classes might be required to the extent of an average of £20 for each district. The two sums would form a total of £650, which Mr. GREENISH speculates might be somewhat reduced by local subscriptions to ensure interested supervision, and he suggests that the balance, possibly £500 a year, might be found by the Pharmaceutical Society. A sympathetic allusion to the late Mr. WILLIAM SOUTHALL, then brought the address to a close.

It will be seen from the foregoing sketch that the Presidential Address to the British Pharmaceutical Conference this year offers ample material for discussion; but whether this will be taken advantage of it would be unsafe in the light of past experience to predict. On our part we express the hope that at least the recognized leaders in pharmacy, and especially those whose names have been associated in the past with the subject of provincial pharmaceutical education, will, as soon as may be practicable, favour the readers of this Journal with their opinions upon Mr. GREENISH'S propositions. In doing so it would be well to remember that, in respect to points of detail, these propositions are to be considered open to modification; so far as we understand Mr. GREENISH'S intention they are simply intended to form a nucleus for criticism. Whether there shall be fifteen or thirty divisions; whether the boundaries shall follow county or other recognized lines, or remain arbitrary as in Mr. GREENISH'S map; the persons who shall constitute the committees, and how much they are to be allowed to spend, are insignificant questions compared with the one, whether committees for organizing centres of education for definite districts shall be appointed at all. The advantage of the present position is that an idea that has been floating in many minds more or less definitely, and which has been more than once hinted at, has now been put into a concrete form that will allow of its proper discussion with a view to its adoption or final rejection. These remarks will apply with equal force to the question as to special preparations. The first thing to be determined is whether these subjects are to be dealt with at all on the broad lines indicated in the Presidential Address, and if this be answered in the affirmative the elaboration of the details would follow as a matter of course.

The novelty of the position, perhaps, may account for the Address not having been dealt with at once exactly on the lines suggested; but immediately after a vote of thanks had been accorded to the President by acclamation, on the motion of Mr. THOMPSON, seconded by Mr. ARBLASTER, notice was given by Mr. REYNOLDS that he would bring forward a practical motion in respect to the special preparation question on Wednesday morning.

Williams on Aconitine.

The reading of papers was then proceeded with and notwithstanding so much has been written about aconitine an interesting communication from Mr. WILLIAMS showed that the last word has not yet been said on the subject. In the first portion of the paper Mr. WILLIAMS described the process adopted by him in producing crystallized aconitine to meet the growing demand for it. The material used, he considers, should be derived from *Aconitum Napellus* only, care being taken to exclude the tubers from other species. The roots are not dried at a temperature sufficiently high to allow of being finely powdered, but a coarse powder is exhausted with 62° to 64° alcohol containing tartaric acid by a process of maceration and percolation. From the strong tincture the spirit is distilled off at the lowest possible temperature, and the residual thin aqueous extract is filtered through paper, which removes some resinous matter, then shaken up with ether, which removes some oily matter, and next treated with sodium carbonate, which precipitates the crude alkaloid. This is washed in moderately hot water, dried in the air, powdered and macerated in pure washed ether, from which it crystallizes on evaporation. It has been recommended by GROVES, WRIGHT and MANDELIN that the base should be converted into nitrate as a means of purification. But although admitting the facility which the nitrate presents for obtaining a crystalline product, Mr. WILLIAMS evidently doubts whether so delicate an alkaloid can escape alteration in contact with nitric acid, and thinks the probability of a change is indicated by the difference in the form of the crystallization of the base before and after conversion into nitrate and subsequent liberation. This point is at present the subject of physiological experiment. The paper was followed by an interesting discussion, opened by Mr. GROVES, who somewhat pooh-poohed the probability of alteration being necessarily consequent upon the conversion of the base into a nitrate if common sense ruled the manipulation. Mr. GROVES suggested the cultivation of some true *Aconitum Napellus* plants, with a view to more exact experiment, and the hazy knowledge existing in respect to the particular compound obtained from tubers of different botanical origin was adverted to by several speakers, the fact being emphasized by Mr. HOLMES remarking that there are as many as twenty-four varieties of that species.

Naylor on Hymenodictyonine.

Mr. NAYLOR then contributed another instalment to the chemical history of hymenodictyonine, the bitter alkaloidal principle isolated by him from the bark of *Hymenodictyon excelsum*, used in India as a tonic. Some of the experiments now recorded consisted in attempts to obtain an iodine derivative of the alkaloid in a crystalline form; these however were unsuccessful, though an amorphous body was obtained which gave on analysis 47·52 per cent. of

iodine, which corresponds pretty nearly with the formula $(C_{23}H_{40}N_2)_2I_3.2HI$. A similar failure attended attempts to obtain a crystalline bromine derivative. Other experiments had for their object to ascertain the effect of oxidizing agents on hymenodictyonine, the general result being an indication that like other non-oxygenated alkaloids it is constitutionally related to pyridine.

The time had now arrived for adjournment to luncheon, which was provided at the Grand Hotel.

Jones and Ransom on Assay of Elaterium.

Upon resuming the first paper read was on the Assay of Elaterium, by Messrs. JONES and RANSOM, which was partly devoted to the explanation of the defective nature of the method given in the Pharmacopœia and partly to the description of an improved method by which the determination of elaterin may be more correctly carried out.

Kirkby on Pareira Brava.

The next paper, by Mr. WILLIAM KIRKBY, had for its subject a false pareira brava from the West Indies. The histological peculiarities of this root as well as the stem were fully described, and will be illustrated when the paper is published. The reading of this paper gave the President an opportunity of reiterating his opinion as to the value of the microscope as a means of detecting intentional sophistication or the accidental substitution of one drug for another.

Gerrard on Ulexine.

The separation of an alkaloid, to which the name "ulexine" was given, from the seeds of the common furze, was announced by Mr. GERRARD a few weeks since in this Journal (see before, p. 101), but the method of preparation then described was defective and wasteful. Mr. GERRARD now states that it can be separated more effectively by treating the oily extract removed from the crushed seeds by alcohol with dilute hydrochloric acid, neutralizing the acid liquid with sodium carbonate, and after allowing resin to deposit adding excess of caustic soda, and shaking the alkaloid out with chloroform; upon treating the chloroformic liquor with dilute hydrochloric acid and evaporating ulexine hydrochlorate is obtained in crystals. The free base is separated in a crystalline form by decomposing the purified hydrochlorate in aqueous solution with soda, shaking it out with chloroform and evaporating. The yield of ulexine from the seeds by this process was only 0·191 per cent.; the alkaloid has also been obtained from the bark and young tops of furze, but in still smaller proportion. Ulexine is described as being soluble in its own weight of water, but quite insoluble in ether. It readily forms crystalline salts, and these, as well as the base, are said to give a characteristic deep red colour with ferric chloride. Mr. GERRARD devoted a paragraph to the galenical preparations of furze, but probably this information may, without disadvantage, await the publication of the paper.

Braithwaite and Farr on False Cubebs.

In some notes on the Chemical Examination of the Fruit of *Daphnidium cubeba*, which were epitomized by Mr. UMNEY in the absence of the authors, Messrs. BRAITHWAITE and FARR described the results of their experiments with the several extracts obtained by treating the material successively with petroleum spirit, ether, alcohol and water. They succeeded in ascertaining the presence of rather more than one per cent. of a volatile oil, and a considerable amount of fat oil containing oleic, capric and lauric acids, together with resinous substances presenting characters analogous to those of alkaloids and glucosides, but owing to the want of sufficient material these constituents could not be thoroughly studied. A sample of the oil which was shown differed markedly in odour from the oil of genuine cubebs, resembling pretty closely in this respect oil of lemon grass.

Alcock on Citrate of Iron and Quinine.

The last communication read on Tuesday consisted of notes on the examination of some trade samples of citrate of iron and quinine, by Mr. F. H. ALCOCK. The samples, six in number, which were described as "typical representatives of the B.P. kind," were examined in respect to solubility, amount of ferric oxide, alkaloidal constituent and sulphate present. Only one sample was represented as coming up to the B.P. standard in containing 15 per cent. of alkaloid, and this sample also gave the best result in respect to solubility, but it contained as much as 1·812 per cent. of sulphate. This quantity of sulphate was exceeded in two other specimens, and suggested the possibility that quinine sulphate had been added directly in their preparation. In the discussion which followed this paper, Mr. UMNEY expressed an opinion, which met with a general affirmatory response, that citrate of iron and quinine which does not answer to the present official requirement in containing 15 per cent. of quinine is improperly made, and is a disgrace to pharmacy.

After this discussion the Conference adjourned until Wednesday morning. A very pleasant sequel to the day's proceedings was arranged by the Local Committee, which had provided a number of brakes, some of which conveyed a party of members to the Mint, where ample opportunity was given for seeing the process of minting coins of copper, bronze, nickel, and brass, from the melting of the alloy to the striking of the coin. Another party meanwhile visited the Exhibition, and at 6 o'clock, having rejoined, the whole of the members were taken for a beautiful drive into the southern suburb of Birmingham.

Hillhouse on Studies in Botany and Materia Medica.

On Wednesday morning the proceedings were opened by Professor HILLHOUSE, of Mason's College, who read a paper in which he showed that for the sake of ensuring thoroughness in the study of botany and materia medica these subjects should be taught with a suitable regard for and co-ordination with the study of other branches of science, which, like

physics, chemistry and physiology, deal with the same subject matter from different points of view, and also with due regard for the practice of those arts, which, like medicine and pharmacy, require a knowledge of drugs and their composition and effects. He pointed out that the study of botany is with the pharmaceutical student largely a means to an end, namely, the systematic and intelligent study of some portion of the heterogeneous subject known as materia medica, and his object was to suggest how the study of botany might be best directed towards eventually qualifying the student for that work. Under the conjoint system adopted in reference to medical education, Professor HILLHOUSE considers that this correlation of different branches of science has not been sufficiently regarded, since the teaching of a branch of knowledge which most persons would consider to be dependent on prior chemical and botanical training is to be deprived of its botanical side, while the period assigned for teaching therapeutics is limited to the first year of the student's career. Although pharmaceutical study is still without any definite regulation the considerations treated of by Professor HILLHOUSE are well worthy the attention of all who hope to see that deficiency removed, and from the rapid progress of science in all directions it becomes especially important from a practical point of view so to adjust the teaching of the different branches that time may be economized, and with regard to the specific object of the course of study the teachers may, to use Professor HILLHOUSE's words, "play into each others' hands." The first part of the discussion which followed the reading of this paper referred to the subject from a medical point of view, Dr. TRIMEN, for instance, differing materially from the author and speaking of the absurdity of professing to arrange a complete course of botany that would be suitable to the conditions of the medical student. Mr. HOLMES, Mr. MARTINDALE, Mr. J. C. SHENSTONE and others, however, brought the question back within pharmaceutical range and argued that the teaching of botany to pharmaceutical students should be made more practical than it is at present.

Unofficial Formulary.

The next business transacted by the Conference involved an innovation which will probably distinguish this from every other meeting that has preceded it. It will be remembered that in his Address the President suggested that the Conference might undertake the task of compiling a non-official formulary. Mr. REYNOLDS now moved a resolution which practically covered this suggestion, the exact words being "that in order to secure greater uniformity "of composition and strength in non-official re- "medies, and also to enable the medical profession "to prescribe them with definite knowledge of "those qualities, and without indicating any parti- "cular maker, the British Pharmaceutical Con- "ference undertakes the preparation of a Formulary "of Non-Official Remedies." This proposition was supported by a reference to what had been done by the Paris Pharmaceutical Society and the American Pharmaceutical Association, and was seconded by Mr. S. R. ATKINS. It was evidently in accord with the views of nearly all present, although the discussion made it apparent that a diversity of opinion existed as to the scope of the proposed Formulary, some speakers wishing to limit it to formulæ for preparations of newly introduced drugs, and others evidently desiring that it should extend to the class of preparations represented by the illustration quoted by the President. One argument that told strongly in support of the motion was that it would give pharmacists an opportunity of proving their capability of rendering assistance in pharmacopœia construction. Eventually the resolution was passed *nemine contradicente*, and then, in order to give it practical effect, Mr. WILLIAMS moved the appointment of a Committee, consisting of Messrs. GREENISH, GROVES, MARTINDALE, SYMES, THRESH, MARTIN, NAYLOR, MABEN, ABRAHAM, and REYNOLDS, with power to add to their number, to prepare a Formulary of Non-Official Remedies and to report to the Executive Committee, the sum of £25 being placed at the disposal of the Committee for expenses. This motion also was carried.

Martin on Preparations of Nux Vomica.

The reading of papers was then resumed, the next in order being a valuable communication by Mr. N. H. MARTIN, of Newcastle, in which he gave the results of the examination of a large number of preparations of nux vomica, obtained from various sources, undertaken with a view to ascertain to what extent the new Pharmacopœia processes are followed in making these preparations, and whether the object sought in fixing an official standard is attained by these processes. Out of 25 samples of tincture of nux vomica 11 were separated as presenting evidence by their colour of having been prepared direct from nux vomica seeds; the alkaloidal strength of these samples ranged from ·119 to ·288 per cent., 7 of them being below the official standard. The 14 samples that appeared to have been prepared by dissolving the extract in a mixture of spirit and water, ranged in alkaloidal strength from ·196 to ·313 per cent., no less than 10 of them being in excess of the official strength and some considerably so. Mr. MARTIN is therefore of opinion that uniformity of alkaloidal strength is not attained by the Pharmacopœia process, even when it is followed, and that the tendency towards excessive potency may be attended by danger and inconvenience. Only 4 samples of extract had been examined, which varied in alkaloidal strength from 15 per cent. of total alkaloid to 16·8. But Mr. MARTIN's principal objection is that as there "exists no relation between the amount of extractive and the amount of total alkaloids in any sample of nux vomica," the Pharmacopœia process practically results in a preparation

which is in such an unstable condition that to call it a standardized preparation is misleading. The variation in the consistency of the standardized extract was confirmed in the discussion that followed the paper, by Mr. CONROY and others.

Williams on Ethyl Nitrite.

Mr. JOHN WILLIAMS then read a note on the Preservation of Ethyl Nitrite, in which he stated that in continuing his endeavours to prepare a solution of ethyl nitrite which would not decompose by keeping he had found the use of glycerine gave very promising results in preventing the rapid decomposition of nitrous ether as well as hydrocyanic acid, and he promised on a future occasion to report how far his expectations were realized. He exhibited samples of glycero-alcoholic solutions containing 16 per cent. of ethyl nitrite and less. Upon pouring the stronger solutions into water more or less violent effervescence was caused by the escape of the gaseous nitrite, the highest strength with which effervescence did not take place being the solution containing 2½ per cent.

The Conference then adjourned for luncheon.

Ransom on Belladonna Liniment.

Upon resuming, the last sitting commenced with the reading of a paper which might be looked upon as a criticism from a manufacturer's point of view of the new Pharmacopœia process for making belladonna liniment. In making the liniment strictly according to the official directions Mr. RANSOM has found that in order to obtain the 30 fluid ounces of final product 54 ounces of rectified spirit had to be used; further the fineness of the powder proved inconvenient when working on a large scale. The process was therefore varied by percolating a No. 20 powder until 40 fluid ounces of spirit had been used and then pressing the marc. In this way 30 ounces of liniment were obtained of almost identical alkaloidal strength with that prepared by the official process, but with a saving of 14 fluid ounces of spirit. Some other experiments were directed to testing the statement made in a footnote to the process in the Pharmacopœia of 1885 to the effect that improved exhaustion requires the increase of spirit as compared with the quantity ordered in the previous edition Practically it was found that the liniments prepared by the two processes were equal in alkaloidal strength. The next point sought to be determined was the extent to which by the present official process for belladonna liniment the alkaloids are removed from the root. It was found that the exhaustion was far from complete, being 71 per cent. of the total alkaloids in one case and 63 per cent. in another, but that the exhaustion was more complete from the richer root. The experience of the author leads him to favour the standardizing of this preparation. Mr. RANSOM also criticizes the official description of the root as favouring the omission of young roots which are relatively rich in alkaloid.

Moss on Salol, a new antiseptic.

Salol, or salicylate of phenol, a new antiseptic which is attracting considerable attention just now, was the subject of a communication from Mr. J. Moss. The first portion of the paper was devoted to the useful purpose of a *réchauffé* of the description of this compound and the claims that have been put forward on its behalf. Most of this information was practically the same as appeared in a note in the "Month" for May last (vol. xvi., p. 1007). It was further mentioned that Professor von NENCKE'S supposition that the decomposition of salol in the duodenum after passing unaltered through the stomach is due to the pancreatic ferment is incorrect, it being in fact due to the alkalinity of the liquid. Mr. Moss has indeed found that the saliva is sufficiently alkaline, though of course only to a small extent. The latter part of the paper recorded the author's failure to manufacture the compound.

W. L. Scott and J. Hodgkin on Terebene.

The next two papers read were on the subject of the quality of so-called "pure terebene." The first, which was by Mr. W. LASCELLES-SCOTT, gave the results of the examination of fifteen samples, from which it appeared that he considered only two samples were entitled to be spoken of as good, most of the others giving indications of having undergone oxidation by formation of peroxide of hydrogen and consequently yielding on evaporation various quantities of resin. One sample which was credited with having caused a cutaneous eruption gave as much as 2·10 per cent. of resin. The second paper, by Mr. JOHN HODGKIN, dealt with the impurity of "pure terebene" as indicated by the polarimeter. Proceeding upon the assumption that American turpentine is usually used in the preparation of terebene and taking 18° 6″ as the standard of rotation of this variety of turpentine, Mr. HODGKIN based his calculation as to the amount of unaltered turpentine in a sample upon the extent of its rotatory power, an essential character of pure terebene being, as is known, its absence of any effect upon a beam of polarized light. Nine samples, two of which were foreign, gave results indicating the presence of unaltered turpentine, calculated upon this assumption, varying between 3·2 and 61 per cent. of unaltered material. One of the samples giving the best indications according to this test was described as having "a slight smell of turpentine," whilst another sample said to have a "pleasant" odour gave indications construed to show the presence of 32·9 per cent. of unaltered turpentine. It was objected to this test that American turpentine is not constant in its rotatory power, but Professor ARMSTRONG remarked that the variety showing the greatest deviation from the standard comes from Savannah and is relatively small in quantity, so that, on the whole, American turpentine is fairly uniform in this respect. Some little amusement was caused when, upon Mr. Moss

stating that he had based his process for the manufacture of terebene upon the published researches of Messrs. ARMSTRONG and TILDEN, Professor TILDEN declared that the outcome of their research was to prove that no definite body corresponding to that originally described as terebene existed; but the apparent contradiction will be understood in the light of a remark by Mr. ALLEN that the name was applicable even if it were only to a mixture of hydrocarbons obtained by the molecular modification of turpentine until it no longer was capable of exercising a rotatory power on polarized light.

Jones on Estimation of Emetine.

In some notes on the estimation of Emetine, Mr. H. W. JONES spoke favourably of FLÜCKIGER'S method for assaying ipecacuanha, which consists in exhausting the finely powdered root with chloroform containing a trace of ammonia (see *Pharm. Journ.*, [3], xvi., 643), and weighing or titrating the residue after evaporation. The author stated that the alkaloid is removed in this way in an unaltered condition, but he agreed with Mr. ALCOCK (vol. xvi., p. 680) that the chloroformic residue is only imperfectly soluble in acidulated water, and said he therefore preferred to treat it with water and dilute sulphuric acid, filter through cotton wool and recover the alkaloid with chloroform and ammonia. In respect to the titration with MAYER'S reagent, by experiments with pure emetine Mr. JONES has found that in faintly acid solutions the most exact indications are given when the dilution is in the proportion of about 1 in 530; but as the error appears to increase regularly with the degree of concentration, he has constructed a table of factors for correction of results. Mr. JONES also corroborates the opinions which have been expressed that the amount of emetine in good ipecacuanha does not greatly exceed 1 per cent., and attributes higher results that have been recorded to the action upon the reagent of substances other than emetine that have been taken up by the solvent employed. Other experiments referred to, went to show that emetine undergoes alteration in treatment with lime, or even when subjected to heat alone on a water-bath, increasing slightly in weight, and then giving in acidulated water highly coloured solutions.

Shenstone on Vin. Ipecac.

A paper by Mr. J. C. SHENSTONE on Vinum Ipecacuanhæ gave the results of some experiments made to compare the behaviour of samples made with natural wines with and without various additions, and with artificial substitutes of known composition. The experiments have not afforded very decisive indications, beyond confirming the generally received opinion that the changes in the preparation are brought about by constituents in the wine used as well as atmospheric oxidation. The presence of sugar and of glycerine appeared to exercise a retarding influence on the precipitation, and Mr. SHENSTONE suggests a formula in which wine is replaced by a corresponding quantity of alcohol and water, with the addition of 10 per cent. of glycerine and 0·5 per cent. of malic acid.

Symes on American Musk.

A variety of musk derived from the "musk rat" (*Fiber Zibethicus*) has been the subject of various notices in Canadian and United States journals during the last few years (see *Pharm. Journ.*, [3], xiii., 110; xv., 87), and has been suggested as a possible substitute for the more expensive variety of musk for various purposes in perfumery. Dr. SYMES reported to the Conference the result of an examination of some of this American musk, from which it appeared that as at present met with it had the disadvantage of being contaminated with matter having a rancid odour, but it was suggested that this might perhaps be avoided by proper precautions taken at the time of collecting the musk. Dr. SYMES also described a process for exhausting the pods of their odour.

Dott on Iodoform.

The remaining four papers were then briefly summarized by the Honorary Secretaries in the absence of the authors. A note by Mr. DOTT on iodoform was a defence of a statement made by him last year as to the extent of the volatility of iodoform, which has been questioned by Dr. VULPIUS. Mr. DOTT reiterates his statement that the average volatilization of iodoform at 100° C. amounts to 6·7 per cent. per hour, and appears to think that the different result mentioned by Dr. VULPIUS was probably obtained at the more indefinite and lower temperature of a water-bath.

Hooper on Cinchona.

In the next paper Mr. DAVID HOOPER communicated some of the results obtained in the course of his quinological work in the Madras cinchona plantations. Shaving cinchona trees as a method of harvesting bark is now very general, but the question as to the limit to the constant and successful shaving of the tree is not yet fully understood. It has been found that when operating on trees of six years old the increase in the amount of quinine during the first and second renewal at intervals of twelve months was most satisfactory, but the increase was not so marked in the third year renewal, although the conclusion arrived at is that renewal by shaving might be permitted for at least four years. The beneficial effect of renewal by shaving was very marked in the case of a six-year old succirubra, which yielded twice as much quinine sulphate as from a natural succirubra of twice that age; but the operation was not satisfactory in its results when applied to trees of sixteen to twenty-one years, as such old trees will not bear the shaving treatment. The application of cattle manure to cinchonas seems, from the results of three sets of experiments on succirubra and magnifolia trees, to have the effect of increasing the amount of total alkaloids, and in two instances the amount of quinine, by 52 per cent. and 20 per cent. respectively; but the usefulness of the application of manure was not so marked in old trees, and it is

believed that the effect of manuring would be more apparent in Crown and Ledger barks. It is also stated that the maximum yield of quinine in Ledger and succirubra barks seems to be attained when the trees are between the age of five and six years, as after that time there is no sensible increase in the amount of quinine. Another point ascertained was that bark which had been kept for ten months in a damp room, and had become mouldy in consequence, had not deteriorated as regards the amount and quality of the alkaloids.

Howard on Cinchona.

Cinchona Cultivation in South America was the title of a paper by Mr. David Howard, who believes that it is to other countries than Ceylon, which occupies at present the most prominent position of all the countries where cinchonas have been cultivated, that we must look for the solution of the scientific points involved in the cultivation of cinchonas, owing to the little care that has been taken in Ceylon to avoid the danger of hybridization. Unfortunately, very little scientific information can be obtained from South America, the natural home of the cinchonas, except what little can be derived from the study of the cultivated bark which reaches us from that country. Among the cinchonas under cultivation in South America are two new species, *C. Thomsoniana*, named after Mr. Thomson, who discovered it in the Central Cordilleras, the home of the well-known *C. lancifolia*, and another discovered by Señor Pombo in Ecuador. *C. Thomsoniana* gave on analysis of the bark of a two-year old tree 3·3 per cent. quinine sulphate, trace of cinchonidine, and 0·55 per cent. cinchonine. The bark from the other species of the same age gave 5·7 per cent. quinine sulphate, 0·43 per cent. cinchonidine, with no cinchonine or quinidine. The improvement brought about by the successful cultivation of the cinchonas is further shown by the results obtained from the same plantations in 1872 and 1881 of the several kinds of cinchonas grown in Jamaica, and these results were even more favourable in the cultivation in Columbia of descendents from the Jamaica plantations. In the case of a succirubra cultivation in Columbia from a Jamaica plant the bark yielded as much as 7·0 per cent. quinine sulphate, with only 1·9 per cent. cinchonidine, and 0·67 per cent. cinchonine and Mr. Howard remarks that this succirubra is one of the finest he has tested. In Mr. Howard's opinion it cannot be too clearly borne in mind that the prospect of future profits in the cultivation o cinchonas depends entirely on the cultivation of high testing bark, for in the face of the importation of such highly valuable cultivated bark from Bolivia, as well as from Java, the profitable growing of inferior bark is impossible.

Dott on Compound Spirit of Ether.

[illegible] paper was a characteristic note by Mr. Dott on compound spirit of ether, the preparation which has recently received an official rehabilitation, which wound up with the following not very complimentary conclusions :—(1) That the Pharmacopœia directions for its preparation admit of a very variable result; (2) that the process consists principally in the preparation of ether, and its evaporation into space; (3) that though this extravagance could not be grudged if it resulted in a product of extraordinary potency, there is no evidence to show that ethyl sulphate or its congeners are of such a nature; and (4) that the introduction of this preparation appears to be a step backwards.

The business of the Conference having been so far concluded, a resolution was proposed by Mr. Schacht,

> "That the cordial thanks of the non-resident members of the British Pharmaceutical Conference be given to the Local Committee, especially to Messrs. Barclay, Thompson, Perry, and Arblaster, for the very successful way in which the arrangements connected with the Birmingham visit have been made and carried out."

This was seconded by Mr. Symes, and carried unanimously. Messrs. Barclay and Thompson responded briefly. Mr. J. B. Stephenson then proposed—

> "That the hearty thanks of the meeting be given to President and Council of the Mason's Science College for granting the Conference the use of the Chemical Lecture Theatre, and to Professor Tilden and Professor Hillhouse, for their valuable assistance in promoting the success of the meeting."

This was seconded and carried by acclamation.

Mr. Allen, of Dublin, proposed :—

> "That the best thanks of the Conference be accorded to Messrs. Elkington and Co., Messrs. Heaton and Co., and Messrs. Gillott for their kindness in allowing visiting members to inspect their works,"

which was seconded by Mr. Maben, and also carried by acclamation.

From the fact that Mr. Plowman was retiring from the office of Honorary General Secretary to the Conference occasion was offered to make a formal acknowledgment of the great services he had rendered in that capacity, and the President moved a resolution to that effect. This was seconded by Mr. Plowman's colleague, Dr. Thresh, and carried with cordial appreciation by the members of the Conference.

Mr. Groves then moved that the best thanks of the members be accorded to the President for the very able and courteous manner in which he had conducted the business of the meeting. This resolution was seconded by Mr. Kemp, of Bombay, and carried with acclamation.

The election of officers for the ensuing year was decided by the presentation of a single ballot paper, and no opposition having been offered it was declared to have been completed, the President chosen for next year being Mr. S. R. Atkins, of Salisbury.

The other members of the Executive Committee are—

Vice-Presidents, M. Carteighe, F.I.C., F.C.S., London; S. Plowman, F.R.C.S., London; C. Symes, Ph.D., Liverpool; G. S. Woolley, Manchester.

Treasurer, C. Umney, F.I.C., F.C.S., London.

Honorary General Secretaries, J. C. Thresh, D.Sc., F.C.S., Buxton; W. A. H. Naylor, F.C.S., London.

Other Members of Executive Committee, W. Elborne, Manchester; A. W. Gerrard, F.C.S., London; T. Maben, Hawick; J. E. Brunker, M.A., Dublin; R. H. Davies, F.I.C., F.C.S., London; D. B. Dott, F.R.S.E., Edinburgh; T. Barclay, Birmingham; M. Conroy, F.C.S, Liverpool; W. H. Symonds, F.C.S., F.R.M.S., London.

Local Secretary, F. B. Benger, F.C.S., Manchester.

Auditors, C. J. Arblaster, Birmingham; W. Wilkinson, Manchester.

Incidentally it was mentioned that the attendance at the Birmingham meeting had been larger than at any previous meeting of the Conference, no less than 187 members' names having been recorded on this occasion, while the actual number of visitors present was probably much in excess of two hundred, so that the varied attractions of the Midland Metropolis as a place of meeting were evidently well appreciated.

At the close of the proceedings on Wednesday afternoon, conveyances were again prepared to take the members to GILLOTT'S Steel Pen Works, and a large number availed themselves of this opportunity of inspecting one of the most interesting industries of Birmingham. Another party went to the Exhibition at Bingley, and afterwards they drove to the Botanical Gardens. In the evening there was a musical and social meeting at the Grand Hotel, and festivities were kept up until an advanced hour in the night.

During the course of Wednesday the weather assumed an unfavourable aspect and some showers of rain fell at intervals; but on Thursday morning it became evident that in Birmingham at least there was a prospect of a steady day of rain. Nevertheless the muster at the Snow Hill railway station soon after half-past eight was considerable, and the special train started at its appointed time with the greater part of the visitors to the Conference. On reaching Stratford-on-Avon umbrellas were indispensable, and several gave up the attempt to visit all the places of interest connected with SHAKESPEARE. Shortly after twelve the train started for Leamington, and on arriving there the members were conveyed to the Town Hall, where they were entertained at luncheon by the chemists resident in that town. After the usual loyal toast had been proposed by Mr. BARCLAY, the toast of the Medical Profession was proposed by Mr. ATKINS, the President-elect, who coupled with it the names of Dr. WYER, of Leamington, and Dr. TIBBITS of Warwick. These gentlemen in responding spoke in pleasing terms of the good influence produced by the Conference and the Pharmaceutical Society in harmonizing the relations between medical men and pharmacists, and in the name of their colleagues of the district welcomed the visitors to Warwickshire. The toast of the Conference and its President was then proposed by Dr. THORNE, of Leamington, in an effective speech, in the course of which he mentioned that Leamington had not a single dispensing doctor. The Local Committee to whom the visitors were indebted for the arrangements made to entertain them and for the hospitalities with which they had been received was then made the subject of a toast by Mr. REYNOLDS, of Leeds, the names of Messrs. BARCLAY, SMITH, PULLIN, HOLLIDAY and THOMPSON being specially associated with it. This was very heartily responded to, and the several gentlemen called upon to reply expressed their satisfaction that the endeavour to carry out the various arrangements had met with the appreciation of the visitors.

The drive to Kenilworth was taken in an opposite direction from that which had been intended, the carriages proceeding first to Warwick and Guy's Cliff and returning by Stoneleigh Park. A very handsomely got-up guide book to these places and to the various points of interest at Stratford-on-Avon had been distributed among the members during the railway journey to Leamington. The descriptive notes for this had been supplied by Mr. W. F. WYLEY, the Vice-President of the Midland Counties Chemists' Association, and together with some excellent photographs, it formed not only a useful source of information, but will also be a pleasant memorial of the excursion which, in spite of the rain that continued almost without cessation, those who took part in it will doubtless be glad to remember as a very successful incident of their visit to Warwickshire.

We cannot close these remarks without again calling attention to the conversazione, held on Monday evening, as having proved a very happy innovation upon previous usage. The greater facilities thus afforded for personal intercourse between the members are of especial value in regard to the objects which the Conference has in view, and it would be desirable if possible to make those facilities for conversation even greater still. It might indeed be useful for that purpose to curtail the periods of meeting now devoted to the reading of papers, and many papers might be read in a more abbreviated form for the purpose of employing some of the time available in the more profitable manner we have mentioned.

In accordance with the announcement which appeared in this Journal the Chemists and Druggists' Trade Association held a dinner at the Grand Hotel, Birmingham, to celebrate the tenth anniversary of its formation. The attendance was good, over one hundred persons being present and sufficient evidence was furnished by that circumstance to show that the idea of holding an annual dinner of the members of the Association at the time when the Conference meets promises, with good management, to become a useful means of promoting the interest of the body. The present attempt to carry out this idea was somewhat tentative, and as much uncertainty prevailed up to the day fixed for the dinner as to the number of guests who would be present it would not be fair to criticize very minutely the details of the entertainment. But we may safely say that the Secretary of the Association was most indefatigable in his endeavours to make the new departure as successful as was possible and the thanks of all who took part in the reunion are due to him for his self-sacrificing exertions.

British Pharmaceutical Conference.

TWENTY-THIRD ANNUAL MEETING.

The Twenty-third Annual Meeting of the British Pharmaceutical Conference commenced on Tuesday, August 31, in the Chemical Lecture Theatre of Mason's College, Birmingham. The theatre, which is a most commodious room, and thoroughly adapted for the purpose, was well filled by members and friends when Mr. THOMAS GREENISH, F.C.S., F.R.M.S., the President, took the chair.

Mr. T. BARCLAY, on behalf of the Local Committee, welcomed the Conference to Birmingham, and in doing so referred to the help which had been afforded by Professor Tilden, Professor Hillhouse, and others. Endeavours had been made by the Committee to make such arrangements as would ensure the meeting being a very pleasant, as well as a profitable one. They were fortunate in meeting at a time when an exhibition of the technical industries of Birmingham was being held at Bingley Hall, and the experiment which had been made on the previous evening of holding a conversazione had proved so successful that he had no doubt the same plan would be followed in the future. It was twenty-one years since the Conference had met in that town, under the presidency of Mr. Henry Deane, when the father of the late Mr. William Southall was Chairman of the Local Committee and Mr. William Southall himself was Local Secretary. All these men had passed away, as well as Mr. Stoddart, of Bristol, Mr. Jones, of Leamington, and Mr. Dymond, each of whom took an active part in the proceedings; but their memory would long linger in the minds of those who knew them, and their bright example would, he hoped, prove a most useful stimulus to the younger members of the profession, some of whom at any rate, would, he trusted, look back with a great deal of satisfaction to this meeting of the Conference in Birmingham.

Professor TILDEN also added a few words of welcome, and expressed the great pleasure it afforded him to meet so many old friends, many of whom he had known since his student days at Bloomsbury Square.

The PRESIDENT having briefly acknowledged the words welcome which had been uttered.

Mr. SIDNEY PLOWMAN (Hon. Gen. Sec.) read the following list of delegates:—

List of Delegates.

Pharmaceutical Society of Great Britain.—The President, Vice-President, and Messrs. S. R. Atkins, Cross, R. Hampson, W. D. Savage, G. F. Schacht, C. Symes and J. Williams. From Scotland:—Messrs. J. Borland, D. B. Dott, A. Kinninmont, J. Mackenzie, J. B. Stephenson and R. Storie.

Pharmaceutical Society of Ireland.—Mr. J. E. Brunker, M.A. (President), Messrs. W. N. Allen, J. C. C. Payne and W. F. Wells, jun.

Aberdeen and North of Scotland Society of Chemists and Druggists.—Messrs. J. P. Kay, J. Paterson and J. Sim.

Brighton Association of Pharmacy.—Messrs. Marshall Leigh and W. D. Savage.

Bristol Pharmaceutical Association.—Mr. G. F. Schacht.

Hawick Pharmaceutical Association.—Mr. T. Maben.

Hull Chemists' Association.—Mr. C. B. Bell.

Leeds Chemists' Association.—Messrs. G. Ward and R. Reynolds.

Leicester and Leicestershire Chemists' Association.—Messrs. S. F. Burford, J. W. Clark and W. Thirlby.

Liverpool Chemists' Association.—Messrs. A. C. Abraham, M. Conroy, A. H. Samuel and W. Wellings.

London Chemists' Assistants' Association.—Messrs. A. A. Deck, E. H. Farr and H. H. Millhouse.

Manchester Pharmaceutical Association.—Messrs. F. B. Benger, G. S. Woolley and W. Elborne.

Sheffield Pharmaceutical and Chemical Society.—Messrs Newsholme, Ward and Kirkby.

The PRESIDENT having welcomed the delegates, making special mention of the gentlemen from India and the Colonies, who had several of them rendered valuable services to pharmacy in England,

Mr. D. S. KEMP (Bombay) briefly responded for the members present from abroad.

Mr. PLOWMAN, Hon. Gen. Sec., read letters of apology for absence from Professor Attfield, Mr. Carteighe, Dr. Quinlan, Professor Tichborne, and many others, and said that Mr. Mason, of Montreal, had sent a congratulatory cablegram.

Dr. THRESH, F.C.S. (Buxton), Hon. Gen. Sec., next read the Annual Report, and the Financial Statement was read by Mr. PLOWMAN.

REPORT OF THE EXECUTIVE COMMITTEE.

During the past year the attention of your Committee has been chiefly engaged at its several meetings upon the routine business of the Conference. One special and important matter has, however, required its attention. In the report presented last year to the Aberdeen meeting it was stated that your Committee had resolved to publish a General Index to the 'Year-Book of Pharmacy,' and that a Sub-Committee had been appointed to arrange the necessary details. This Sub-Committee has met on several occasions, and the result of its labours has been such, that at a meeting of the Executive Committee, held on June 10, 1886, Mr. Plowman, the Secretary to the Index Committee, was enabled to present a report stating that a few bound copies of the Index had then been completed, and that the printers could commence delivery to members at once. Twelve hundred and fifty copies have been prepared, and a considerable proportion of this number has been distributed to members.

The General Index consists of 246 pages and contains complete references to the proceedings of the Conference since the inaugural meeting, and of the subject matter of the whole series of Year-Books, including the 1885 volume. It has been issued at the nominal subscription of 2*s.* 6*d.* and on this account has caused a considerable financial loss to the Conference. Your Committee nevertheless feels that this expenditure, approved of by the Aberdeen meeting, is fully justified, since it is difficult to over-estimate the enhancement in value of the many volumes of the Year-Book as works of reference caused by the publication of a General Index up to date. A limited number of copies of the Index is still for disposal, and can be supplied to members, postage free, at the rate of 2*s.* 6*d.* per copy, on application to the Secretaries.

It is peculiarly appropriate to refer to the Colonial and Indian business of the Conference at a time when a Colonial and Indian Exhibition is being held at South Kensington. Your Committee has much pleasure in being able to report that the affairs of the Conference in the Colonies and India continue to be in a most satisfactory condition. The large increase in the number of members residing abroad consequent upon the appointment of Colonial and Indian Secretaries has been fully maintained. These gentlemen have not relaxed in their efforts on behalf of the Conference in their respective districts and by their loyal action and personal influence have been largely instrumental in securing the friendly co-operation of our Colonial and Indian *confrères*. Mr. David Hooper, F.C.S., Government Quinologist in Madras and the newly appointed Secretary for that Presidency, sends a paper to be read at this meeting entitled "Quinological Work in the Madras Cinchona Plantations."

It is with very great regret that your Committee has to announce officially the deaths during their tenure of office of Mr. Henry Sugden Evans, Secretary for Canada, and of Mr. L. B. Bush, Secretary for New South Wales. Both did good service to the Conference and freely and

ungrudgingly devoted a large amount of time in promoting the truest and best interests of the Conference in Canada and New South Wales. Mr. D. S. Kemp has resigned the Secretaryship for Bombay owing to his leaving India. The following Colonial and Indian Secretaries have been appointed since the last general meeting of the Conference :—Bombay, Erasmus Beynon ; Canada, A. H. Mason, F.C.S.; Madras, David Hooper, F.C.S.; New South Wales, Ryder Horton.

It is a subject for congratulation that no other gathering in which pharmacists are interested takes place this year, so as in any way to clash with the Conference meeting. In 1884 the meeting of the British Association at Montreal, and in 1885 the International Pharmaceutical Congress at Brussels, prevented some of the members from attending the Conference gatherings during those years. There are several new features in the present meeting. Last evening members met the President and officers of the Conference at a conversazione at the Grand Hotel. Your Committee feels that members have not in former years had sufficient opportunity of becoming known to each other. The means afforded by the excursion have not in the opinion of your Committee been quite adequate for this purpose in the past. It must be admitted that last night's experiment was highly successful, and calculated to promote one great object of the Conference, viz., friendly intercourse and common goodwill among pharmacists. This object will be further advanced by a concert and social evening on the night of Wednesday, September 1. Some alterations in the hours of the business sittings of the Conference have been made. The object of these alterations is to allow the business of the Conference to be concluded in such time as to afford members an opportunity of visiting works and places of interest in the neighbourhood. On some former occasions these visits have been paid during the luncheon interval, and there has been great difficulty in getting members together again in proper time for the afternoon sitting.

During the past year no grant in aid of research has been applied for, and no report of any research for which money has been granted will be presented this year ; but twenty papers will be read at the present meeting. One paper was considered not quite suitable for the Conference, and the author was requested to withdraw it.

Mr. Siebold was last December re-appointed Editor of the 'Year-Book' for 1886. The manuscript of Parts I., II., and III. is now on the table, and includes all the abstracted matter in the forthcoming volume.

Since the last general meeting ninety-two gentlemen have been elected to membership.

It is the painful duty of your Committee to report the death during the past year of Mr. William Southall. Mr. Southall was President of the Conference during 1880, and performed the duties of the office with marked tact and ability. Although for many years before his death he frequently suffered from ill-health, he always retained his kindly geniality, and never relaxed in his desire to further the best interests of the Conference. Many members will miss his personal friendship and will mourn his loss.

Your Committee regrets to have to announce that the Senior Honorary General Secretary, Mr. Plowman, has, in accordance with a desire he expressed last year, tendered his resignation, and as his decision is final his duties will terminate after the present meeting.

Mr. Plowman has served the Conference in the capacity of Hon. Gen. Sec. for five years and his exertions on its behalf have been so indefatigable that the Committee feels it its duty to record its sincere appreciation of his services, and to acknowledge that much of the success of the meetings which have been held during his tenure of office has been due to his exertions.

FINANCIAL STATEMENT FOR THE YEAR ENDING JUNE 30, 1886.

The Hon. Treasurer in Account with the British Pharmaceutical Conference.

July 1, 1885. *Dr.*	£	s.	d.	£	s.	d.
To Assets forward from last year—						
,, Balance in hand at Bank . . .	220	16	7			
,, Cash in Secretary's hands . . .	0	3	6			
,, Messrs. J. and A. Churchill's Account	118	6	8			
				339	6	9
June 30, 1886.						
To Sale of Year-Book by Publishers . .	19	6	8			
,, Sale of Year-Book by Secretary . .	10	10	0			
				29	16	8
,, Advertisements, 1885 vol. . . .	115	13	0			
,, ,, 1884 vol.. . . .	15	11	6			
				131	4	6
,, Subscriptions from Members				651	17	2
,, Index Book, sale of, per Secretary . . .				0	15	0
,, Outstanding Liabilities, viz., Messrs. Butler and Tanner's Account unpaid				137	2	0
,, Difference to balance				0	0	4
				£1290	2	5

June 30, 1886. *Cr.*	£	s.	d.	£	s.	d.
By Expenses connected with Year-Book :—						
Printing, Binding, Publishing .	376	16	5			
Postages and Distributing . .	51	17	6			
Advertising and Publishers' charges	36	0	8			
Editor's Salary	150	0	0			
Foreign Journals	5	2	6			
				619	17	1
,, Expenses connected with Index to Year-Book :—						
Printing, Binding, Publishing .	126	2	0			
Postages and Distributing . .	6	0	0			
				132	2	
,, Secretary's Salary (Mr. Princep) . .	100	0	0			
,, Blue Lists	9	6	4			
,, Printing and Stationery . . .	35	1	1			
,, Postages	31	10	0			
				175	17	5
,, Expenses of Aberdeen Meeting (Rent Hall)	5	5	0			
,, Mr. Princep (Secretary) . . .	9	0	0			
				14	5	0
,, Petty Cash				6	13	8
,, Expenses per Colonial Secretaries, Addressing Circulars and Distributing Bills, etc. :—						
New Zealand Secretary . . .	0	18	10			
Victoria Secretary	1	1	0			
				1	19	10
,, Assistant for Mr. Princep while ill . . .				1	10	0
,, Expenses for Bank Charges, Collections, etc.	0	1	9			
,, Cheque Book	0	8	4			
				0	10	1
,, Outstanding Assets :—						
Messrs. J. and A. Churchill's Account . .				114	10	6
,, Balance at Bank				219	7	0
,, Cash in Secretary's hands				3	9	10
				£1290	2	5

1886, July 1, Assets	£	s.	d.
Cash	222	16	10
Churchill's Account (since paid) . .	114	10	6

THE BELL AND HILLS FUND.

Dr.

	£	s.	d.
July 1, 1885. To Balance in hand	22	18	2
July 7, 1885. To Dividend on Consols, £350	5	1	6
Jan. 7, 1886. ,, ,, ,,	5	1	6
	£33	1	2

Cr.

	£	s.	d.	£	s.	d.
1885-6. By Purchase of Books for Aberdeen, per Hy. Kimpton	10	16	9			
,, Balance	22	4	5			
				£33	1	2
Being Cash in Bank	12	1	5			
And Dividends accrued on Consols, but not received prior to the closing of the Accounts	10	3	0			
	£22	4	5			

		£	s.	d.
1886, July 1, Assets	Cash	22	4	5
	*Consols	350	0	0

Audited and found correct, { JAMES PATERSON, Aberdeen.
Angust 23rd, 1886. { CHARLES J. ARBLASTER, Birmingham.

* Securities viewed.

After a few words from Mr. PATERSON (Aberdeen) recommending that the accounts of the Conference should in future be kept in a more systematic and business-like manner.

The PRESIDENT moved the adoption of the Report and Financial Statement.

Mr. W. D. SAVAGE (Brighton) seconded the motion, which was carried unanimously.

The PRESIDENT then delivered the following address:—

THE PRESIDENT'S ADDRESS.

To be chosen to fill the Presidential chair on the occasion of the meeting of the British Pharmaceutical Conference in Birmingham I feel to be a great honour; but it involves an amount of responsibility from which a timid nature would incline me to shrink, and the responsibility assumes larger proportions now that the vigorous efforts made to extend the membership to India and the Colonies have been attended with such marked success.

My first duty is to offer a cordial welcome to you all; it is an agreeable one, and I do it most heartily.

It may be that you will expect from me an encouraging review of a year of work done in the direction of the advancement of pharmacy together with the well-being of the pharmacist. I do not propose, however, to devote much of my address to a review of the past; I prefer to utilize its lessons in an attempt to grapple with the problems of the future. In the past, and, indeed, in the present, I see so little that is cheering, and so much that is discouraging, that I must ask you beforehand to forgive me if in speaking of them my remarks are somewhat decisive, my disapproval or condemnation freely outspoken.

When the Conference met last year in Aberdeen the new edition of the national Pharmacopœia was just being issued. Since then that work has been the subject of much discussion and criticism among pharmacists, and one result has been the publication of numerous and important errata, so that allusion to that work on the present occasion can scarcely be avoided. Without going into details, the question may now be asked, does the British Pharmacopœia of 1885 represent the advance which has taken place in pharmacy in the interval between that and the preceding issue? It is my own opinion—and I think it more than probable that there is a general consensus of opinion—that it does not; but that this last edition represents the diligent gathering of fragmentary papers with an absence of the applied practical knowledge necessary for the proper elaboration of such a work.

The production of a Pharmacopœia that shall be fully equal to our ideal of such a book must always be difficult, perhaps impossible; but a strenuous effort should be made to place it on a level with progress in the science and in the art of pharmacy. A British pharmacist taking part with pharmacists of other and more favoured nations in the deliberations on the formation of an International Pharmacopœia cannot but feel humiliation at the position occupied by the pharmacists of Great Britain in respect to the compilation of their national text-book. The validity of their claim to a more practical recognition is not a new idea, but one largely entertained and assented to by the medical profession. Pharmacists will therefore do wisely to press their reasonable and just demand for a more direct voice in the preparation of the formulæ of successive editions of the British Pharmacopœia, for it is impossible for any man or body of men to resist indefinitely the pressure of surrounding opinions. Meanwhile, I cannot leave the subject without expressing the regret I feel, in common with all pharmacists, that our efforts for the advancement of pharmacy are not yet legally recognized as a sufficient basis for a claim to representation in the Pharmacopœia Committee of the Medical Council.

But are we, as pharmacists, free from some share of blame in this matter? Have we, as a body, taken any concerted action with the view of improving the processes for those preparations already in the Pharmacopœia, or have we taken any steps to examine new and hitherto little-known drugs, and to supply the most suitable formulæ for the preparations of the same before they get into the hands of the "mystery-mongers" by whom they are brought to the notice of the medical profession? If the answers to these questions involve us in some reproach, I rejoice to know there is a prospect of this soon being taken away. In the research laboratory which it is proposed to establish and supply with modern conveniences for conducting original work, advanced students, already trained and disciplined in scientific method, will meet with encouragement and assistance to do thoroughly that which time and opportunity did not previously admit of.

I cannot refrain from expressing an individual hope, but one which I have no doubt will be shared by you all,

that when the claims of original research are satisfied there may be found some quiet spot where vegetable histology in its application to materia medica may be systematically pursued by students in pharmacy, where the value of the microscope as a means of identifying drugs and recognizing adulterations and substitutions will be fully appreciated.

The meeting of the International Congress in Brussels cannot be lightly passed over. The issue of an approved International Pharmacopœia, essential as a companion to, but not to supersede any national Pharmacopœia, which shall contain only active drugs and their medicinal preparations, may be an event in the future; but whether in the near future or not, it is impossible that pharmacists practising pharmacy under different conditions, and subject to different pharmacy laws, can meet together in Congress without mutual advantage. Probably when the time arrives that an International Pharmacopœia may reasonably be expected, it will be found that many of the advantages sought for in the compilation of such a work have been gradually and almost imperceptibly attained by more frequent intercourse and familiar conversation. These international courtesies, whilst being very agreeable, are also very valuable, and if the issue of an International Pharmacopœia were to be considered as their sole and ultimate aim—in fact their "finality"—I could wish, for the sake of pharmacy generally, that the result should be postponed for at least another generation.

So much for the past, and now for the present and future.

An address may consist mainly of platitudes, or of statements of fact or of opinion with which those present would be quite agreed; but I hold it as quite within the lines of a presidential address to start fresh topics, and give food for *active* thought. This is done in the United States, where the Presidential address is frequently referred to a Committee to bring up subsequently a report upon suggestions contained in it, and, if desirable, to frame a resolution for adoption.

In considering the subject of an address for the present occasion, I have thought it might be of advantage to refer to the official definition of the Conference and its objects. "An organization established for the encouragement of pharmaceutical research, and the promotion of friendly intercourse and union among pharmacists." Whilst perhaps it may be admitted that the first of these has been fairly well attained, I fancy I see year by year a growing tendency to a diminution of that friendly intercourse which characterized our early gatherings. Recent meetings have shown signs that the Conference is getting into a sort of "rut;" there have been of late but few fresh faces, excepting those belonging to the places visited, whilst there has been an increasing number of papers summarized or read in the absence of the authors, and then, as a consequence, rarely followed by discussion or interchange of opinion. It may be that this has been due to the comparative absence of non-technical topics from our discussions, and that, in our desire to avoid certain phases of pharmaceutical politics, we have ignored subjects that are of the utmost importance alike to ourselves and the public.

The question I would raise is, Shall the Conference be considered a "mutual tickling and admiration society," or can it employ itself in certain *active* duties for the benefit of its members and all those who practise the art of pharmacy?

I am very reluctant to throw a stone into so placid a pool of self-esteem, but I must confess to a feeling that the British Pharmaceutical Conference is an association which if it continues to exist for any practical benefit must assume more *active* duties than it has hitherto done, or the *raison d'être* of its existence will certainly be called in question.

We cannot but feel some sympathy with that cry of distress which reaches us from pharmacists in the near and remote districts of Great Britain with regard to the present condition of our art. Excepting in some of the centres and the more important provincial towns pharmacy has no existence for pharmacists; the pharmacy of the country is absorbed by medical men, and the very soul of pharmacy is taken out of those who are ostensibly engaged in its practice, and whose legitimate calling it undoubtedly is. With a given number of inhabitants there is an average amount of sickness; but the pharmacist, especially in country districts, literally sees nothing of it and he is obliged to turn his attention in other directions to satisfy the claims of his family and to relieve the burdens imposed on him by society and the State. When a prescription makes its appearance, once a fortnight or thereabouts, all hands, apprentices included, are called forward to see this curious interruption to their ordinary duties. It is in these "happy hunting grounds" that our apprentices conceive their first ideas of pharmacy and is it to be wondered at that when they enter the examination room a prescription should prove as great a curiosity as it did before?

If pharmacy in a large proportion of the places where it is supposed to be practised were only a little lower it would cease to exist. In fact I am not sure that we are not gradually but surely drifting into that condition when there will be a line of separation, not faint and obscure but marked and determined, between the pharmacist proper and the retailer of drugs or the drysalter.

The remedy is not so obvious. The entire separation of the practice of medicine from that of pharmacy, such as obtains in continental countries, suggests itself; but is this great change practicable within a limited period of time? Legislation on the subject must not be anticipated. Perhaps the pharmacist, showing greater scientific and practical skill in the conduct of his art than can be expected in a surgery, will acquire the greater confidence of the public, and I think it may be assumed that the higher and continually improving character of the education of the medical profession will insensibly tend to dissociate the practice of medicine from that of pharmacy.

But there is an evil growing up in the very midst of us, and assuming large proportions, which should be grappled with, I think, by this association. I will call it "wholesale prescribing for the medical profession," absolutely dictating to that body in what relative proportions a combination of well-known drugs should be prescribed. These proprietary preparations, for the most part "factory made," thrust upon the medical profession and unblushingly advertised, are sapping the foundations of true pharmacy and at the same time depriving the pharmacist of the legitimate practice of his calling.

There can be no desire on the part of the pharmacist to limit the members of the medical profession in their choice of remedial agents for the treatment of disease ; but that question is not involved in the consideration of this practice. A pharmacist with any dispensing business finds it necessary to keep an extra "light porter," technically termed a "runner," to find out which of his neighbours has been the unfortunate purchaser of a 4*s.* 6*d.* bottle of some nostrum required to enable him to complete a 1*s.* 6*d.* mixture. Mist. Magnesiæ et Bismuthi Comp. and (Jones) within brackets is typical of a large number of them. Magnesia is well known ; of bismuth the profession cannot be ignorant ; but the charm lies in the "Comp.," which conceals the colouring and flavouring agents necessary for effect. In fact, these secret proportional combinations of ordinary drugs are accepted as if they were more effective than the same drugs combined in a prescription adapted to the requirements of careful diagnosis.

Pharmacists are harassed by the demand for these proprietary prescriptions, which prescribers take up without thought, and without a second thought thrust aside, their unofficial pharmacopœia being mainly the advertisement pages of the medical journals.

It is not the province of the pharmacist to call in question the therapeutic value of any medicine, but it does seem to him curious that a spirit said to be distilled from a non-volatile drug should possess any more medicinal value than ordinary spirit in a state of more or less dilution. What advantage can it be to therapeutic science to know that a certain compound has been found useful in a certain class of diseases if the composition of the medicine be a trade secret ?

The members of the medical profession are largely responsible for the growth of this evil. Whilst in their collective capacity they strongly condemn "nostrums," yet individually many daily prescribe them. It is a practice perplexing to every pharmacist and derogatory to the medical profession, which justifies the apprehension expressed by Dr. Quain in his Harveian oration, that "the art of writing a rational prescription is in danger of becoming lost, and may indeed have a still more prejudicial influence now that the furnishing of gratuitous medical advice is being made the means of pushing the sale of proprietary nostrums."

This phase of pharmaceutical business assumes many different forms, and I ask you now to determine for your own protection to grapple with this hydra-headed monster before the knell of true pharmacy is sounding in your ears. It is by no means too early to make the effort, and it may not yet be too late ; by and bye you may cry like women for the loss of those privileges you have failed to defend like men. One way of doing this will be for us to see that we ourselves meet as far as possible the wants of the medical profession. If unofficial preparations of a certain type attain favour with the profession, why should we not as soon as possible place ourselves in a position to supply them ? If after careful examination of such compounds *quasi* authoritative formulæ for their preparation were published that portion of the medical profession which had seen such happy results from the use of the "nostrums" would, it might be hoped, if the formulæ were issued by the British Pharmaceutical Conference, be only too glad to prescribe them as Mist. Magnesiæ et Bismuthi Comp. B.P.C., etc., and every intelligent pharmacist could prepare them in his own pharmacy. This would apply to a long list of preparations of which mist. magnesiæ is typical.

Would not the Conference be a very proper body, and the very proper body, to take up this subject, to investigate these much lauded new preparations that make their appearance with the usual advertising *éclat*, and to give definite formulæ for the same, so that medical practitioners might be able for themselves to determine in what cases to employ the remedies persistently thrust under their notice with successful cases manufactured ready to hand? Medical science might thus be materially assisted and pharmacy elevated at the same time.

Any formulæ published under the auspices of the British Pharmaceutical Conference would be issued with its transactions. They might also be published separately as the "Unofficial Formulary of the British Pharmaceutical Conference," and thus be brought under the notice of prescribers with a suggestion that instead of ordering a preparation with one particular maker's name, as for instance "Jones," the formulæ sanctioned by the Conference should be indicated by the letters B.P.C. Surely a large portion of the medical profession would consider this a boon, and gladly avail themselves of it. I now leave this subject to be dealt with as the Conference may see fit.

Another subject that demands immediate attention in the interests of the future of pharmacy is the still unsatisfactory and inadequate provision for pharmaceutical education in the provinces. It would be impossible to overestimate the service rendered by the Conference in affording an opportunity for pharmacists being brought into contact with each other ; this alone is a matter of the first importance. The Conference has also been mainly instrumental in bringing to the front many young but able men, who may be looked upon to fill our vacant places with advantage to the body and credit to themselves. Wherever, too, the Conference meets there results from its presence something like a step—and perhaps the first step—towards organization for the general good of the young men in that locality who are engaged in pharmacy. But notwithstanding all that has been done by this Conference, by the Pharmaceutical Society, and by other associations that may also exist, the trade in its broadest sense is still only very partially organized to work for the common good. Especially is this the case with regard to organization for providing anything worthy of the name of pharmaceutical education.

The subject of Pharmaceutical Education is every year claiming a greater share of attention. One great difficulty that lies before us arises from the very loose manner of receiving and employing apprentices. It cannot be reiterated too often that a youth destined for pharmacy should before leaving school have been taught at least the elementary branches of a good English education, or he cannot be expected to master the principles of those sciences which directly or indirectly govern the practice of pharmacy. Another equally great difficulty is that, in a large majority of cases, the young man has no satisfactory opportunity for acquiring a knowledge of

these elements of science during the period of his pupilage. The question which now awaits solution is how to provide an adequate remedy for a condition of things which has become chronic and which has paralysed every isolated effort made throughout the country. Schools have sprung into existence, but in a very short time they have dwindled into obscurity. Not long since it was suggested by a member of the Pharmaceutical Society that prizes should be offered for competition in provincial schools. The project was entertained by the Council, but when the provincial schools were sought for they had all with one or two exceptions ceased to exist by a slow but gradual process of decay.

To my mind this is not due so much to absence of demand for such teaching, as to the need of organizing—in fact, for focussing as it were—the demand in quantities that will command a supply. I know and feel that I am treading on debateable ground, but I will place my views before you for your earnest consideration.

I would suggest that for the organization of the demand and supply of pharmaceutical education, as well as for other purposes which I will allude to presently, Great Britain might be mapped out into districts, say about fifteen, twelve in England and Wales and three in Scotland. Each district might be under the special supervision of a representative local Committee, whose business it should be to establish one or more educational centres for its respective district, *utilizing as far as possible existing university or college teaching*, or when this is not practicable, negotiating for the establishment of suitable courses of lectures. Many of the divisions that I would suggest contain within their limits, and in more or less central positions, important educational institutions, which, if they do not already include within their curriculums exactly the teaching required, would no doubt be ready to do so were there evidence of any adequate demand for it.

Upwards of eight hundred candidates come up for the Minor yearly, and nearly four hundred pass: this number should furnish fair-sized classes at so limited a number of centres. But even if the classes were sometimes not large enough to be self-supporting, the Committees would then be in a position to call upon the Council of the Pharmaceutical Society for the aid which it has over and over again, under successive Presidents, expressed its willingness to give wherever there is proper organization.

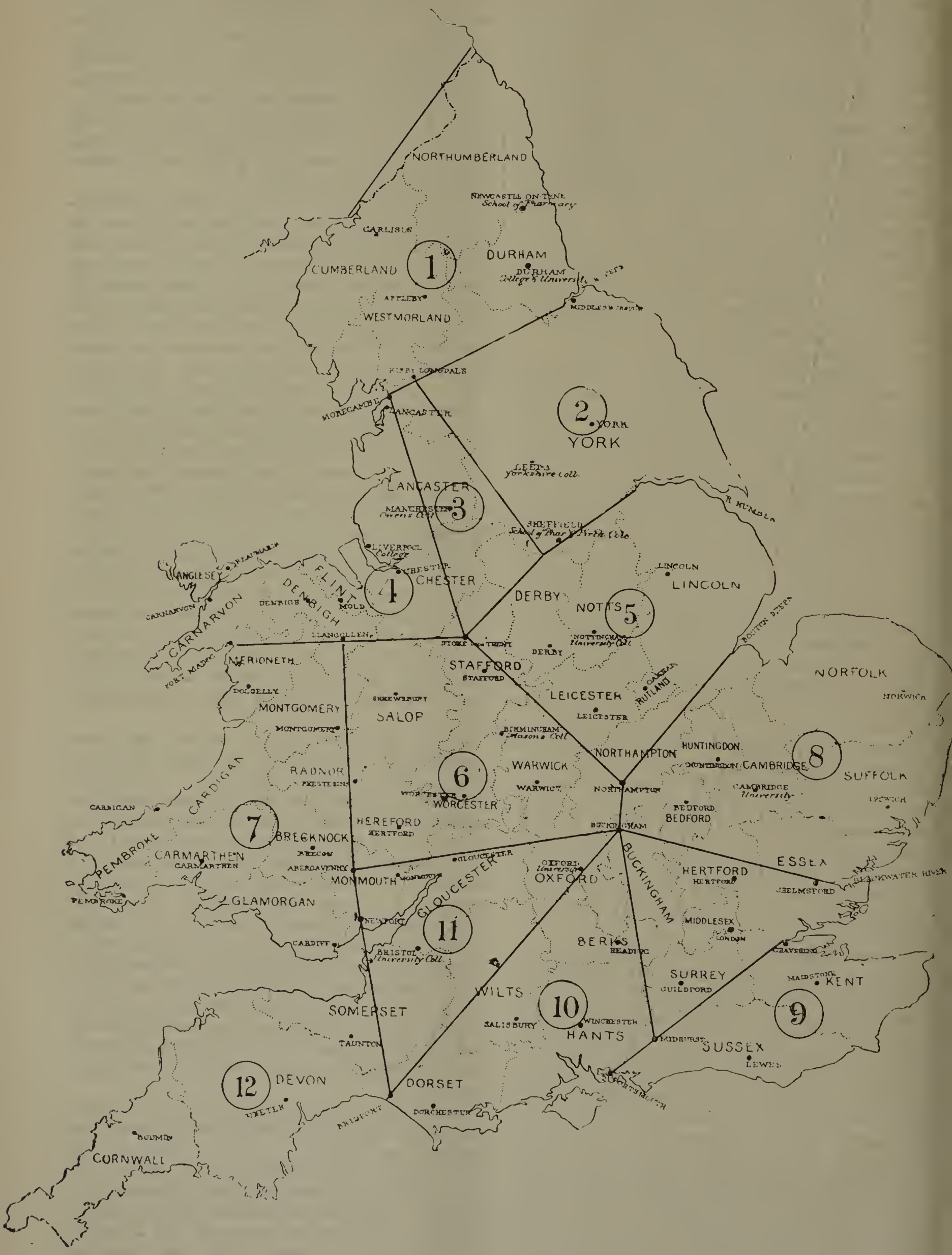
The question then arises as to how these Committees of organization should be constituted. The most promising materials that I can see are the Local Secretaries of the Pharmaceutical Society resident in the districts, or at least a certain portion of them, and, in addition, any member of Council might be an *ex officio* member of a Committee. The manner of election of these Local Secretaries gives them essentially a locally representative character, and as I contemplate the possibility of the Pharmaceutical Society being called upon to contribute liberally from its surplus income, it seems only reasonable that those entrusted with this work should have some official connection with that Society. It will be remembered that the Local Secretaries are appointed by the Council on the nomination of the members and associates of the Society resident in the respective districts. Every town in Great Britain (except London and Edinburgh) that returns a member to Parliament and any other town in which there are resident not less than three members or associates in business is entitled to nominate a Local Secretary, the number of them at present being over three hundred. These Committees could furnish annual or half-yearly reports to the Council and formulate recommendations. The incidental expenses of such Committees might be agreed upon and paid, up to a certain amount, by the Pharmaceutical Society, and these several organizations would become, as it were, provincial branches.

Without trenching on the province of any other provincial association, such Committees would keep the Council in touch with the entire country, and they could be made available for much useful work in connection with other business required by the Pharmaceutical Society. If I read the signs of the times aright, our next political struggle will be for the very existence of our present rights rather than the extension of our present privileges. We shall then require union and strength, both of which would be promoted by these organizations.

I need only remind you of the Poison Bill introduced by Lord Carlingford, in which it was suggested that the initiation of articles into the Poison Schedule should be taken from the Council of the Pharmaceutical Society, and that it should rest entirely with the Privy Council. Were that privilege allowed to pass from your control the position of the proverbial "toad under a harrow" would be preferable to that of the chemist and druggist subjected to the vagaries of a department practically ignorant of the exigencies of the medical profession and the requirements of the various industrial occupations. But on the other hand, in considering grave public questions, such as the sale of poisons, we must take care that the cry "our craft is in danger" be not the main consideration and stand in the path of legitimate progress.

British pharmacists cannot, however, be further organized for educational or any other purposes by simply reiterating abstract statements as to the desirability of such organization and the benefits that would possibly accrue from it. In this respect the subject has already lost all charm of novelty; therefore as I have made myself responsible for once more bringing it forward I feel bound at least to offer a contribution towards the building up of the edifice. Even if my contribution be condemned as wood, hay and stubble, fit only to be burned, it may yet serve a good purpose, since the evoking of the active thought necessary to put it out of the way may also result in substituting for it at least a "button" of the precious metals. I will therefore venture to place before you in some detail, but still very briefly, my ideas as to the formation of the suggested districts and then add a few words as to the probable expense.

District No. 1.—Commencing with the North of England, the first district might be defined by one line following the boundary of the two kingdoms and another line running straight from the mouth of the Tees on the east to Morecambe Bay at Morecambe on the west. The district would include Northumberland, Durham, Cumberland, Westmoreland and a part of Yorkshire. A Committee consisting of 21 members could be formed from the Local Secretaries of the Phar-


NORTHUMBERLAND
NEWCASTLE ON TYNE
School of Pharmacy
CARLISLE
CUMBERLAND
1
DURHAM
DURHAM
College & University
APPLEBY
WESTMORLAND
KIRBY LONSDALE
MORECAMBE
LANCASTER
2
YORK
YORK
LEEDS
Yorkshire Coll.
LANCASTER
3
MANCHESTER
Owens Coll.
SHEFFIELD
School of Pharmacy & York Coll.
R. HUMBER
LIVERPOOL
College
CHESTER
CHESTER
4
ANGLESEY
BEAUMARIS
CARNARVON
DENBIGH
FLINT
DENBIGH
MOLD
LLANGOLLEN
DERBY
NOTTS
5
LINCOLN
LINCOLN
NOTTINGHAM
University Coll.
DERBY
BOSTON DEEPS
NORFOLK
NORWICH
STAFFORD
STAFFORD
LEICESTER
RUTLAND
LEICESTER
MERIONETH
DOLGELLY
MONTGOMERY
SALOP
MONTGOMERY
SHREWSBURY
BIRMINGHAM
Mason's Coll.
WARWICK
6
WORCESTER
WORCESTER
NORTHAMPTON
HUNTINGDON
CAMBRIDGE
8
SUFFOLK
CAMBRIDGE
University
IPSWICH
RADNOR
PRESTEIGN
WARWICK
NORTHAMPTON
CARDIGAN
CARDIGAN
7
BRECKNOCK
BRECON
HEREFORD
HERTFORD
BEDFORD
BEDFORD
BUCKINGHAM
PEMBROKE
CARMARTHEN
CARMARTHEN
ABERGAVENNY
MONMOUTH
MONMOUTH
GLOUCESTER
OXFORD
University
OXFORD
BUCKINGHAM
HERTFORD
HERTFORD
ESSEX
CHELMSFORD
BLACKWATER RIVER
PEMBROKE
GLAMORGAN
NEWPORT
CARDIFF
11
BRISTOL
University Coll.
BERKS
READING
MIDDLESEX
LONDON
GRAVESEND
SURREY
GUILDFORD
MAIDSTONE
KENT
WILTS
10
9
SOMERSET
SALISBURY
WINCHESTER
HANTS
MIDHURST
SUSSEX
LEWES
TAUNTON
12
DEVON
EXETER
DORSET
DORCHESTER
BRIDPORT
SOUTHAMPTON
BODMIN
CORNWALL

maceutical Society, and they might perhaps find in the University of Durham, or the recently established School of Pharmacy at Newcastle-on-Tyne, materials for the voluntary organization of the education required.

District No. 2.—Following the southern limit of the preceding division from Middlesborough, at the mouth of the Tees, westward to a spot about Kirkby Lonsdale, a line drawn from thence south-east to a point a little south-west of Sheffield and then striking north-east to the mouth of the Humber, would include a purely Yorkshire district represented by 28 Local Secretaries and having Leeds, with its Yorkshire College of Science, and York in fairly central positions, besides Sheffield, with Firth College, on its borders.

District No. 3.—Proceeding further westward from Kirkby Lonsdale along the southern limit of district No. 1 to Morecambe, a line passing south-east to Stoke, and then north-east to the south-west corner of district No. 2, and following that boundary line north-westwards again to Kirkby Lonsdale, would include a district smaller in area than most of the other districts, but having a dense population. It would take in many important manufacturing towns in Lancashire, including Manchester, with Owens College, and portions of Yorkshire, Cheshire, Staffordshire and Derbyshire. It is represented by 29 Local Secretaries.

District No. 4.—This district might be defined by the western boundary of No. 3 and a line drawn almost due west from Stoke to Port Madoc. It would include the remainder of Lancashire and Cheshire, as well as Denbigh and Carnarvon. Liverpool, with its new School of Chemistry, would be available as an educational centre and the district would furnish a Committee of 18 members.

District No. 5. Returning to the east coast, another district might be defined by passing from the mouth of the Humber along the southern boundaries of districts 2 and 3 to Stoke ; drawing from thence a line south-east to Northampton and then north-east to Boston Deeps. The district would include Lincolnshire, Nottinghamshire, Rutlandshire, and parts of Derbyshire, Leicestershire and Northamptonshire. There is a College of Science at Nottingham, and in the district there are about 27 Local Secretaries.

District No. 6.—Proceeding further westward from Stoke the limits of this district might follow the southern boundary of No. 4 to Llangollen ; from thence pass due south to a point a little westward of Abergavenny ; then due east to Buckingham, northwards to Northampton and return north-westwards to Stoke. This would enclose Shropshire, Worcestershire, Warwickshire and parts of Northamptonshire, Herefordshire, Radnorshire and Montgomeryshire. Our present place of meeting, Birmingham, would present in its Mason's College at least one possible educational centre, and the district would contribute about 33 Local Secretaries to form a Committee.

District No. 7.—A line passing from Llangollen due south along the western boundary of No. 6 and prolonged to Newport would divide off a purely Welsh district, consisting principally of the counties of Carmarthen, Pembroke, Cardigan and Glamorgan. This district, although a fairly large one, is not at present so fully represented in the Pharmaceutical Society as most others; but nevertheless its 10 Local Secretaries might form a good working Committee.

District No. 8.—Returning once more to the east coast and starting from Boston, a line passing along the southern boundary of No. 5 to Northampton ; thence southward along the eastern boundary of No. 6 to Buckingham, and then returning eastward to the German Ocean about the mouth of the Blackwater river, would enclose a very important area. It would include Norfolk, Suffolk, Huntingdonshire, Cambridgeshire, Bedfordshire, and the northern portions of Hertfordshire and Essex. As, however, London would be quite easy of access from some parts of this district, it seems probable that its demand for provincial education would be somewhat diminished. The district has 32 Local Secretaries. I am not aware that there is any available educational institution in this district, although it boasts an ancient university. But probably it will be some time before Cambridge or Oxford will follow the example of continental universities and include a pharmaceutical curriculum within their calendars.

District No. 9.—Another important district, but similarly affected in respect to access to the metropolis, would be divided off by a boundary line passing from Gravesend and the mouth of the Thames to Portsmouth, including the countries of Kent and Sussex and a portion of Surrey. It would be represented by about 25 Local Secretaries.

District No. 10.—Another district might be marked out by a line starting at Portsmouth and passing a little way north-east along the boundary line of No. 9 to about Midhurst, then due north to Buckingham, and finally returning to the English Channel, in a south-westerly direction to a point about Bridport. This would provide for Hampshire, Berkshire, Dorsetshire, and part of Wiltshire. Here again I fear there is at present no available educational centre, but I have no doubt that the worthy Local Secretary at Salisbury, assisted by about 20 colleagues, would prove equal to coping with the emergency.

District No. 11.—Starting again at Bridport and following the western boundary of No. 10 north-eastwards to Buckingham, then along the southern boundary of No. 6 westwards to Abergavenny, and afterwards due south to Newport, and then across the Severn back to Bridport, a district could be formed of which Bristol, with its newly-established college for the west of England, might well be the centre. It would include the counties of Gloucester, Oxford and Monmouth and parts of Herefordshire, Wiltshire and Somersetshire, and would be represented by 15 Local Secretaries.

District No. 12.—The portion of the western boundary of No. 11, passing from the Bristol Channel to the English Channel would mark off a district consisting of Devonshire and Cornwall and part of Somersetshire. Here again there would be plenty of scope for the organizing powers of the 21 Local Secretaries who would constitute the Committee.

I feel that an apology will be due from me before I proceed further and make any suggestions respecting the organization of the Northern Kingdom. I do not doubt that there are Scottish friends here more capable than myself for the task, and quite willing to take the work in hand if it requires to be done. My plea must be that

what I venture to say in respect to Scotland, as well as England, is purely suggestive.

I think that the whole of Scotland might be divided into three districts, one covering a much larger area than the others, but not so densely populated.

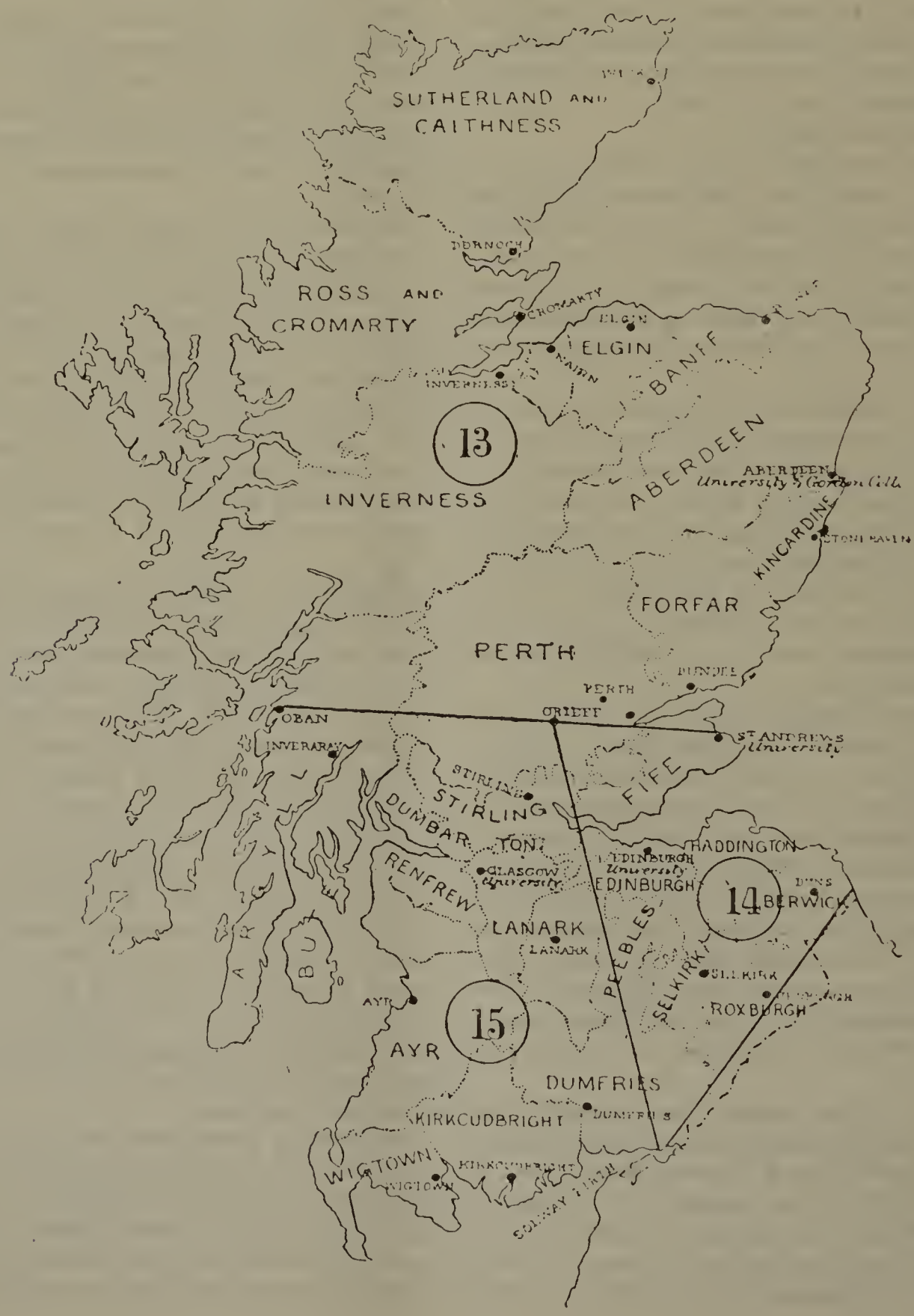
District No. 13.—This district might be defined by a line drawn from St. Andrews, where there is a university, on the east coast, right across the country to Oban on the west coast. It would include the whole of the country north of Perth, and in Aberdeen would include one city at least that understands the organization of education. There are 10 Local Secretaries in the district.

District No. 14.—A line drawn from Crieff, on the southern boundary of No. 13, so as to pass east of Stirling and strike the coast about the mouth of the Solway, would divide the remainder of Scotland into fairly equal parts. The eastern division would of course include Edinburgh, and doubtless, as in past years, the local representatives of the Pharmaceutical Society would be able to make advantageous terms with the university professors for the attendance of pharmaceutical students at their classes. The Local Secretaries are 9 in number.

District No. 15.—The western division would probably adopt Glasgow as a centre, and there again there is a university that might be utilized to some extent. There are 10 Local Secretaries in this district available for a Committee.

It will have been noticed perhaps that I have omitted from the proposed divisions a considerable area around London. This I consider to be already provided for in the way of education, which is the subject that I am discussing on the present occasion. There is no reason however, why the Local Secretaries of the Home District should not also form a Committee to deal with pharmaceutical matters.

As to the financial portion of the problem it will be evident that at present an estimate pretending to approximate exactness must be out of the question. Any statement made therefore should be looked upon simply



as a nucleus for criticism. Speaking first with respect to the expenses of the organizing Committees, the costs of them will depend upon the frequency of the meetings and the distances to be travelled by the committeemen to the places of meeting. This will necessarily vary very much, not only as between district and district, but even in the same districts. Supposing, however, that the limit of the expenses of each Committee were limited to an average of twenty shillings per head per annum for each member of it. In that case, since there are only three hundred and fifty places entitled to return Local Secretaries, even if all these Local Secretaries were included in the Committees, the sum required would not exceed £350. Then in respect to the expenses of the educational centres. It may be fairly expected that many of these, when once fairly established, would be self-supporting; others, in disadvantageous situations would require help. But, taking one district with another, supposing an annual grant in aid of £20 per district were required, the sum total for the fifteen districts would only be £300. The two items together would therefore amount to £650, and this I think would be an outside estimate. Probably a large proportion of this sum is already raised and spent in more or less abortive educational efforts in connection with different associations throughout the country; but if only one-third of it were raised by local efforts, so as to ensure the lively supervision of self-interest, I should not be without hope that the Council of the Pharmaceutical Society would see its way to providing the remainder. Certain I am that the funds of the Society might be expended much less profitably than in this way, whilst it does not seem improbable that the greater popularity of the Society, resulting in an increased membership, would make up to a large extent for the expenditure.

At any rate, with such an organization as that I have endeavoured but imperfectly to sketch to take charge of a school, any district could go straight to the Council of the Pharmaceutical Society and claim substantial assistance, and the Council would be only too willing to help, the result being a better understanding and more sympathy between them. And where there is at present no apparent demand, organization may be the means of galvanizing into some degree of activity many of those the law of whose present existence is apathy.

Perfection may not be within measureable distance, but a gradual improvement in the tone of the candidates for examination and a sound and healthy development might fairly be expected. In qualifying for an art which is daily becoming more scientific some opportunities for the student to acquire sound scientific instruction are imperative and it would be found that the requirements of the daily practice of his art would react in the most healthy manner upon the scientific teaching.

There always will be found strong men who, in spite of difficulties, teach themselves; but students who have been subjected to scientific training will outstrip these less fortunate comrades, and I believe that the great result of a movement such as I advocate throughout the Kingdom would be a prudent regulating of the average education of the candidates for the examinations.

If we now adopt Paley's definition of education as "comprising every preparation that is made in our youth for the sequel of our lives," we shall still find that the backbone of all true pharmaceutical education is absent, unless technical training go hand in hand with scientific teaching, the art being the practical application of the principles of the science.

These are some of the hard peas which the pilgrim pharmacist has to walk on daily; they irritate him and impede his progress. The problem before us is how to soften them. Some would recommend one course of treatment, others a totally different one; but so long as the peas are softened and we score progress my object in bringing these subjects into some prominence on this occasion will have been accomplished.

At annual gatherings like the present the pleasure with which friend meets friend is sadly marred by the absence of those who can never more take part in our proceedings. We meet in Birmingham, and it is with feelings of sincere regret that I allude to the death of William Southall, who but a few years ago occupied this chair. He had attained a high position in his profession; a man of culture and an accomplished botanist. His death is not only a loss to scientific pharmacy, but society in its more extended sense can ill afford to spare him, and I will add in conclusion "another master mind is summoned from this world-wide council-hall."

Mr. C. THOMPSON (Birmingham), in moving a vote of thanks to the President for his very able address, said it was evident that his remarks on the subject of secret remedies had met with the full approval of the meeting; with regard to provincial education there could be no doubt that the President was working in the right line, and whether or not the scheme put forward by him was workable at present, there could be little doubt that in a few years some such scheme would have to be introduced in order to satisfy the demand for pharmaceutical education. For his own part, though perhaps this was not the right time or place to go into the matter, he should like to see the same system of localization applied to the election of the Council of the Pharmaceutical Society.

Mr. ARBLASTER (Birmingham) seconded the motion, which was put by Mr. H. B. Brady, as senior Vice-President, and carried by acclamation.

Mr. R. REYNOLDS said he should be prepared on the following morning to bring forward a practical proposition on the subject of formularies.

(*To be continued.*)

Chemists and Druggists' Trade Association of Great Britain.

A dinner to celebrate the tenth anniversary of this Association was held at the Grand Hotel, Birmingham, on Tuesday, August 31. Mr. Cross, President, occupied the chair, supported by Mr. Thomas Greenish, President of the Pharmaceutical Conference. The company numbered upwards of one hundred.

The health of the Queen having been drunk in the usual loyal manner,

Mr. Harrison (Sunderland) proposed the next toast. He said he had been asked by a friend that morning whether he was come to see the funeral of the Chemists and Druggists' Trade Association or its resurrection. He had witnessed several funerals, and did not think the countenances of those around him were at all appropriate to such an event, and as to a resurrection, he was entirely inexperienced; but he had the honour of proposing the Chemists and Druggists' Trade Association of Great Britain. He put the toast forward on two grounds:—Firstly, on account of what the Association had done

in the past, and, secondly, on account of the work it was still calculated to do. Ten years ago when the Association was formed there was a deep feeling of discontent at the condition of things then and the immediate prospect before chemists and druggists, and he ventured to think that the position in which they now stood was largely owing to the work the Association had done. Soon after its formation the question of whether a chemist was to be allowed to recommend the articles in which he dealt came in controversy, and unless there had been a large representative organization, in touch with members of the trade throughout the kingdom, that very important question could not have been fought and won as it was. The very fact that they were able to carry on their business with ordinary freedom was owing to the action of the Association. From time to time they had been called upon to defend their members when subjected to vexatious prosecution, not to defend men who wilfully broke the law, which they would never think of doing, but to defend men wrongfully accused, and they had established a perfect *entente cordiale* with almost every Government department which came in contact with the trade, such as the Board of Inland Revenue and the Trade Marks department of the Board of Trade. He much regretted that owing to the apathy of the trade they had been obliged to give up the work they had commenced in this latter department, and he believed the time was not far distant when many others would regret it also. Again they stepped in some years ago when obnoxious legislation was threatened, and by their local organizations throughout the country were able to raise such an outcry that the Government were very glad to shelve the question. But they could not live entirely on the past; if they were to progress they must show reason for their continued existence. No one would admit that their present condition was perfect; all agreed that great changes in the Pharmacy Act were required, and at any rate the principles embodied in it should be carried out, which at present was not the case. They had the means of bringing pressure to bear throughout the country almost at a moment's notice if required, and seeing what good work had been done, and how much more still remained to do, he asked them to accept this toast, coupling with it the names of Mr. Cross (the President), Mr. Reynolds, Mr. Umney and Mr. Long.

The Chairman, in responding, said the great value of the Trade Association had been thoroughly recognized, and having done such good work in the past it ought not to be allowed to decay. They must, however, live more in the future than in the past, and so long as he had the honour to hold office in it, such would be his endeavour.

Mr. Reynolds (Leeds) said this toast no doubt appealed to both thick and thin supporters of the Association, and he feared he must be reckoned amongst the latter. He remembered a saying attributed to Lord Palmerston that he did not care for those who would support his Government when in the right; anyone could do that, he valued the support which was rendered right or wrong. He had been connected with the Association from its birth, and might therefore be supposed to know something of the infant who was now just ten years old. The period of dentition was generally an anxious one for parents, but this child cut its teeth and used them too almo t immediately; this department was under the management of a very skilful dentist, Mr. Glaisyer, and he must say that the child's teeth had always been in good order when wanted. They could not expect to be always in a state of excitement over a Poison Bill, but it was a great thing to have an organization and a staff which could always be put to work on an emergency. Unfortunately this ten year old bantling was rather short of pocket money, and though this might have kept him out of mischief it had also prevented him doing as much good as he otherwise might. At any rate, the way in which he had spent his money was an example to an older and richer brother, though he deprecated any rivalry between them except as to which should do the most good. They were constantly being interfered with by unauthorized persons and it was a matter of great regret that when such offenders were brought to book they simply paid the fine and went on doing the same, publicity being very often entirely avoided by the amount being paid into court, and when this was the case he found the local newspapers declined to publish the fact from the fear of a prosecution for libel.

Mr. Umney said he was looking forward to the time when the Association and its elder brother would work thoroughly hand in hand together for the common good. He had watched the work of the Association with great interest, feeling that it was, much of it, work which the Pharmaceutical Society could not do. They all knew that many great and important things had come from Birmingham, and if he were not mistaken the trade at large would one day recognize the value which this Association had been.

Mr. Long also responded briefly, remarking on the advantageous position of Birmingham as the head quarters of such an Association, being so centrally situated.

Mr. Thos. Barclay next proposed the Pharmaceutical Society of Great Britain, and took occasion to read a letter he had received that morning from Professor Attfield, in which that gentleman deplored the apathy which existed amongst the pharmaceutical body, and expressed the hope that the presence in Birmingham of the leaders of the three pharmaceutical bodies, the Conference, the Society and the Trade Association, would help to get rid of the prevailing inertia, for unless this were accomplished he feared they would receive orders to "move on" from some Government or medical board. Mr. Barclay said it was complained sometimes that the Pharmaceutical Society did not do as much as it might for the interests of the trade, but he feared it did not always get credit for what it did do; he trusted that the gathering would be the means of drawing more closely the bonds of union between the two Societies, and he felt that the best friends of the Pharmaceutical Society were those who supported the Trade Association, since it could do work which it was impossible for the Society to do. He coupled with the toast the names of Mr. Atkins, Mr. John Moss and Mr. Hampson.

Mr. S. R. Atkins, in responding, said he felt the responsibility very deeply, but he was thoroughly loyal to the Society, and was under deeper obligations to it than he should ever be able to repay. Many, he feared, knew little about the Society, and cared less, but this was very much to be regretted, for whenever a crisis arose in pharmacy their only chance and safety lay in presenting a united front to the enemy. He was happy to believe that no rivalry existed between the two Societies. The Pharmaceutical Society had done an immense deal, not perhaps all that could be wished; but when he looked back to the time of his own apprenticeship, and thought of the immense advances, intellectually and socially, which had been made since then, he could not but recognize that much of it was due to the far-seeing wisdom of those who, in days gone by, founded the Society. He was present at the previous Conference held in Birmingham, twenty-one years ago; many of those then present had passed away, but he saw young men rising up around him who he knew would do the work even better than those who had preceded them; there might be difficulties, but difficulties only existed for brave men to conquer, and if they were true to themselves he believed there was yet a fine field for pharmacy in England.

Mr. John Moss said he was very proud to think his name had been associated with this toast, for he owed everything almost to the Pharmaceutical Society. Efforts were now being made to extend the sphere of its usefulness in educational matters, and he trusted the results would before long become apparent in the improved condition of pharmacy generally.

Mr. Hampson said when he first joined the Pharmaceutical Society he thought it could do everything needed in connection with the trade, but he soon found that that was impossible, and therefore he supported the establishment of the Trade Association as well. Possibly if the Society had received more support from the trade the Trade Association would never have come into existence, but he felt now quite satisfied that the two should exist side by side, for each had work of its own to do.

Mr. Wylie proposed the Pharmaceutical Conference, coupling with the toast the names of Mr. Greenish and Mr. Plowman. He considered that everyone in the trade ought to belong to the Conference, which formed a sort of connecting link between pure science and those who followed the trade of pharmacy. It also promoted good feeling amongst the members, and did a great deal to remove that trade jealousy which still existed in some places, and in company with the other two organisms it might form one member of a triple alliance having the good of pharmacy for its aim, viz., scientific research, legal status, and trade defence. The Conference had had many eminent presidents, and the eminent microscopist and pharmacist who presided over their deliberations at th meeting would not lower the standard in any way.

Mr. Greenish asked to be excused from saying much in reply, having already had a hard day's work. The Conference had done much for pharmacists at large, and if pharmacy were ever to be raised from its present very low condition it must be done by increasing their scientific knowledge. When he came to London fifty years ago the Pharmaceutical Society did not exist, and assistants, and young men from the country especially, did not know where to go to get a little sympathy, assistance, or direction. The Society was established, and did much to bring men together, and the Conference also had done much the same thing. It certainly increased their geographical knowledge in a remarkable degree, and brought out feelings of hospitality and friendship. It was said that the Trade Association, with which he had been connected from the beginning, was in rather low water at present, and he would therefore throw out the suggestion that it should hold a dinner every year in the town where the Pharmaceutical Conference met, which would be an admirable way of bringing it before the public and increasing the number of members.

Mr. Sidney Plowman, in responding, referred to an allusion which had appeared in a certain publication to the impending dissolution of the Conference. He protested against such an idea, for he felt sure that the Conference had as much vitality now as ever it had. There was plenty of new blood coming forward as could be seen by the programme of the present meeting, and this would keep the Conference as active as it had been at any time of its existence.

Dr. Thresh, being called for, also added a few words, in which he spoke of the necessity for a pharmacist to be not only a man of science, but a man of business, these two aspects of the calling being admirably represented by the Conference and the Association. The first meeting of the Conference he attended, he was so much pleased with the papers and discussions that he was seized with the ambition to become some day one of its officers, and if, as Secretary he had been able to do anything in its behalf, he could truthfully say that he had received more from it than he had bestowed.

Mr. Maltby (Lincoln) next proposed the Pharmaceutical Press, coupling with the toast the names of Dr. Paul, Mr. Wootton and Mr. Scott.

In the absence of Dr. Paul, Mr. Wootton and Mr. Scott briefly responded.

Mr. Harrison (Sunderland) then proposed the health of Mr. Haydon, the Secretary of the Trade Association.

Mr. Haydon, in replying, said there was no doubt the Association was not in so flourishing a condition as it had been, but he attributed this mainly to the general depression of trade from which the whole country had been suffering, and which had affected other trade societies in exactly the same way. If any cause of excitement arose, the prospects of the Association would improve, and they would then rejoice to think that such an organization existed. He concluded by proposing the health of the Chairman, which Mr. Cross suitably responded to, and the proceedings terminated.

The British Association for the Advancement of Science.

FIFTY-FIFTH ANNUAL MEETING.

The fifty-fifth annual meeting of the above Association commenced on Wednesday, September 1, at Birmingham, under the Presidency of Sir J. William Dawson, C.M.G., M.A., LL.D., F.R.S., F.G.S.

The President's Address.

Twenty-one years have passed away since the last meeting of the British Association in this great central city of England. At the third Birmingham meeting—that of 1865—I had the pleasure of being present, and had the honour of being one of the Vice-Presidents of Section C. At that meeting my friend John Phillips, one of the founders of the Association, occupied the Presidential chair, and I cannot better introduce what I have to say this evening than by the eloquent words in which he then addressed you :—"Assembled for the third time in this busy centre of industrious England, amid the roar of engines and clang of hammers, where the strongest powers of nature are trained to work in the fairy chains of art, how softly and fittingly falls upon the ear the accent of science, the friend of that art, and the guide of that industry! Here where Priestley analysed the air, and Watt obtained the mastery over steam, it well becomes the students of nature to gather round the standard which they carried so far into the fields of knowledge. And when on other occasions we meet in quiet colleges and academic halls, how gladly welcome is the union of fresh discoveries and new inventions with the solid and venerable truths which are there treasured and taught. Long may such union last; the fair alliance of cultivated thought and practical skill; for by it labour is dignified and science fertilized, and the condition of human society exalted." These were the words of a man who, while earnest in the pursuit of science, was full of broad and kindly sympathy for his fellow-men, and of hopeful confidence in the future. We have but to turn to the twenty Reports of this Association, issued since 1865, to see the realization of that union of science and art to which he so confidently looked forward, and to appreciate the stupendous results which it has achieved. In one department alone—that to which my predecessor in this chair so eloquently adverted in Aberdeen, the department of education in science—how much has been accomplished since 1865. Phillips himself lived to see a great revolution in this respect at Oxford. But no one in 1865 could have anticipated that immense development of local schools of science of which your own Mason College and your admirable technical, industrial, and art schools are eminent examples. Based on the general education given by the new system of Board schools, with which the name of the late W. E. Forster will ever be honourably connected, and extending its influence upward to special training and to the highest university examinations, this new scientific culture is opening paths of honourable ambition to the men and women of England scarcely dreamed of in 1865. I sympathize with the earnest appeal of Sir Lyon Playfair, in his Aberdeen address, in favour of scientific education; but visiting England at rare intervals, I am naturally more impressed with the progress that has been made than with the vexatious delays which have occurred, and am perhaps better able to appreciate the vast strides that

have been taken in the direction of that complete and all-pervading culture in science which he has so ably advocated.

No one could have anticipated twenty years ago that a Birmingham manufacturer, in whose youthful days there were no schools of science for the people, was about to endow a college, not only worthy of this great city, but one of its brightest ornaments.* Nor could anyone have foreseen the great development of local scientific societies, like your Midland Institute and Philosophical Society, which are now flourishing in every large town and in many of those of less magnitude. The period of twenty-one years that has elapsed since the last Birmingham meeting has also been an era of public museums and laboratories for the teaching of science, from the magnificent national institutions at South Kensington and those of the great universities and their colleges down to those of the schools and field clubs in country towns. It has besides been an era of gigantic progress in original work and in publication,—a progress so rapid that workers in every branch of study have been reluctantly obliged to narrow in more and more their range of reading and of effort to keep abreast of the advance in their several departments. Lastly these twenty-one years have been characterized as the "coming of age" of that great system of philosophy with which the names of three Englishmen, Darwin, Spencer, and Wallace, are associated as its founders. Whatever opinions one may entertain as to the sufficiency and finality of this philosophy there can be no question as to its influence on scientific thought. On the one hand it is inaccurate to compare it with so entirely different things as the discovery of the chemical elements and of the law of gravitation; on the other, it is scarcely fair to characterize it as a mere "confused development" of the mind of the age. It is indeed a new attempt of science in its maturer years to grapple with those mysterious questions of origins which occupied it in the days of its infancy, and it is to be hoped that it may not, like the Titans of ancient fable, be hurled back from heaven, or like the first mother find the knowledge to which it aspires a bitter thing. In any case we should fully understand the responsibility which we incur when in these times of full-grown science we venture to deal with the great problem of origins, and should be prepared to find that in this field the new philosophy, like those which have preceded it, may meet with very imperfect success. The agitation of these subjects has already brought science into close relations, sometimes friendly, sometimes hostile, it is to be hoped in the end helpful, with those great and awful questions of the ultimate destiny of humanity, and its relations to its Creator, which must always be nearer to the human heart than any of the achievements of science on its own ground. In entering on such questions we should proceed with caution and reverence, feeling that we are on holy ground, and that though, like Moses of old, we may be armed with all the learning of our time, we are in the presence of that which while it burns is not consumed; of a mystery which neither observation, experiment, nor induction can ever fully solve.

In a recent address, the late President of the Royal Society called attention to the fact that within the lifetime of the older men of science of the present day, the greater part of the vast body of knowledge included in the modern sciences of physics, chemistry, biology and geology, has been accumulated, and the most important advances made in its application to such common and familiar things as the railway, ocean navigation, the electric telegraph, electric lighting, the telephone, the germ theory of disease, the use of anæsthetics, the processes of metallurgy, and the dyeing of fabrics. Even since the last meeting in this city, much of this great work has been done, and has led to general results of the most marvellous kind. What at that time could have appeared more chimerical than the opening up by the enterprise of one British colony of a shorter road to the East by way of the extreme West, realizing what was happily called by Milton and Cheadle "the new North-west Passage," making Japan the next neighbour of Canada on the west, and offering to Britain a new way to her Eastern possessions; or than the possibility of this Association holding a successful meeting on the other side of the Alantic? To have ventured to predict such things in 1865, would have appeared quite visionary, yet we are now invited to meet in Australia, and may proceed thither by the Canadian Pacific Railway and its new lines of steamers, returning by the Suez Canal.* To-day this is quite as feasible as the Canadian visit would have been in 1865. It is science that has thus brought the once widely separated parts of the world nearer to each other, and is breaking down those geographical barriers which have separated the different portions of our widely extended British race. Its work in this is not yet complete. Its goal to-day is its starting point to-morrow. It is as far as at any previous time from seeing the limit of its conquests, and every victory gained is but the opening of the way for a farther advance.

By its visit to Canada the British Association has asserted its imperial character, and has consolidated the scientific interests of Her Majesty's dominions, in advance of that great gathering of the industrial products of all parts of the empire now on exhibition in London, and in advance of any political plans of Imperial federation.† There has even been a project before us for an international scientific convention, in which the great English Republic of America shall take part, a project the realization of which was to some extent anticipated in the fusion of the members of the British and American Associations at Montreal and Philadelphia in 1884. As a Canadian, as a past President of the American Association, and now honoured with the Presidency of this Association, I may be held to represent in my own person this scientific union of the British Islands, of the various Colonies and of the great Republic, which, whatever the difficulties attending its formal accomplishment at present, is certain to lead to an actual and real union for scientific work. In furtherance of this I am glad to see here to-day influential representatives of most of the British Colonies, of India, and of the United States. We welcome here also delegates from other countries, and though the barrier of language may at present prevent a larger union, we may entertain the hope that Britain, America, India and the Colonies, working together in the interest of science, may ultimately render our English tongue the most general vehicle of scientific thought and discovery, a consummation of which I think there are, at present, many indications.

But, while science marches on from victory to victory, its path is marked by the resting-places of those who have fought its battles and assured its advance. In looking back to 1865 there rise before me the once familiar countenances of Phillips, Murchison, Lyell, Forbes, Jeffreys, Jukes, Rolleston, Miller, Spottiswoode, Fairbairn, Gassiot, Carpenter and a host of others present in full vigour at that meeting, but no more with us. These were veterans of science; but, alas! many then young and rising in fame are also numbered with the dead. It may be that before another Birmingham meeting many of us, the older members now, will also have passed away. But these men have left behind them ineffaceable monuments of their work, in which they still

* It was in 1865 that Sir Josiah Mason was, quietly and without any public note, beginning to lay the foundation of his orphanage at Erdington.

* It is expected that, on the completion of the connections of the Canadian Pacific Railway, the time from ocean to ocean may be reduced to one hundred and sixteen hours, and from London to Hong Kong to twenty-seven days.

† I should note here, in connection with this, the valuable volume of 'Canadian Economics,' edited by Mr. D. A. P. Watt, which was one of the results of the Montreal meeting.

survive, and we rejoice to believe that, though dead to us, they live in that company of the great and good of all ages who have entered into that unseen universe where all that is high and holy and beautiful must go on accumulating till the time of the restitution of all things. Let us follow their example and carry on their work, as God may give us power and opportunity, gathering in precious stores of knowledge and of thought, in the belief that all truth is immortal, and must go on for ever bestowing blessings on mankind. Thus will the memory of the mighty dead remain to us as a power which—

'Like a star
Beacons from the abode where the eternal are."

I do not wish, however, to occupy your time longer with general or personal matters, but rather to take the opportunity afforded by this address to invite your attention to some topics of scientific interest. In attempting to do this I must have before me the warning conveyed by Professor Huxley, in the address to which I have already referred, that in our time science, like Tarpeia, may be crushed with the weight of the rewards bestowed on her. In other words, it is impossible for any man to keep pace with the progress of more than one limited branch of science, and it is equally impossible to find an audience of scientific men of whom anything more than a mere fraction can be expected to take an interest in any one subject. There is, however, some consolation in the knowledge that a speaker who is sufficiently simple for those who are advanced specialists in other departments, will of necessity be also sufficiently simple to be understood by the general public who are specialists in nothing. On this principle a geologist of the old school, accustomed to a great variety of work, may hope so to scatter his fire as to reach the greater part of the audience. In endeavouring to secure this end, I have sought inspiration from that ocean which connects rather than separates Britain and America, and may almost be said to be an English sea—the North Atlantic. The geological history of this depression of the earth's crust, and its relation to the continental masses which limit it, may furnish a theme at once generally intelligible and connected with great questions as to the structure and history of the earth, which have excited the attention alike of physicists, geologists, biologists, geographers and ethnologists. Should I, in treating of these questions, appear to be somewhat abrupt and dogmatic, and to indicate rather than state the evidence of the general views announced, I trust you will kindly attribute this to the exigencies of a short address.

If we imagine an observer contemplating the earth from a convenient distance in space, and scrutinizing its features as it rolls before him, we may suppose him to be struck with the fact that eleven-sixteenths of its surface are covered with water, and that the land is so unequally distributed that from one point of view he would see a hemisphere almost exclusively oceanic, while nearly the whole of the dry land is gathered in the opposite hemisphere. He might observe that the great oceanic area of the Pacific and Antarctic Oceans is dotted with islands—like a shallow pool with stones rising above its surface—as if its general depth were small in comparison with its area. Hs might also notice that a mass or belt of land surrounds each pole, and that the northern ring sends off to the southward three vast tongues of land and of mountain chains, terminating respectively in South America, South Africa, and Australia, towards which feebler and insular processes are given off by the Antarctic continental mass. This, as some geographers have observed,* gives a rudely three-ribbed aspect to the earth, though two of the three ribs are crowded together and form the Europ-asian mass or double continent, while the third is isolated in the single continent of America. He might also observe that the northern girdle is cut across, so that the Atlantic opens by a wide space into the Arctic Sea, while the Pacific is contracted towards the north, but confluent with the Antarctic Ocean. The Atlantic is also relatively deeper and less cumbered with islands than the Pacific, which has the higher ridges near its shores, constituting what some visitors to the Pacific coast of America have not inaptly called the "back of the world," while the wider slopes face the narrower ocean, into which for this reason the greater part of the drainage of the land is poured.* The Pacific and Atlantic, though both depressions or flattenings of the earth, are, as we shall find, different in age, character and conditions; and the Atlantic, though the smaller, is the older, and from the geological point of view, in some respects, the more important of the two.

If our imaginary observer had the means of knowing anything of the rock formations of the continents, he would notice that those bounding the North Atlantic are in general of great age, some belonging to the Laurentian system. On the other hand, he would see that many of the mountain ranges along the Pacific are comparatively new, and that modern igneous action occurs in connection with them. Thus he might be led to believe that the Atlantic, though comparatively narrow, is an older feature of the earth's surface, while the Pacific belongs to more modern times. But he would note in connection with this that the oldest rocks of the great continental masses are mostly toward their northern ends, and that the borders of the northern ring of land and certain ridges extending southwards from it constitute the most ancient and permanent elevations of the earth's crust, though now greatly surpassed by mountains of more recent age near the equator. Before leaving this general survey we may make one further remark. An observer looking at the earth from without would notice that the margins of the Atlantic and the main lines of direction of its mountain chains are north-east and south-west, and north-west and south-east, as if some early causes had determined the occurrence of elevations along great circles of the earth's surface tangent to the polar circles.

We are invited by the preceding general glance at the surface of the earth to ask certain questions respecting the Atlantic. (1) What has at first determined its position and form? (2) What changes has it experienced in the lapse of geological time? (3) What relations have these changes borne to the development of life on the land and in the water? (4) What is its probable future?

Before attempting to answer these questions, which I shall not take up formally in succession, but rather in connection with each other, it is necessary to state as briefly as possible certain general conclusions respecting the interior of the earth. It is popularly supposed that we knew nothing of this beyond a superficial crust perhaps averaging 50,000 to 100,000 feet in thickness. It is true we have no means of exploration in the earth's interior, but the conjoined labours of physicists and geologists have now proceeded sufficiently far to throw much inferential light on the subject, and to enable us to make some general affirmations, with certainty; and these it is the more necessary to state distinctly, since they are often treated as mere subjects of speculation and fruitless discussion.

(1.) Since the dawn of geological science, it has been evident that the crust on which we live must be supported on a plastic or partially liquid mass of heated rock, approximately uniform in quality under the whole of its area. This is a legitimate conclusion from the wide distribution of volcanic phenomena, and from the fact that the ejections of volcanoes, while locally of various kinds, are similar in every part of the world. It led to the old idea of a fluid interior of the earth, but this is now generally abandoned, and this interior

* Dana, 'Manual of Geology,' introductory part. Green, 'Vestiges of a Molten Globe,' has summed up these facts.

* Mr. Mellard Reade, in two Presidential addresses before the Geological Society of Liverpool, has well illustrated this point and its geological consequence.

heated and plastic layer is regarded as merely an under-crust.

(2.) We have reason to believe, as the result of astronomical investigations,* that, notwithstanding the plasticity or liquidity of the under-crust, the mass of the earth—its nucleus as we may call it—is practically solid and of great density and hardness. Thus we have the apparent paradox of a solid yet fluid earth ; solid in its astronomical relations, liquid or plastic for the purposes of volcanic action and superficial movements.†

(3.) The plastic sub-crust is not in a state of dry igneous fusion, but in that condition of aqueo-igneous or hydro-thermic fusion which arises from the action of heat on moist substances, and which may either be regarded as a fusion or as a species of solution at a very high temperature. This we learn from the phenomena of volcanic action, and from the composition of the volcanic and plutonic rocks, as well as from such chemical experiments as those of Daubrée and of Tilden and Shenstone.‡

(4.) The interior sub-crust is not perfectly homogeneous, but may be roughly divided into two layers or magmas, as they have been called : an upper, highly siliceous or acidic, of low specific gravity and light-coloured, and corresponding to such kinds of plutonic and volcanic rocks as granite and trachyte ; and a lower, less siliceous or more basic, more dense, and more highly charged with iron, and corresponding to such igneous rocks as the dolerites, basalts, and kindred lavas. It is interesting here to note that this conclusion, elaborated by Durocher and von Waltershausen, and usually connected with their names, appears to have been first announced by John Phillips, in his 'Geological Manual,' and as a mere common sense deduction from the observed phenomena of volcanic action and the probable results of the gradual cooling of the earth.§ It receives striking confirmation from the observed succession of acidic and basic volcanic rocks of all geological periods and in all localities. It would even seem, from recent spectroscopic investigations of Lockyer, that there is evidence of a similar succession of magmas in the heavenly bodies, and the discovery of Nordenskiöld of native iron in Greenland basalts affords a probability that the inner magma is in part metallic.*

(5.) Where rents or fissures form in the upper crust, the material of the lower crust is forced upward by the pressure of the less supported portions of the former, giving rise to volcanic phenomena either of an explosive or quiet character, as may be determined by contact with water. The underlying material may also be carried to the surface by the agency of heated water, producing those quiet discharges which Hunt has named crenitic. It is to be observed here that explosive volcanic phenomena, and the formation of cones, are, as Prestwich well remarked, characteristic of an old and thickened crust ; quiet ejection from fissures and hydro-thermal action may have been more common in earlier periods and with a thinner over-crust.

(6.) The contraction of the earth's interior by cooling and by the emission of material from below the over-crust has caused this crust to press downward, and therefore laterally, and so to effect great bends, folds, and plications ; and these modified subsequently by surface denudation constitute mountain chains and continental plateaus. As Hall long ago pointed out,† such lines of folding have been produced more especially where thick sediments had been laid down on the sea bottom. Thus we have here another apparent paradox, namely, that the elevations of the earth's crust occur in the places where the greatest burden of detritus has been laid down upon it, and where consequently the crust has been softened and depressed. We must beware, in this connection, of exaggerated notions of the extent of contraction and of crumpling required to form mountains. Bonney has well shown, in lectures delivered at the London Institution, that an amount of contraction, almost inappreciable in comparison with the diameter of the earth, would be sufficient ; and that as the greatest mountain chains are less than $\frac{1}{800}$th of the earth's radius in height, they would on an artificial globe a foot in diameter be no more important than the slight inequalities that might result from the paper gores overlapping each other at the edges.

(7.) The crushing and sliding of the over-crust implied in these movements raise some serious questions of a physical character. One of these relates to the rapidity or slowness of such movements, and the consequent degree of intensity of the heat developed, as a possible cause of metamorphism of rocks. Another has reference to the possibility of changes in the equilibrium of the earth itself as resulting from local collapse and ridging. These questions in connection with the present dissociation of the axis of rotation from the magnetic poles, and with changes of climate, have attracted some attention,‡ and probably deserve further consideration on the part of physicists. In so far as geological evidence is concerned, it would seem that the general association of crumpling with metamorphism indicates a certain rapidity in the process of mountain making, and consequent development of heat, and the arrangement of the older rocks around the Arctic basin forbids us from assuming any extensive movement of the axis of rotation though it does not exclude changes to a limited extent. I hope that Professor Darwin will discuss these points in his address to the Physical Section.

(*To be continued.*)

* Hopkins, Mallet, Sir William Thomson, and Professor G. H. Darwin maintain the solidity and rigidity of the earth on astronomical grounds ; but different conclusions have been reached by Hennesey, Delaunay, and Airy. In America Barnard and Crosby, Dutton, Le Conte, and Wadsworth have discussed these questions.

† An objection has been taken to the effect that the supposed ellipsoidal form of the equator is inconsistent with a plastic sub-crust. But this ellipsoidal form is not absolutely certain, or, if it exists, is very minute. Bonney has in a recent lecture suggested the important consideration that a mass may be slowly mobile under long continued pressure, while yet rigid with reference to more sudden movements.

‡ *Phil. Trans.*, 1884. Also Crosby in *Proc. Boston Soc. Nat. Hist.*, 1883.

§ Phillips says ('Manual of Geology,' 1855, p. 493): "If we regard them (the internal crystalline rocks) as acquiring solidification by cooling in zones parallel to the surface we should have sheets of granitic and basaltic rocks generated below, the first uppermost, the last undermost, while above the several strata were produced in a series beginning at the bottom. In this sense the rocks of fusion may be called with Lyell *hypogene*. Certainly under particular areas of country are found evidence of the liquefaction of one set of igneous products after the solidification of others. Many dykes of basalt traversing granite show themselves to have been in fusion after the solidification of the granite." In various forms Phillips returns to this idea, as at pp. 556 and 564, in that unpretending manner which was his wont. Dr. Sterry Hunt has kindly directed my attention to the fact of Phillips's right of priority in this matter. Durocher in 1857 elaborated the theory of magmas in the *Annales des Mines*, and we are indebted to Dutton, of the United States Geological Survey, for its detailed application to the remarkable volcanic outflows of Western America.

* These basalts occur at Ovifak, Greenland. Andrews has found small particles of iron in British basalts. Prestwich and Judd have referred to the bearing on general geology of these facts, and of Lockyer's suggestions.

† Hall (American Association Address, 1857, subsequently republished, with additions, as 'Contributions to the Geological History of the American Continent,') Mallet, Rogers, Dana, Le Conte, etc.

‡ See recent papers of Oldham and Fisher in *Geological Magazine* and *Philosophical Magazine*, July, 1886. Also Péroche, *Revol. Polaires*. Paris, 1886.

THE COLONIAL AND INDIAN EXHIBITION AT SOUTH KENSINGTON.

QUEENSLAND—*continued.*

A number of tanning barks are exhibited by the Queensland Commissioners, several of them being accompanied by an analysis of a very practical character, showing the amount of tannin and of extract that can be obtained from the bark. These extracts do not appear to be the tanning extracts which are now coming largely into use, and which save a good deal of expense in freight.* The following table is taken from the details given :—

	Tannin.	Extract.	Residue.
Black wattle (*Acacia Cunninghami*, Hook.)	9·13	16·15	74·72
Green wattle (*A. decurrens*, Willd.)	15·08	26·78	58·14
Black wattle (*A. neriifolia*, A. C.).	13·91	17·87	68·22
Wattle (*A. penninervis*, Sieb.). .	14·49	33·06	52·45
Silver wattle (*A. podalyriæfolia*, A. Cunn.).	12·40	29·50	58·10

In addition to the above, the following analyses of Queensland tanning barks are furnished by Mr. F. M. Bailey, F.L.S. :—

	Tannin.	Extract.	Residue.
A. leptocarpa	10·20	26·41	63·39
A. longifolia	12·67	32·05	55·28
A. polystachya	18·20	22·54	59·23
Rhizophora mucronata	28·85	29·24	46·91
Bruguiera Rheedii	19·48	37·91	42·61

The other tanning barks shown, but of which no analyses are given, are those of the Brisbane box (*Tristania conferta*, R. Br.), turpentine or tee (*Eucalyptus microcorys*, F. v. M.), gum-topped box (*E. hemiphloia*, F. v. M.), iron bark (*Eucalyptus siderophloia*, Benth.), rough stringy bark (*E. Baileyana*, F. v. M.), scribbly gum (*E. hæmastoma*, Sm.), stringy bark (*E. acmenoides*, Schau.), oak (*Casuarina suberosa*, Ott. and Dietr.), honeysuckle (*Banksia integrifolia*, L.), hickory wattle (*Acacia aulacocarpa*, A. Cunn.), and red ash (*Alphitonia excelsa*, Reissek.). Great credit is due both to the Government Botanist and Chemist, as well as to Dr. Bancroft, for the way in which the plants of Queensland have been identified, and their economic products examined and reported on. The Queensland Court, although containing in a small space a good deal of matter interesting to pharmacists, contains infinitely more of interest to the wool merchant, the tanner, the timber merchant, the metallurgist, and to numerous other trades. The visitor should not leave the exhibit before seeing the beautiful and probably unique collection of opals in this Court. They are shown both in the matrix and polished, and their beauty is such that it might make even a rainbow jealous. The naturalist, too, will find many curious birds and animals to engage his attention. Altogether, the Executive Commissioner may well be proud of his extensive, well-arranged and attractive Court.

WEST AUSTRALIA.

Passing southwards down the Queensland Court, that of West Australia comes into view. The drugs exhibited in this section are but few in number, comprising chiefly gums, sandal wood, and a few specimens of herbs.

The "gums" include resins, such as black boy gum (*Xanthorrhœa*); astringent gums, such as that of red gum (*Eucalyptus calophylla*); flooded gum (*E. rostrata*); and those of the arabic or bassorin class. The manna gum and that of *E. calophylla* are said to be procurable in large quantities. The export of gums during 1884 was estimated at £944.

The sandal wood is that of *Fusanus spicatus*, R. Br., which is found from the Great Bight to Sharks Bay. The amount exported in 1884 was valued at £29,960. China is the chief market for this kind of sandal wood (see *Pharm. Journ.*, [3], xvi., p. 820).

The herbs include the following:—(1) a plant, known as Carpenter's bitters, which is frequently used with hops in flavouring home-brewed beer ; (2) a plant now used as tea, but formerly taken medicinally by the colonists ; (3) a kind of sarsaparilla, which grows plentifully in the swamps near the coast, and which is frequently employed as a domestic remedy. Several specimens of honey are shown, derived from a bee imported into the colony within the last twenty years, but which has now multiplied to such an extent that swarms have been seen 150 miles eastward of Perth. Flowering trees and shrubs rich in honey being plentiful, the bees are never at any time of the year in want of food, and judging from the extraordinary rate at which they are increasing it is believed that before long the collection of wild honey and wax will prove a lucrative pursuit. The hives are robbed twice a year, in September and February.

The cultivation of the olive appears to have commenced in this colony, since six bottles of olive oil, extracted from the fruit by the boys at a Catholic orphanage at Subiaco, are exhibited by the Vicar-General.

The remarkable bark of the paper bark tree (*Melaleuca Leucadendron*) seems worthy of notice from its extreme durability, and from being impervious to water, instances being known where it has been used for dam and drainage purposes, in conjunction with timber, and it has been found that after many years the paper was quite sound, although the timber had decayed. The mangrove bark, used for tanning purposes, seems to possess considerable colorific power, since a part of the wood will stain the ground surrounding it for a considerable distance.

The pearl fishery is an important industry in this colony, the exports of pearls having amounted in 1884 to £10,000, and of shells and mother-of-pearl to £15,000. In this Court one of the sights of the Exhibition is to be seen. This is a magnificent pearl, named the Southern Cross, consisting apparently of nine distinct pearls arranged in the form of a cross, seven forming the centre of the cross and two the arms. On closer inspection it is, however, seen that the pearls are not distinct, but form one entire pearl. This specimen is probably the largest and most perfect pearl of its size ever found, and is valued at £10,000. A trophy of mother-of-pearl shells in this Court also forms a striking object.

SOUTH AUSTRALIA.

This Court presents very little of pharmaceutical interest, although in other respects it holds its own with the other Australian colonies. There are specimens of gums of the acacia class, cork grown on Mount Lofty, spirit of wine 65·5 o. p., distilled from the produce of South Australian grapes, white wine vinegar from the same source, and extract of wattle flowers (*Acacia pycnantha*) for use as a perfume. Olive oil of native production is shown by no less than six exhibitors, and although the colony does not yet export this product, the time is probably not far distant when South Australia will supply the mother country with olive oil purer than

* Christy's 'New Commercial Plants,' No. 5, p. 35.

that now obtained from Italy and France. The cultivation of the olive was commenced in 1844, when the late Mr. W. Giles, manager of the South Australian Company, obtained from Marseilles fifty-one plants, comprising five choice varieties of olives, planted them, and in 1851 obtained sufficient oil from the fruits to send to the International Exhibition in London. The high prizes subsequently obtained at International and Intercolonial Exhibitions in different quarters of the globe, even in France, have led to the conviction of the fitness of the colony for olive cultivation, and to the gradual extension of the culture. The best known varieties of the olive from France and Spain have been introduced, and skilled French pruners of the olive have been employed, so that there is every prospect of ultimate success in this industry. The wines form a distinct feature in this exhibit and some of them appear to be excellent in flavour and quality. Doubtless when Pasteur's researches are better known in the colony these wines will improve through the scientific skill brought to bear upon them and will compete strongly with European wines. The aggregate annual vintage of this colony is set down at 600,000 gallons and the quantity is yearly increasing. Currants are also prepared in Australia. Several specimens of native hops and honey are exhibited. The industry of bee-keeping has recently shown signs of vigorous development and has now taken a firm place among the rural employments of the people. The Fairfield apiary, now one of the largest in the colony, which commenced with twenty-seven hives, has increased to one hundred and nine, and obtained in one year 14,300 lbs., or nearly 6½ tons of honey. Some assistance has been given to bee-keeping by the Chamber of Manufactures, whose aim it is to introduce and encourage new industries. It has imported Ligurian queen bees for distribution to expert bee keepers, and has secured the passing of an Act to make Kangaroo Island a close district for Ligurian bees. It is hoped by careful selection and skilful breeding that a superior strain of these bees will be secured, and that in future years Australian bee-keepers may be able to draw their stock from these instead of running the risk of importations from Europe.

Victoria.

This Court is without doubt one of the most beautiful, if not the most beautiful in the Exhibition. The entrance to it is through a golden arch which nearly spans the Court, and represents the bulk of the gold found in the colony since its first discovery in 1875; this amounts to the enormous quantity of £216,000,000. Last year 778,618 ounces of gold were obtained in Victoria. On passing through the arch the walls are seen to form a perfect picture gallery, the lower portion of which is devoted to oil paintings by Australian artists, many of them being extremely beautiful. The whole collection gives an excellent idea of the country, the people and their mode of life. The upper portion of the walls of the Court is lined with carefully executed coloured drawings of life size. These convey to the mind a very correct idea of the beauty of the native vegetation of Victoria. Each of the drawings has the vernacular name of the plant represented attached.

The object which will more especially attract the attention of pharmacists in this Court is the case of eucalyptus oils and gums, and other allied products exhibited by Mr. J. Bosisto, the President of the Royal Commission for Victoria. This exhibit includes some special samples of the following oils:—*Eucalyptus amygdalina*, rectified, of sp. gr. 0·856, and non-rectified, of sp. gr. 0·865; *E. globulus*, sp. gr. 0·920, an oil which darkens and becomes resinous on exposure to light; *E. oleosa*, of sp. gr. 0·904, and *E. dumosa*, of sp. gr. 0·912, the last two having a strong camphoraceous odour; and the essential oils of *E. citriodora*, *E. fissilis*, *E. goniocalyx* and *E. obliqua*, which are shown as examples of the different varieties of odour occurring in this genus. The oil of *E. citriodora* resembles that of citronelle, but all four are suitable for perfuming soaps. A large specimen of eucalyptol and the bitter principle eucalyptin in an amorphous state may also be noticed in this exhibit. Mr. Bosisto remarks concerning the former that it is obtained from *E. amygdalina* and *E. globulus*, that its vapour density is 6·22, and that it is a homologue of camphor, being two steps higher in the series. It is more volatile than the oil of eucalyptus, and is used as an inhalation in bronchial and diphtheritic affections in the proportion of half to one teaspoonful with half a pint of hot water. This eucalyptol is prepared chiefly from *E. amygdalina* and *E. globulus*. It is claimed for it that it is a very different article from what is sold in this country at a price at which it would not pay to produce eucalyptol even in Australia. Eucalyptol is chiefly exported to the United States and India, and, as well as the eucalyptin, is used in several hospitals in Australia and India. The eucalyptin is given in low fevers in the form of pills, in doses of one to three grains. It is hygroscopic. Messrs. Bosisto and Co. describe their red gum obtained from *Eucalyptus rostrata* as being thoroughly soluble. It is shown in two forms, one being the usual commercial article, and the other as prepared by a special process. The former dissolves only partially, giving a pale yellowish red solution; the other dissolves almost immediately, giving a deep claret-red liquid. The latter form is not only astringent but mucilaginous; it is probably the only really soluble red gum at present in commerce. It is employed in medical practice in Australia and India for astringent gargles and injections. These preparations are said to be superior to both catechu and kino in their action, nevertheless they are as yet but little used in this country.

The resins of the grass trees, *Xanthorrhœa hastilis* and *X. australis*, are shown. The former is of a bright yellow colour and resembles what is known in English commerce as gum acroides; the latter is of a dark red like dragon's blood. Both are used in staining wood to imitate cedar and oak and to form a japan lacquer for tin ware, for which they answer admirably.

Mr. Bosisto speaks highly of the tincture of the bark of *Atherosperma moschatum* as a sedative in bronchitis and asthma. It is prepared of the strength of 4 ounces of the bark to 20 ounces of rectified spirit and is given in doses of thirty to sixty drops, usually on a lump of sugar. The volatile oil of the bark taken alone is said to have a lowering action on the heart. It is given in doses of one or two drops. The essential oil, and a tonic alkaloid extracted from the bark and named atherospermine, are shown.* One hundred lbs. of the bark are said to yield 18 ounces and 6 drachms of the oil.

* See 'Official Exhibition Record,' 1862, p. 56, and 'Philadelphia Exhibition Record,' 1875, pp. 82, 83.

The Pharmaceutical Journal.

SATURDAY, SEPTEMBER 11, 1886.

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ELEMENTARY SPECULATIONS.

THE remarkable relations that have been recognized as existing between the combining proportions of the substances which modern chemistry regards as being elementary have long attracted the attention of investigators, and they have led to speculations respecting the real nature of those substances which possess a high degree of interest. It is not therefore surprising to find that Mr. CROOKES, as President of the Chemical Section of the British Association, should have selected this subject for his inaugural address at the Birmingham meeting. Modern chemistry draws a sharp line between simple and compound substances which was not dreamt of by the alchemists of the Middle Ages, and though the practical importance of the investigations that have been carried out during the past century under the influence of this fundamental principle has been signally manifested by their bearing on the purposes and needs of daily life, the actual difference between the views of a past epoch and those of the present may not be so widely different as is supposed. The fact is that a certain class of inquirers working at the very confines of our knowledge find themselves occasionally face to face with a barrier which has hitherto proved impassable, the so-called chemical elements, or those forms of matter which have not as yet been reduced to anything simpler; as Mr. CROOKES puts it, they extend before us as the wide Atlantic stretched before the gaze of COLUMBUS, mocking, taunting, and murmuring strange riddles which no man has yet been able to solve. The question encountered by such explorers is, What are these chemical elements? Text-book definitions afford no satisfaction, and mere philosophical speculations do little more. But spectroscopic observations have furnished evidence leading to the inference that in the sun and other heavenly bodies many of our reputed elements are dissociated or broken up into simpler forms of matter. The condition upon which this altered state of existence depends is held to be intense temperature, and the formation of those persistent forms of matter which we term chemical elements is held to be the result of a gradual lowering of that temperature to degrees at which the particular states of aggregation or constitution peculiar to them become possible. Such views have long been entertained in a more or less vague form by FARADAY, GRAHAM, Sir WILLIAM THOMSON, Sir BENJAMIN BRODIE and others, but it was not until within the last few years that they have been brought to some extent within the limits of probability by the study of spectroscopic phenomena, and have thus offered inducements for further investigation.

Looking at the number and distinctive properties of the known chemical elements, the question whether these are accidental or determinate naturally suggests itself. Might there not as well have been only seven or seven hundred, or seven thousand of them as the number commonly recognized as distinct. The mutual relations brought out by the periodic classification of NEWLANDS, MENDELEEF and MEYER are not consistent with the idea of accidental difference, while on the other hand the extremely rare occurrence of some of the chemical elements lends but little probability to the idea of their inherent individuality. The very facts of the case seem to suggest the probability that the substances we know as chemical elements may have been evolved from some few or possibly only one antecedent form of matter somewhat in the same way that the innumerable variations of plants and animals are held to have been developed from fewer and earlier forms of organic life. The records of such a process of evolution would not, however, be preserved as those of former plant and animal life are preserved in the "great stone book.' All such changes as consisted in the formation of the chemical elements from forms of matter not in harmony with the present general conditions must have been confined to periods too remote to be grasped by the imagination, when the matter of which our earth consists was in a state very different from its present condition. It is, therefore, from indirect evidence that we must seek to glean some knowledge, and at the outset we may be guided somewhat by the conclusion arrived at by HERSCHEL, that atoms bear the impress of manufactured articles. As a manufactured article certainly implies a raw material, and probably also the existence of by-products, the questions present themselves to us, What is here the raw material? Whether we can detect any form of matter which bears to the chemical elements a relation like that of a raw material to a finished product, say, like that of coal-tar to alizarin? Can we recognize any chemical elements which seem like waste or refuse? To these questions no direct answer is yet forthcoming, but they indicate the direction in which investigation is to be pursued.

This aspect of the subject recalls to mind the fact that early in the present century, when the determination of the combining proportions of the chemical elements was engaging the attention of chemists, an hypothesis was put forward by PROUT that the atomic weights of the elementary substances were

simple multiples of that of hydrogen. In many instances this is actually the case, and in those where a discrepancy is observed, it is the opinion of eminent chemists that we have an expression of the same fact masked by some residual or collateral phenomena. At that time the observations upon which this hypothesis was based were held to justify the conclusion that the πρώτη ὕλη of the ancients might be realised in hydrogen. The article in which this opinion was expressed was published anonymously in the 'Annals of Philosophy' for February, 1816, but in all probability the author of it was Dr. PROUT. Mr. CROOKES puts forward a similar view, and after enumerating the various arguments in favour of the compound nature of the chemical elements, and the circumstances which constitute evidence in that direction, he propounds an imaginary representation of the formation of the elements, beginning at a period before the earth was thrown off from the central nucleus of molten fluid, and before even the sun had consolidated from the primordial material, to which he, like the writer above referred to, gives the name of *protyle*, to express in a manner analogous to the word protoplasm, the idea of a primal form of matter, existing before the evolution of the present chemical elements of our earth. It would detract too much from the interest with which this address will be read to follow the author now more minutely than has been done in the preceding brief summary, but we may at least express our concurrence with him in his concluding remarks and his commendation of the study of this intricate question to the younger generation of chemists, not only as the most interesting but the most profoundly important in the entire compass of the science.

A PUBLIC ANALYST ON THE PURITY OF DRUGS.

A REPORT has lately been presented to the local authorities of Bethnal Green by the public analyst of that district, in which he gives the results of his examination of twenty-four examples of drugs and pharmaceutical preparations that had been submitted to him during the quarter ending at midsummer. It is satisfactory to find that none of these samples gave indication of having been adulterated, and that the analyst regards this fact as speaking well for the druggists as a class of traders. The articles tested comprised those most frequently used, such as quinine, jalap, rhubarb, and paregoric. All of them were found to be of proper strength, and to possess the properties and qualities prescribed by the British Pharmacopœia. The analyst in his report takes occasion to refer to the responsibility of the position held by druggists, and to the circumstance that having to undergo an examination as to their fitness for carrying on business on their own account, the public has thus a guarantee of their personal character which is borne out by facts. Among the samples other than drugs reported upon by this analyst a number of samples of mineral water, ginger beer and lemonade were examined with a view to ascertain whether they contained metallic impurities such as lead or copper, but in no case was anything of this kind detected. The amount of alcohol in some of these articles used as temperance drinks was determined in consequence of the statement that has been made in Parliament that they often contain rather large proportions of alcohol. The largest quantity found in ginger beer and ginger ale was however 1·2 per cent. of proof spirit; in other cases the amount varied from 0·2 to 0·7 per cent. These quantities are not larger than might be expected from the mode of manufacture of these articles and they are too small to be of any importance either as regards the excise or the use of these drinks by teetotalers.

The meeting of the British Association in Birmingham was on Wednesday brought to a successful termination. The sections from the time of their opening sittings until their close appear to have been well supplied with papers, many of which were of considerable interest. On Friday, the 3rd inst., the promised discussion on the nature of solution took place in the Chemical Section, and in the evening of the same day Professor Rücker delivered a lecture to a large audience in the Town Hall on "Soap Bubbles." On Saturday evening another lecture was delivered in the Town Hall to an audience of working men, by Professor W. C. Roberts-Austen, the subject being "The Colours of Metals and Alloys." A third lecture was delivered on Monday evening by Professor Rutherford on "The Sense of Hearing." On Monday the General Committee had under its consideration an invitation to the Association from the Government of New South Wales to meet in Sydney in 1888, the centennary of the establishment of that colony. A resolution was eventually passed that the proposal should be entertained, with a view of holding a supplementary meeting of the Association in Sydney in the spring of that year, provided that the Council is satisfied that a sufficient number of representatives of British science will be able and willing to go. At the same meeting an invitation to meet in Bath in 1888 was accepted, and Sir Henry Roscoe was elected as president of the meeting in Manchester, which was fixed to commence on the 21st of August next year. At the concluding sitting on Wednesday it was announced that the total number of tickets issued for the Birmingham meeting had been 2453, whilst the money receipts had been £2512.

* * *

The President of the Biological Section, Mr. W. Carruthers, took for the subject of a most interesting address, which we hope to have an opportunity of publishing, the available knowledge of the past history of the species of plants which still form a portion of the existing flora. Alluding to the great superiority presented by the actual plant over the most exact description for the purpose of comparison, he said the earliest recorded herbarium was collected between 1540 and 1550, but that no collection of English plants is known to exist older than the middle of the seventeenth century. The most

careful comparison, however, of the plants in the oldest available herbaria showed that they do not possess any peculiarities to distinguish them from recently collected specimens, and that if any changes are taking place in plants it is certain that the three centuries during which their dried remains have been preserved in herbaria have been too short to make them manifest. Recent explorations of previously unopened Egyptian tombs have yielded a harvest of much older material, in the shape of wreaths and garlands woven some four or five thousand years ago. These are in a wonderfully perfect state of preservation, so that Dr. Schweinfurth has been enabled to identify among them no less than fifty-nine species of plants. But with the exception of a form of vine leaves, which, though agreeing exactly in form with those of vines cultivated in the present day, have the under surface clothed with white hairs, in no case has it been possible by careful study to detect any peculiarities in living plants which are absent from their representatives found in the tombs. Taking a stride still further back into the past, Mr. Carruthers referred to the discovery of plants in deposits of a pre-glacial period at Cromer, and said that in the beds explored by Mr. Clement Reed sixty-one species of plants belonging to forty-six genera had been found, and of these forty-seven species had been identified. It might have been supposed that the various physical conditions which have necessarily affected these species over large areas of the earth's surface in the course of, say, 250,000 years, would have led to the production of many varieties, but the uniform testimony of the remains of this considerable pre-glacial flora, as far as the materials admit of comparison, is that no appreciable change has taken place.

* * *

"Colour blindness" was the subject of a conference between the Mathematics and Physical Science Section and the Biological Section, if indeed it be lawful to use the term after an eminent physicist has stigmatized it as incorrect. Lord Rayleigh said that it had been established by various workers that ordinary colour vision is threefold and threefold only. Dr. König said that all the phenomena of colour perception can be explained by supposing that each surface element of the retina consists of three constituents, each of which, when affected, causes a different colour sensation. Young proposed red, green and violet as the fundamental sensations, and the perception of various shades of colour would be the resultant of the fundamental sensations originating in the more or less partial action of the three constituents of the retina, whilst the sensation of white could be the resultant of the simultaneous affection of all of them together. Professor Michael Foster, treating the subject as a physiologist, said that the theory as to colour perception was that a ray of light acting on the retina broke down its substance in a manner varying with the colour of the ray, and thus produced the sensation characteristic of that colour. He added that all persons are more or less colour blind in the outside of the pupil, but that people known as "colour blind" have, as it were, a patch cut out of the inner part of the retina, so that they are unable to perceive red or green, or green appears as yellow, and so on. This condition, he said, might be produced by the "pernicious" habit of smoking, if continued for a long time, or if a particular kind of tobacco be used, the effect being to produce colour blindness in the very central field of the red.

* * *

In a paper read before the Chemical Section Professor Carnelly gave some deductions as to the relation of the air in dwellings and schools to disease, drawn from data collected in Dundee, which were interesting although in some respects not altogether novel. The data showed that the proportion of carbonic acid and organic matter is much higher in town air than in suburban air, and higher during the day than during the night. They also showed that in all classes of houses the death rate varied inversely in proportion to the cubic space allotted to each person, and directly in proportion to the carbonic acid and organic matter in the air. It also appeared that phthisis had been more fatal in three-roomed houses than in houses with only one or two rooms; not, Professor Carnelly thinks, because the three-roomed houses were more unhealthy, but because the persons corresponding to those attacked by phthisis in them would have succumbed to diarrhœa, measles, or other diseases at a earlier period in the one- and two-roomed houses.

* * *

The Welsbach method of gas lighting by incandescence, about which vague reports have been floating for some time past, was more definitely described in a paper read by Mr. C. W. Cork before the Mechanical Science Section. It consists in impregnating textile fabrics with solutions of the oxides of zirconium, lanthanum and yttrium, by which the fabric is said to be made so refractory that when a hood made of it is placed over the most efficient form of atmospheric burner it resists for a long time the highest temperature obtainable from the burner, and glows with a brilliant white and very steady incandescence. The gas consumed in producing this incandescence is said to represent only from 25 to 50 per cent. of the quantity required to produce an equal amount of light when burnt in the ordinary way, whilst the combustion is perfectly smokeless.

* *

Some weeks ago we drew attention to the anomalous influence of the law by which "coffee mixtures" are allowed to be sold under a Government stamp, and we also pointed out that so far as coffee is concerned this practice tends to render the provisions of the Food and Drugs Act abortive. There is probably no article of general consumption that is so largely adulterated as coffee, and it would appear that the habit of purchasing coffee ready ground affords very great facilities for its adulteration, for what is commonly sold under the designation of "French coffee" almost always contains a large admixture of chicory. The idea that such an admixture is characteristic of coffee as it is used in France is, however, entirely unfounded, and it is simply an illusory pretext for adulteration. Coffee is never sold in France in the ground state, but always in the berry, which is ground by the consumer immediately before being used. The addition of chicory is exceptional rather than general, and when it is practised for the sake of cheapness, as in some country places, the chicory is always purchased separately, and added when the decoction is prepared. Those who desire to have pure coffee should therefore avoid being misled by the specious statements as to so-called "French coffee," and, to protect themselves, they should procure their coffee in the unground condition.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly meeting of the Council was held on Wednesday, the 1st instant.

Present—The President (Mr. J. E. Brunker, M.A.), in the chair; the Vice-President (Mr. Draper), Sir George Owens, Dr. Collins, Dr. Montgomery and Messrs. Evans, Doran, Hayes, Grindley, Beggs and Simpson.

A letter was read from Mr. George Lane McCormack, of Monkstown, urging the Council to establish a school of pharmacy for the better training of pharmaceutical students. The writer urged that instead of asking members of the Society to contribute £1000, they should begin in a moderate way with a room, benches, bottles, etc., at a cost of about £60. If the cost could not be provided in any other way, Government should be petitioned for the money.

The President said this subject had been very thoroughly threshed already, and a committee had issued circulars to see what support they would get. Answers were received from a few gentlemen promising support, but according to his recollection Mr. McCormack was not one of them. The Council had no power to allocate the funds of the Society for the purpose in question.

Dr. Montgomery: No doubt a good school of pharmacy is a very desirable object.

The Vice-President: We are of one mind as to that, if we had the funds and moral support necessary for the establishment of one. Mr. McCormack should be told that the apathy is not on the part of the Council, but of the members of the Society.

Mr. Grindley: I think the fact of Mr. McCormack writing about the matter looks as if he would contribute.

Sir George Owens remarked that every day men came up for examination at the Apothecaries' Hall who were grossly ignorant as to the making of tinctures, masses, and other preparations. They said—"We get them ready-made from the druggists now." In olden times the apothecary's apprentice learned to make all his own tinctures.

The Vice-President: The Council is not apathetic as to this matter, but unhappily the members of the Society are. We should have had this school long ago if there had been a general *consensus* of feeling about it.

The Registrar was directed to write to Mr. McCormack, stating that the subject had been already considered by the Council, but that the support promised by the pharmacists of Ireland to the establishment of the school had not justified the Council in proceeding further with the matter; and that the Council had no funds which it could allocate to the purpose.

A letter was received from Sir William Kaye, Clerk to the Privy Conncil, enclosing copies of the reports which had been made to the Lord-Lieutenant by Dr. George Duffey, Visitor of the Society's Examinations, upon the examinations held in April and July last. The report on the April examinations stated as follows:—"Eleven candidates presented themselves for the Preliminary examination. Four were rejected, and the general answering of the seven who passed was with one exception indifferent. One candidate was rejected in dictation who otherwise would have passed, and the dictation of two other rejected candidates was also bad. One candidate passed on the low total answering of 44 per cent. His marks in three subjects were extremely low, and indicated most unsatisfactory knowledge. None of the candidates had been previously in for this examination. For the licence there were nine candidates, only two of whom passed. One of the seven unsuccessful candidates had also been previously rejected at the same examination. The cause of this extremely high percentage of rejections seems to be due to poor answering generally, especially in the practical portions of the examinations, more than to failure in any one special subject. Thus six of the seven rejected candidates failed to secure the total of 165 marks on the whole examination, which, as I explained in my first report, the Council of the Society has fixed as the minimum number of marks a candidate must obtain in order to pass. Two of these six failed to score the minimum passing standard of marks necessary to pass in each of three different subjects. Another of the same six failed in two subjects and the remaining three failed in one subject, in addition to all of the six not obtaining on the whole examination the requisite total number of marks to pass. The seventh unsuccessful candidate lost his examination by wanting three marks of the number required to pass in one part of the subjects of examination although his grand total of marks was higher than the fixed limit. Another candidate who failed in one subject by half a mark only wanted but four marks of the minimum pass total. Had this candidate scored four more marks and thus made his total up to 165 he must nevertheless have been rejected for six months by the hard and fast rule laid down. A standard for an examination is excellent and I approve of the one adopted by the Society and conscientiously and efficiently followed by the examiners; but the cases I have quoted prove the possibility of such an occurrence as I indicated in my former report, viz., the rejection of a candidate by half a mark, and show, as I then submitted, the advisability of a conference of all the examiners to discuss the passing or rejection of a candidate after a review of all the marks he has obtained, and of the general character and style of his answering, and of his practical work, before a final decision is made. As the last examinations were conducted on the same lines as those of the previous examinations in January the remarks and suggestions I had the honour to make in my report to your Excellency on those examinations hold good in the present instance also, I would again respectfully repeat the request I made in my former report, viz., that I might be permitted to make my report annually instead of quarterly and would urge its consideration on the same grounds as those previously advanced."

Dr. Duffey's report dated July, stated that the usual quarterly examinations were held in the rooms of the Society on the 5th, 7th, 8th, and 9th instant. "For the Preliminary examination twenty candidates presented themselves. Eight of these were rejected, the subject of weights and measures being that in which seven of these were chiefly deficient. Of the unsuccessful candidates, one had been twice previously rejected, and another once previously. One of the successful candidates had been rejected at a former examination. With two exceptions, the general standard of answering of the successful candidates was only "middling." The answering in Latin was perhaps somewhat better than at the two previous examinations. For the licence examination ten candidates came forward, none of whom had previously presented themselves; three were rejected. Of these one failed in all the subjects, another in theoretical chemistry, and the third did not make the requisite total of marks in the whole examination in order to pass. The average standard of answering was fair, ranging from 78 to 57 per cent. Both examinations were in every respect conducted in a similar way to those upon which I have had twice previously within this year the honour of reporting to your Excellency. As regards the Preliminary examination, I am not aware whether any application has as yet been made to your Excellency and the Privy Council to consent to the Society apparently exceeding the powers given it under their regulations (*vide* Regulations—Examiners, IV., and my Report of January, 1886) in allowing one examiner, apparently from pecuniary considerations, solely to discharge the duties that three examiners were elected to perform. I am by no means of opinion that the subjects of chemistry and botany should be removed from the Preliminary examination. Indeed, apart from the laudable desire evidenced by the Society

to encourage their study in the schools of the country by including chemistry and botany in their Preliminary examination, the advantage of a knowledge of these subjects to a pharmaceutical chemist raises the question whether the maximum number of marks obtainable in these subjects as awarded by the present examiner, viz, 10 per cent. in each of the grand total, is commensurate with their relative importance to the other subjects of the examination. As the Council of the Society attaches weight to the system of marking it has adopted in the examination for the licence, it would seem desirable that a similar system should be laid down for the Preliminary examination, so that in both examinations there should be uniformity. The need of some definite standard was particularly evident at the last examination. In the event of a change of examiners, and in the absence of detailed instructions for their guidance, fixing the minimum passing number of marks in each subject, as well as the minimum total of marks on the whole examination to be obtained in order to pass, would, as in the examination for the licence, be an assistance to the examiner in carrying out the views of the Council held as the relative value it considered should be assigned to each subject, and the standard requisite. In the absence of such a guide the views held by an examiner might differ materially, and from time to time, from those of the Council. Besides, under the existing absence of system the responsibility thrown upon the single examiner is, I think, too great. I am unable to report any improvement in the arrangements for the accommodation of the candidates at the examinations. I would suggest that small tables similar in pattern to those used in the Royal University should be procured. Such tables, by occupying a small space, would give more room, and their employment would diminish the facilities which sitting in close proximity at a large long table affords of copying."

The President said it would not be easy to deal with these letters after having merely heard them once read. Mr. Allen, who was not present now, had proposed resolutions on the subject, and the best course would be to refer the reports to a committee, with a view to their being discussed at the next monthly meeting.

The Vice-President remarked that Dr. Duffey's reports were so valuable that the Council should do everything in their power to have them quarterly. There were several points of great importance in the present reports. The possible failure of a candidate by half a mark was a very serious matter. According to the old system the examiners met, and if there was a doubt about a candidate the *consensus* of their opinions decided the matter. That might be reverted to with advantage. But he was not aware that they had ever had three examiners for the Preliminary examination.

The President: No. There is an examiner appointed under the sanction of the Privy Council to examine in arts at the Preliminary examination. The Council afterwards included elementary botany and chemistry in that examination, and consequently the duty of examining in them was thrown on the arts examiner. Dr. Duffey raises the question as to whether he is entitled to examine in botany and chemistry.

The Vice-President: He is perfectly competent to do so.

The President: Not only that, but he was appointed on the distinct understanding that he was to examine in those subjects.

The Vice-President: It is not a pecuniary question.

The President: We can put ourselves in order by passing a resolution asking the Privy Council to sanction the present arrangement.

Dr. Collins remarked that in the cases of other medical bodies, the usual practice was to refer the reports of the visitors to the examiners in the first instance.

It was ordered that the reports of Dr. Duffey should be referred to a Committee of the Council, and also to the examiners for their joint consideration.

A letter was received from Mr. Edward W. Allsom, Dispenser to the Cork Union Hospital, asking if his certificate in practical pharmacy would be accepted by the Council, in respect of apprentices who had served four years. He stated that the average number of patients in the hospital was 1000, and that greatly over 200 prescriptions per day were made up. The only difficulty in his case, he stated, was that he did not "keep open shop;" but the words of the Society's Regulation were that a "certificate could be had from a pharmaceutical chemist, a registered chemist and druggist of the Pharmaceutical Society of Great Britain, or *from* an apothecary keeping open shop." That implied that the pharmaceutical chemist, or chemist and druggist of the English Society need not keep open shop.

The President: The regulation in question, was prepared by the law officer of the day, but this gentleman seems to have found a hole in it. But he is wrong, for the word "from" is not in the regulations, and the words "keeping open shop" are intended to govern the whole of the preceding parts of the sentence.

Mr. Grindley: Did not this question come up in a case at Limerick?

The President: It did, and it was settled then.

The Registrar was directed to inform Mr. Allsom that his request could not be granted.

Donations were received consisting of the Report for 1844 of the Smithsonian Institution, Washington, and a work by Professor N. B. Power, of Madison, Wisconsin, entitled 'Contributions from the Department of Pharmacy, of the University of Wisconsin, No. 2.'

Thanks were voted to the donors.

A report from the Law Committee was received.

A letter was read from the magistrates who presided at Kells Petty Sessions on an occasion when George Cooney and Maria Leonard were fined £5 each for a breach of the Pharmacy Act in selling poisons, asking the consent of the Council to the fines being reduced to £1 each, on the ground that the defendants being "traders of high character, would not knowingly or wilfully violate the law, and that they were never likely to repeat the offence."

The President said the Society's inspector was entitled to a third of the £5, and if the penalties were reduced the Council would have to make up the difference to him, besides losing its own share of the original penalties.

Mr. Doran: It would be a very bad thing to reduce these penalties. If you do you will not get parties to come forward to prosecute.

Mr. Simpson: If the penalties of £5 be enforced there will be a less chance of parties committing the offence again.

The President: As far as I can see these people who were come down on did not really seem to know of the existence of the Pharmacy Act and the Poisons Act.

Mr. Grindley: In all the prosecutions that we have had the fines have not covered the expenses.

Dr. Montgomery: What business does Cooney carry on?

Mr. Simpson: He is a general grocer.

In the course of discussion an instance was mentioned of spirits of salts being sold in a whisky bottle with a whisky label attached.

The Registrar was directed to write to the justices, stating that having regard to the necessity of enforcing the law and the expense of prosecution, the Society did not see their way to complying with their request as to the reduction of the penalties.

The Law Committee also reported that on the 30th ult., at Oldcastle Petty Sessions (Co. Meath) Philip Gaynor, publican and seedsman, and Mrs. Harte, widow of an apothecary, were fined £5 each for breaches of the

Pharmacy Act, and 1*s.* and costs each on two charges under the Poisons Act. Also that a further adjourned case is pending at Navan Petty Sessions.

At the Preliminary examination 12 candidates passed and 8 were rejected.

Some financial business having been disposed of, the Council adjourned.

Chemists and Druggists' Trade Association of Great Britain.

A meeting of the Executive Committee was held at the office of the Association, 23, Burlington Chambers New Street, Birmingham, on Wednesday, September 1, at 9.30 a.m. Mr. W. G. Cross (Shrewsbury), President, in the chair.

The minutes of the previous meeting of the Executive were read and confirmed.

The President referred to the loss that the Association had sustained through the death of Mr. William Southall, and moved—

"That this Committee, on behalf of the Association, beg to express their deep regret at the loss they have sustained by the death of Mr. William Southall, Treasurer of the Association, a firm supporter of the Society since its formation. They likewise desire to accord their sympathy with his bereaved family."

Mr. Holdsworth seconded the proposition, and after being supported by the Vice-President and Mr. Andrews, the motion was carried unanimously.

Mr. Harrison moved—"That Mr. Holdsworth be appointed Treasurer to the Association for the ensuing year." He considered, he said, that Mr. Holdsworth, having taken such a very active part in the working of the Society, was the gentleman who should be elected to the position of Treasurer.

Mr. Symes seconded the resolution, which was carried unanimously.

The following appointments of committees for the ensuing year were then made:—

The officers of the Association, together with Messrs. Andrews, Barclay, Bell, Churchill, Davis, Hampson, Harrison, Hart, Jervis, O. Jones, W. Jones, Parker and Symes, to form a Law and Parliamentary Committee for the ensuing year.

The officers of the Association, together with Messrs. Andrews, Barclay, Bell, Chapman, Churchill, Crook, Davis, Hampson, Harrison, Hart, Jervis, Jones, W. Jones, Parker, Symes and Walker, to form a General Purposes Committee.

The officers of the Association, together with Messrs. Barclay, Churchill and W. Jones, to form a Finance Committee.

The following officers were re-appointed:—Mr. Henry Glaisyer as Solicitor to the Association; Mr. W. F. Haydon as Secretary; Mr. A. S. Wright as Assistant Secretary; and Professor Attfield as Analytical Referee. Messrs. Lloyds, Barnetts and Bosanquets Banking Company were also re-appointed Bankers to the Association; and Messrs. Laundy and Co., Public Accountants, were re-appointed Auditors.

The Secretary then read a draft memorandum on the Patent Medicine Stamp Acts, which he proposed to submit to the Somerset House authorities, and then circulate among the members of the trade. The consideration of the same was taken in committee, and after some considerable discussion it was referred to the Urgency Committee.

Local Secretaries to the Association for the ensuing year were appointed.

Several letters were read from members of the trade, and the Secretary was instructed as to the manner in which he should deal with the same.

British Pharmaceutical Conference.

TWENTY-THIRD ANNUAL MEETING.

(*Continued from page* 199.)

Tuesday, August 31.

After the President's Address the reading of papers was commenced with a communication on—

Crystallized Aconitine.

BY JOHN WILLIAMS, F.C.S., F.I.C.

In the British Pharmacopœia aconitine is described as an amorphous alkaloid. And this is the form in which it has been prepared in England for many years, the English alkaloid being distinguished by its being in white lumpy masses, whereas the foreign article was generally sold in the state of powder.

Within the last few years, however, a demand has arisen for the alkaloid in a crystallized state, and consequently more definite and certain in its constitution, and presumably in its medicinal activity. As long as aconitine was solely employed as an external application this was not so important, but now that it is becoming largely used as an internal remedy, it is necessary that its strength and purity should be more accurately defined; in fact, it is of the greatest importance that its strength should be if possible absolutely uniform.

The process described in the Pharmacopœia fairly gives the mode by which the English amorphous alkaloid can be obtained; but to produce the article in a crystallized state, a few modifications are necessary, and with your permission I will occupy a short space of your time in describing such details of the process as I had found useful.

The *Aconitum Napellus* should be the only source of the root. Other aconites such as the *ferox*, or Indian, and the Japanese plant have been used in past times; but we now know through the labours of Groves, Alder Wright, and Paul, and many others in England, not to mention other investigators on the continent, that the various species of aconite do not yield identical alkaloids, as at one time was supposed, and great care should be used to secure roots from the proper plant only.

The root should not be dried at a high temperature so as to enable it to be finely powdered, but should be brought to the state of coarse powder only; if made very fine it is difficult to work.

The root is to be exhausted with spirit of full strength, say 62° to 64° over proof; if methylated spirit is used, care should be taken that the sample is clean and free from gummy or resinous matters. About 4 ozs. of tartaric acid to each hundredweight of the root should be dissolved in the spirit. More may be used, but I doubt if there is any advantage in doing so.

To exhaust the root, I find it best to employ a combined maceration and percolation process. The maceration should be in the cold, and be maintained for about four days, when the percolation should be proceeded with. I find it advantageous to return the percolate to the root, and allow a second maceration of say a day, then the percolation repeated; and even the maceration and percolation repeated a third time, although wasteful, is I think advantageous. By passing a sufficient quantity of clean spirit through the percolator at the end, the whole of the now very concentrated tincture can be obtained, and the root in this way entirely exhausted with the smallest possible quantity of spirit. The spirit must now be distilled off at the very lowest possible temperature. I have tried spontaneous evaporation, but there are practical reasons why that is not advantageous, but this should be remembered that all the processes should be conducted at the lowest possible temperature, as subjection to a high temperature for any length of time will injuriously affect the product.

The distillation of the spirit should be stopped before the whole of the spirit has come over and a little hot

water added and the whole placed in a water-bath gently heated until the last traces of spirit have been driven off; this frequently takes some hours. The thin aqueous extract should now be filtered through coarse filtering paper which has previously been damped with water; in this way a quantity of resinous matter is separated and a clear dark-brown liquor produced which should be distinctly acid to litmus paper. This liquid (in its still acid state) should then be well shaken with an equal bulk of ether, which will dissolve out a small quantity of oily matter, but will hardly if at all take up any of the aconitine. The ether should be separated and the aqueous liquid gently warmed for some time to drive off the last traces of ether.

To this thin aqueous extract should be added a slight excess of concentrated solution of ordinary carbonate of soda, not the bicarbonate as recommended by some. I do not find it work as well; its solution is perhaps too dilute. The crude alkaloid is at once precipitated and the liquid should be gently warmed, when if the process has been properly conducted and the liquid is quite free from spirit and ether, the alkaloid will agglomerate and become a resinous looking mass, much as quinine does under like circumstances. This mass should be removed by means of a glass rod from the liquid, placed in a small basin and washed several times with moderately hot water, until the wash water comes away quite colourless.

The mass in a short time can be easily powdered and dried by exposure to the air, which is better than drying in a hot-air closet.

The alkaline mother liquor from which the crude alkaloid has been separated, if shaken with ether will yield a considerable further quantity of alkaloid, but as far as my experience goes not quite identical with that first yielded; at any rate I have found it incapable of yielding a crystallized alkaloid, and I very much suspect it to be inferior in medicinal activity.

The dried brown crude alkaloid coarsely powdered is now to be macerated in pure ether; I mean by that ether which has been well washed to separate any alcohol which is present in ordinary ether and then dried by means of anhydrous carbonate of potash. This maceration should be done in the cold and fresh portions of ether used as long as any soluble matter continues to be extracted. The various ethers mixed and filtered should be placed in a shallow basin and allowed to evaporate. It is best to assist the first part of the evaporation by means of a hot-water bath, but at a certain point the basin should be removed, lightly covered and allowed to evaporate spontaneously, when a considerable quantity of crystallized aconitine will be deposited; these crystals can be drained, and the mother liquor will still continue to yield fresh crops of crystals. The crystals thus obtained are, however, always contaminated with a certain amount of gummy extractive non-crystalline matter; this I find can be best removed by digesting the crystals for a very short time in a little very pure and cold ether in which the gummy matter is very much more readily soluble than the crystals.

By this means, although there is some loss and the crystals lose part of the sharpness of their angles, they are rendered practically pure, and can be dried on bibulous paper without any difficulty.

I need hardly remind members of this Conference of the series of important papers which have been at various times laid before the meetings by Messrs. Groves, Dr. Alder Wright and others, still there appears to be an opening for further investigation upon some points. My attention was directed to this matter by an admirable paper, which appeared in the *Pharmaceutical Journal* of March, 20, 1886, by M. Mandelin. In that he recommends that only crystallized aconitine should be used medicinally, in which I quite agree with him, but advises that in the process of making the crystallized article the base should be first converted into nitrate, and from such nitrate the pure crystallized alkaloid afterwards produced.

Now, I have long held the opinion that aconitine is an alkaloid of a very delicate nature, and that it is very undesirable to bring it into contact with reagents of a powerful character, and certainly combining it with nitric acid, and the curious manner in which the alkaloid apparently resists the action of this very corrosive acid has caused me much surprise, and if my idea is correct we may suppose is liable to produce a change in the alkaloid, which may not be advantageous.

Our knowledge of nitrate of aconitine is, I think, mainly due to Dr. Wright, who pointed out, in a paper read before this Conference, that the alkaloid could be readily converted into a nitrate, and by such means its purification much facilitated. To effect this object the ethereal solution of the aconitine should be evaporated to dryness, and the alkaloid dissolved in a small quantity of dilute nitric acid, and then a large excess of much stronger nitric acid added, when, in a short time, the whole becomes an almost solid mass of nitrate of the alkaloid. This should be subjected to pressure, and the salt washed several times with diluted, but rather strong acid, pressing out as much mother liquor, and with it impurity, as possible between each washing.

In this way a quantity of nearly white and pure nitrate of aconitine (but of course contaminated with a considerable excess of acid) can be obtained. This nitrate of aconitine when dissolved in warm water and allowed to evaporate spontaneously, crystallizes in rather dark-coloured rosettes of great beauty, apparently consisting of flat prisms radiating from a centre. To reproduce the aconitine from the nitrate, it is only necessary to dissolve in water, and precipitate with carbonate soda in slight excess; the precipitate should be slightly washed and dried, then treated with successive portions of pure ether in the cold until quite exhausted, and the ethereal solution so produced allowed to evaporate spontaneously.

Again the crystals which form round the edges of the beaker or basin will be contaminated with non-crystalline gummy matter, and can be purified in the same way as mentioned before, but the great bulk of the ether deposits a mass of very white light crystals which appear to require no further purification.

Unfortunately the quantity of crystallized aconitine produced either directly or by the intervention of nitric acid is very small, and it is necessary to work upon considerable quantities of root to obtain very tangible results.

Now as a mere matter of speculation the question arose, if the alkaloid produced directly by the process I have first named, which I may call the normal alkaloid, more nearly approaches the alkaloid as contained in the living plant than that produced by the second or nitric acid process. It was with a view of settling that question in my own mind, that I thought of examining the two products microscopically.

Here I must thank my friend Mr. Waddington for his kindness in making me a number of slides of various stages of manufacture. He is well known for his great skill as a microscopist, and his success in crystallizing chemical substances generally places me under a very special obligation to him.

I believe that I am allowed to mention that the crystallization of the aconitines has in all cases been from alcohol and not from ether, and that somewhat dilute alcohol is better suited for the purpose than very strong.

The crystals of aconitine when examined under the microscope with, say $\frac{1}{4}$-inch power, and polarized light, are very beautiful. The aconitine made directly (normal) especially yield crystals of great interest; they appear to be very thin flat prisms with pointed ends, reminding one of the polygonal figure around which chemists figure the position of meta, para and ortho groups of molecules. The aconitine produced from the nitrate on the contrary,

although crystallizing with great readiness, does not apparently produce crystals of this form, but only confused, ill-defined small groups of prismatic crystals, radiating from a centre, but very frequently so confused and ill defined that it is very difficult to assign an exact figure to them. Now this result occurred not once, but many times; in fact it has been found impossible to obtain any crystals from No. 2 alkaloid exactly like those produced by the normal aconitine. The slides under the microscope will, however, better illustrate my meaning than anything I can say, and I exhibit the normal aconitine, the aconitine recovered from the nitrate, and also the nitrate of aconitine itself, which is not only very curious and instructive, but also very beautiful as a polarizing object.

The normal crystallized aconitine (or that which had not been subject to the action of nitric acid) was kindly examined physiologically by Dr. Stevenson. He found that the $\frac{1}{3000}$th of a grain killed a mouse in twelve minutes, and states that it is in his opinion one of the most powerful lethal preparations he has ever examined.

I have since sent him some of the alkaloid recovered from the nitrate, but he has not yet given me any report as to its physiological action.

I feel I must apologize for having taken up your time with a subject on which so much has been written, and by authorities so eminent, that I can only regret that I have been able to do so little towards settling some of the important practical questions involved in the production of crystallized aconitine.

In conclusion, it may be interesting for me to mention that I have examined microscopically a considerable number of specimens of crystallized aconitine made by other experimenters, and have been astonished at the great variety of forms the crystals assumed. I think I may say no two gave exactly identical results, but every sample differed from every other. Why this should be I do not know, and it is evident we have still much to learn as to the roots used, and the exact mode of operation employed.

At the conclusion of the paper Mr. WILLIAMS said that owing to the warmth of the weather the microscopic slides which he had brought had become damaged, but Mr. Waddington had kindly sent him some fresh ones, which he should be happy to show to the members afterwards.

The PRESIDENT having proposed a vote of thanks to Mr. Williams,

Mr. T. B. GROVES (Weymouth) said this subject was not a new one to him, for some twenty years ago he produced samples of nitrate of aconitine, and also crystallized aconitine uncombined with acid, and recommended then that the crystals, as a definite body, should take the place of other forms of aconitine. He was pleased to find that Mr. Williams, who then seemed rather doubtful as to the crystals produced being true aconitine, had now come round to his own view that this was the only proper form for use in medicine. At present they were almost entirely dependent upon the French for this crystalline aconitine, Duquesnel being the chief maker, who obtained a very large price for it. He thought it was not surprising that there should be differences in the form of the crystals obtained, as they all knew how important an influence slight differences of temperature, rapidity of evaporation, and the presence of other salts in the liquid had on the shape of crystals, besides which aconitine was a very complex molecule and very liable to modification. The most serious point to be noticed was the occasional presence of crystals devoid of poisonous properties. Some time ago when working on a considerable quantity of what was supposed to be *A. Napellus* he obtained 1½ ozs. of crystalline matter which under the microscope presented a slightly different appearance to previous specimens, and on repeating the process of crystallization he managed to separate two entirely distinct bodies, one of which was entirely devoid of toxic properties, the other being the ordinary alkaloid. It was very important to be able to separate this non-poisonous body from that which was so extremely poisonous, but at present he did not know of any satisfactory means of accomplishing this. Dr. Alder Wright had since examined this non-poisonous alkaloid carefully and given it the name of picraconitine. He (Mr. Groves) thought possibly it was the same alkaloid as Mr. Broughton had discovered in the *A. heterophyllum*, but Dr. Wright said no, it was a distinct alkaloid. Some time afterwards Mr. Cleaver, in making extract of aconite from the green herb, found that the product was non-poisonous and had no effect when taken into the mouth. Mr. Cleaver then examined it for alkaloid and asserted that he found it to be precisely the same alkaloid as he (Mr. Groves) had got from the supposed root of the *A. Napellus*, but on pursuing the subject a little farther Mr. Cleaver was at last convinced that the plant he had been working on was *A. paniculatum*. This remark had not been verified by other investigators. It seemed very desirable that the Conference should arrange for the growth of some true *A. paniculatum*, and endeavour to isolate from them this picraconitine. He had nothing to add to his views on aconitine as given some three years ago, but did not think it was necessary to use tartaric acid and bicarbonate of soda instead of hydrochloric acid and ammonia; he used the latter reagents, and proceeding cautiously never had any difficulty in producing crystals to the extent of about a third of the whole yield of alkaloid. He always separated the aconitine as nitrate, which he maintained was the proper way. From that nitrate crystals of aconitine could be got without modification.

Mr. LONG said this was an eminently practical paper, in which all could take an interest. He should like to know whether the cultivation of this plant would impair its usefulness for preparing aconitine from. The general experience of chemists was that they got a confused mass of these roots, and it was very difficult to determine which species they belonged to. It seemed to him that the percolation and repercolation would have a tendency to cause re-absorption of the active principle. He should think also that distillation *in vacuo* would be desirable.

Mr. E. M. HOLMES said he had paid considerable attention to the genus *Aconitum*, and he found on looking up the literature of the subject that there were at least twenty-four varieties of *A. Napellus* known to botanists. Under these circumstances it seemed to him that the difficulty in obtaining a collection of roots of one uniform character would be very great, even if it were possible at all in commerce. He therefore thought Mr. Groves's suggestion, that a typical form should be cultivated in sufficient quantity for the alkaloid to be prepared from was a very excellent one; he should be glad to do what he could in this way, and Mr. Shenstone, of Colchester, had promised to assist him. They would set to work as soon as they knew the quantity required for preliminary experiments.

Mr. WILLMOTT (London) said the Conference was much indebted to Mr. Williams for giving the results of his experience, especially as he did not see his way three years ago to agreeing with Mr. Groves that crystallized aconitine only should be used for internal administration. The British Pharmacopœia gave no dose for aconitine, and therefore it was presumably not intended for internal use. It was a very powerful agent, not only in the crystallized, but also in the amorphous form, which Mr. Williams formerly advocated, as he could vouch from personal experience. Some time ago, when suffering from a severe attack of neuralgia, having read in a medical work that no neuralgia could resist aconitine, he tried some of the amorphous form, which had been in the house some years, making up $\frac{1}{48}$ gr. in two small pills. He got on very well for two or three days, but on increasing the dose on the third day by one pill, equal to

about $\frac{1}{1000}$ of a grain, symptoms came on which induced him to abandon the treatment. He quite agreed with Mr. Williams that uniformity was the great point to be achieved; if that could be done aconitine would be largely prescribed, and would form a very efficient remedy.

Mr. UMNEY remarked that the researches of Dr. Wright, Mr. Groves, and others, showed the various kinds of aconite root which were in commerce when their researches were made. There were large quantities of Indian aconite root at one time, which was supposed to be derived from *A. ferox*, and when that was disposed of the Japanese came in for some time; but at present they were almost dependent on German sources. There seemed great difficulty in obtaining anything like an adequate supply of the official root, and he thought the only way would be to cultivate in this country either it or the *A. paniculatum* or other varieties.

Mr. GROVES said the roots operated upon were sold as *Aconitum Napellus*, but the operators had no means of identifying them, and could only accept the statements of the importers.

Mr. UMNEY said the roots of the *A. ferox* or Indian aconite were present in considerable quantities some twenty years ago; but none of it was now seen in the London market. Then for some five or six years the market was flooded with Japanese root, but that was now absent. The Indian root was probably produced from one plant only, but that from Japan was unquestionably a mixture of several kinds. Aconite was cultivated in Cambridgeshire and other parts of England.

The PRESIDENT said he was employed for a long time some years ago, in making sections of aconite root, and he found that the aconites of commerce were much mixed. One particular kind of which he wanted to get the root, he was utterly unable to obtain in England, but got it through a friend in Prague. He was much surprised to hear from a gentleman who was engaged in the investigation of aconitine that he had examined that particular aconite, and did not find any alkaloid in it; and on inquiring further he found he had obtained his material from a wholesale house. It appeared to him that in such investigations the roots themselves should be operated upon, not extracts obtained from wholesale houses. Their knowledge of the aconites would be very much increased, if experimenters would take the trouble to make sections of the root, and ascertain if it was really *A. Napellus*, and there was not much difficulty in doing this. If $\frac{1}{3000}$ grain of aconitine were fatal to a small animal, and there was any uncertainty about its composition, it was not yet an article which could be satisfactorily used in medicine.

Mr. A. W. GERRARD said he could corroborate from his own experience much of what Mr. Williams had said, especially with reference to the necessity, where methylated spirit was employed for the extraction of the alkaloid, of adding a certain proportion of tartaric, or some weak acid. It was not so necessary to do this where rectified spirit was used; but if methylated spirit were distilled an alkaline residue would be found. It was also very important to stop distillation before all the spirit was removed, for a large proportion of alkaloid was easily destroyed if evaporation were carried too far, especially if the temperature were high. He would ask Mr. Williams if the syrupy matter which he separated from the crystalline aconitine by maceration in cold ether was alkaloidal. He found that, as a rule, treatment with nitric acid in these processes in the slightest excess caused a considerable destruction of alkaloid. He reprecipitated with subcarbonate of soda or ammonia, considering them better for aconitine than caustic potash or soda. He happened to be in possession of a portion of Mr. Cleaver's make of crystalline aconitine, and a very fine specimen it was. Dr. Ringer had experimented with it and found it extremely active. Turning to another point, it seemed to him the first thing to be aimed at was to obtain a definition of aconitine, which at present did not exist. It seemed to be one of a class of alkaloids which it was difficult to define; but his argument was that it did not matter from what source it was obtained, whether from *A. Napellus* or *paniculatum*, from India, Japan or Germany, if it were strictly and accurately defined. It was another thing when dealing with pharmaceutical preparations, but if aconitine were a well-defined substance it did not matter where it came from.

Mr. ALCOCK asked if Mr. Williams could state the effect of ordinary chemical reagents on the amorphous and crystallized aconitine respectively. With regard to the official aconite root he remembered twelve months ago he had occasion to attempt to obtain some genuine samples such as could be placed before students, but found very great difficulty in doing so. Parcels were sent of *A. Fischeri*, and also of *A. ferox*, but he could not get the real English aconite. He got German *A. Napellus* roots, but on breaking them they failed to give the characteristic fracture mentioned in text-books, the roots being in such bad condition, and he feared an investigation would have failed to obtain aconitine from them in any form. He hoped that aconite would be more largely grown in England for medicinal purposes.

Mr. JOHN MOSS said it was very generous of Mr. Williams to put before the Conference with such circumstantiality the process for manufacturing crystallized aconitine. When gentlemen of authority and experience did this they took a most important step towards producing that uniformity which all were looking for in aconitine and other things of similar kind. Most people when they received a benefit were encouraged to ask for more, and he should be glad if Mr. Williams would say what kind of root he used, because they knew that the different roots met with in the market yielded aconitine of very different characters. For example *A. Napellus* yielded both aconitine and pseudaconitine, whilst *A. ferox* produced a larger proportion of pseudaconitine than of aconitine. He should like to know also whether Mr. Williams succeeded in getting one of these alkaloids only and that of a pure character. Another question was whether the roots were wild or cultivated; because one authority maintained that the wild plant yielded crystallized aconitine more readily than the cultivated, and also insisted on the use of tartaric acid as Mr. Williams did.

Mr. BURFORD (Leicester) asked if the gummy matter which so persistently cropped up was not of an alkaloidal character, and might it not be due to a decomposition of the aconitine, in the same way as quinicine and other bodies derived from cinchona alkaloids.

Mr. WILLIAMS, in reply, said he thought the gummy matter was alkaloid somewhat changed, probably by oxidation; but he did not think it would crystallize. His contention was that aconitine was so delicate an alkaloid that it changed even in the course of manipulation, and this would account for the different results obtained by different manipulators; but when once obtained in a tangible crystalline form, it could be relied upon. As to the roots employed he was quite at the mercy of the wholesale dealers for what he used, and had never been able to obtain roots of a thoroughly satisfactory character, which he could say were absolutely of one species. It would be a very great advantage if they could obtain roots which could be relied upon as being really of the species desired. As Mr. Holmes had pointed out, there were several varieties of *Aconitum Napellus*, and crossed varieties might be produced unless the plant was carefully watched. He could not agree with Mr. Gerrard that it did not signify what root you started with, and that the aconitine when isolated absolutely from any other bodies would be identical whatever species it was made from. He thought the alkaloids produced, even when crystallized, were distinctly different, and in this he agreed with Mr. Groves and other investigators. He had been astonished

at the varying shapes of the crystals under the microscope, but the same sample of aconitine always yielded crystals of the same form, which showed that there was something more than mere accident in the matter, or variations in the temperature and strength of solution. Mr. Williams then drew on the black-board some of the forms most frequently met with, and stated that one variety with a cubical form of crystal appeared to be inert. The paper was only suggestive, and his idea was that the first step was to get a definite root, and next to get a definite process, so that the results could be compared. By proceeding in that way they would be able in time to arrive at some accurate knowledge of aconitine.

The next paper was on—

Certain Derivatives of Hymenodictyonine.

BY W. A. H. NAYLOR, F.C.S.

In continuing my study of the alkaloid hymenodictyonine my latest efforts have been directed towards gaining some knowledge of its behaviour when acted upon by iodine, bromine, and oxidizing agents. An outline of the working details and the results obtained are supplied by the following paragraphs.

On gradually adding a weak solution of iodine in ether to an ethereal solution of the alkaloid the iodine became decolorized and a deep orange-red precipitate was formed, which quickly agglutinated and presented the appearance of a black resinous mass. By continuing the addition of iodine until it ceased to be decolorized an excess could readily be recognized. The resultant varnish-like mass was washed freely with ether, in which it was but little soluble, and then treated with hot alcohol. It was soluble to a considerable extent in cold alcohol, but its solubility increased with increase of temperature. It was hoped that by the use of a limited quantity of this solvent, acting on the compound at a suitable temperature to be ascertained by experiment, followed by a gradual process of cooling, a crystalline derivative would separate out. The expectation was not realized, for the substance that separated under these conditions was always amorphous.

The experiment was next tried of adding iodine in large excess to a solution of the alkaloid in much ether. This had the effect of producing a more flocculent precipitate at the moment of its formation, but toward the end of the reaction the several particles began to coalesce. This viscid mass was treated precisely as the previous one, and refused to be coaxed into crystallizing.

A third attempt was made by precipitating a weak solution of the alkaloid in ether, with rather less iodine than would be required to produce complete precipitation. The precipitate was subjected to the same treatment as the previous ones, and resembled them in the granular appearances of their separations from alcohol, notwithstanding the inducement to assume some definite form offered by the varying temperatures to which they were subjected.

Although, after much labour and thought, I have failed to obtain an iodo-derivative in a crystalline form, I do not regard it as one of those organic principles to which the faculty of crystallization has been denied, but believe that a more perfect knowledge of the conditions of its formation in a state of purity would lead to its production. This belief is encouraged by a close correspondence to a possible formula which may be assigned to the iodo-compound, prepared by the method last described, that of incomplete precipitation. That portion of the viscid mass which dissolved in a limited quantity of hot alcohol and separated out on cooling, gave, in a series of iodine determinations by combustion with quick lime, the equivalent of 47·52 per cent. The formula $(C_{23}H_{40}N_2)_2I_3.2\,HI$ would require 47·92 per cent. of iodine. Throughout these combustions it was observed that a fatty looking substance distilled over, having the characteristic odour of naphthalene. From solution in alcohol it crystallized in white scales.

Several attempts were made to produce a crystalline bromo-derivative, but without success. The flocculent precipitate which resulted from the reaction of ethereal solutions of bromine and alkaloid, after treatment with hot alcohol gave on cooling a granular looking body, which was chiefly remarkable for the facility with which it parted with a portion of its bromine. A stable and definite compound was not obtained.

The action of oxidizing agents on the alkaloid next claimed attention. The alkaloid was converted into sulphate and to its aqueous solution was gradually added a one per cent. aqueous solution of potassium permanganate, until the liquid became permanently coloured. It was then concentrated by distillation to a low bulk and filtered. The filtrate was neutralized with sulphuric acid and evaporated to dryness. The residue was exhausted with hot alcohol, which on cooling gave a deposit and when quite cold was filtered. The filtrate was evaporated, taken up with water and converted into a silver salt, which was decomposed by sulphuretted hydrogen. Filtration, evaporation, and subsequent purification of the residue with alcohol and water, left a feebly coloured acid having the following properties.

It was markedly acid to litmus, and had a bitter after-taste. It dissolved readily in alcohol and water, and was but little soluble in ether. It united both with bases and acids. Its hydrochloride in aqueous solution when evaporated over sulphuric acid assumed an arborescent crystallization; the platinochloride under the same conditions crystallized in plates or prisms. The acid was not precipitated with sulphate of copper, but gave with nitrate of silver a white gelatinous precipitate, which in the moist state became rapidly reduced on exposure. Lead acetate gave a white granular precipitate. Two determinations of the platinum in the platino-chloride dried at 115° C. gave 29·50 per cent. of platinum. The formula $(C_6H_5NO_2HCl)_2PtCl_4$ requires 29·72 per cent. of platinum, and this is the platinochloride of a pyridine-monocarboxylic acid, viz., $C_5H_4N.COOH$. Further, the acid, or one of its salts, when distilled with lime, yielded as a product of decomposition a volatile base which possessed the peculiar odour and general properties of pyridine. This property of the acid, coupled with its behaviour towards reagents, and the percentage of platinum in its platino-chloride, may be accepted as trustworthy evidence of its being a carboxylic derivative of pyridine. If nitric acid be used in place of potassium permanganate the same acid is obtained.

It would therefore appear that in common with the rest of the non-oxygenated alkaloids hymenodictyonine is constitutionally related to pyridine.

The President having proposed a vote of thanks to Mr. Naylor for this paper, which evidently represented a large amount of work,

Mr. Alcock said this principle was obtained from a largely used febrifuge, *Hymenodictyon excelsum*. of which an Indian doctor told them two or three years ago at a pharmaceutical meeting in London. As the drug was considered to be valuable in medicine it would be well to know what was the best solvent for the active principle.

Mr. Naylor said he did not know of any single solvent which was capable of removing the whole of the alkaloid from its combination with the bark; but alcohol was the best. He had retained a considerable portion of this alkaloid, with the view of placing it in the hands of some eminent physiologist, and now that its chemistry had been fairly studied he hoped they might soon know something about its physiological action.

The Conference then adjourned until two o'clock.

On resuming, the next paper read was on—

The Assay of Elaterium.

BY H. W. JONES, F.C.S., AND F. RANSOM.

On the publication of the new British Pharmacopœia last year, we found, independently of each other, that the method given for assaying elaterium was quite unworkable; and attention was directed by one of us to the fact. Since then we have had occasion to work out a practicable method of assay, the results of which we now record.

Under "Elaterium" the Pharmacopœia says, "treated by the method described for 'elaterin' it should yield 25 per cent., or not less than 20 per cent. of that substance." The process given for the preparation of elaterin consists in "exhausting elaterium with chloroform, adding ether to the chloroformic solution, collecting the precipitate, washing the latter with ether, and purifying by recrystallization from chloroform."

The 'Pharmacographia,' from which the process has been adopted, states that the best method of obtaining elaterin is by exhausting elaterium with chloroform; and that from a solution so obtained, "a white crystalline deposit of elaterin is immediately separated by addition of ether."

As a matter of fact ether does not precipitate elaterin in any quantity from a chloroformic solution of elaterium, even when added in very considerable excess; and the same is true of a solution of pure elaterin.

In order that even a small amount of elaterin may be thrown out of solution by ether, the chloroformic solution must contain a large proportion of the active principle and a great excess of ether must be added. With a weak chloroformic solution the addition of ether fails to effect precipitation, as the following experiment will show.

An amount of crystalline elaterin weighing 0·226 gram was dissolved in 10 c.c. of chloroform, in a stoppered bottle to avoid evaporation; and pure ether gradually added. When 90 c.c. had been used the solution was still perfectly bright. No further addition of ether was made, and after twelve hours no elaterin had separated.

A useful assay process may however be based upon the use of chloroform and ether, if, instead of adding ether to the chloroformic solution, we operate upon the dry residue from the same after evaporation. Working in that way we have found certain precautions necessary to obtain constant results. The dry residue from the chloroformic solution requires to be well washed with ether to free it from colouring matter and other impurities; and unless that part of the process be efficiently done, the weight of the product will vary greatly. The following experiment was made with a view of determining the amount removed in various stages of washing. The residue from a chloroform exhaustion of one gram of elaterium, treated with ether in a dish so as to break up the mass, was transferred to a miniature percolator and washed with successive small amounts of ether, and the residue after evaporation of each 5 c.c. weighed.

1st.	5 c.c. gave	·144	gram.
2nd.	,, ...	·030	,,
3rd.	,, ...	·012	,,
4th.	,, ...	·010	,,
5th.	,, ...	·006	,,
6th.	,, ...	·004	,,

The ether was passed slowly through, and the washings were comparatively colourless when the third 5 c.c. had been obtained; but the residue from the same was decidedly coloured.

Even after washing till ether passes through the elaterin colourless, we find that the white, or nearly white product will still give a coloured solution when redissolved in chloroform. On that account we prefer to redissolve in chloroform, evaporate, and wash with ether for the second time.

Another source of error lies in the amount of elaterin removed by solution in ether, aided possibly by the presence of various other matters held in solution. Pure elaterin is not nearly so soluble in ether as has been recorded, yet a notable amount is removed in process of washing. The United States Pharmacopœia, which does not include elaterium but embraces elaterin, gives the solubility in ether as 1 in 290, which appears to be the determination of Hennel (*Journ. Royal Inst.*, i., 532; and quoted by Gmelin, 'Chemistry,' xvii., 335).

From an examination of various samples of elaterin prepared by ourselves in different ways, and from a sample purchased from a well-known continental manufacturer, we have arrived at the conclusion already stated as to solubility, and cannot accept the figures given by Hennel. It must be remembered that the presence of even 1 per cent. of an impurity more soluble in ether than elaterin itself, would decidedly affect the figure for solubility. We reserve further remarks on solubility until we have operated upon a sample of proved absolute purity. Not only have different figures been given for the solubility of elaterin, but its reactions have been differently recorded showing that products of varying purity have been operated on by various observers. Thus Power (1875) in common with some other writers stated that elaterin is *instantly* coloured red by sulphuric acid, whilst Lindo (*Chemical News*, xxxviii., 35; 'Year-Book Pharm.,' 1878), who introduced the carbolic acid test, found that no characteristic coloration was produced by sulphuric acid alone; and this is in accordance with the recent work of Johannson (*Zeit. Anal. Chem.*, xxiv., 154), who finds that with concentrated sulphuric acid it gives a pale yellow coloration, becoming red at the edges after some time and ultimately cherry-red. The elaterin obtained by the assay method which we have adopted also gives no immediate red coloration with sulphuric acid, but instantly responds in the most minute amounts to the carbolic test, showing it to be a practically pure product.

The British Pharmacopœia thus describes this test for elaterin:—"With melted carbolic acid it yields a solution which, on addition of sulphuric acid, acquires a crimson colour rapidly changing to scarlet."

Elaterium may be exhausted with alcohol; but we greatly prefer chloroform for the purpose. Complete exhaustion can be effected in the cold, for after passing about 10 c.c. of extra chloroform through the powder after that solvent had begun to drop in a colourless condition, it was found that no elaterin was obtained from further amounts of percolate with *boiling* chloroform, as no reaction could be obtained with the carbolic acid test applied to the dish in which the percolate of the boiling chloroform had been evaporated.

F. B. Power (*American Journ. Pharm.*, Jan. 1875) employed alcohol for exhausting elaterium and precipitated the elaterin by means of potassic hydrate. The concentrated tincture is poured whilst still warm into a dilute solution of the alkali. By that method he only obtained 14 per cent. of elaterin. The potash test employed in the 1867 Pharmacopœia has been wisely discarded by the editors of the new edition, but is still the official process of the Italian Pharmacopœia (1881).

As evidence of the extreme unreliability of the potash test we quote two experiments made under somewhat different conditions, as to bulk and temperature.

(1) Exhausted 1 gram with rectified spirit, evaporated to the consistence of a syrup and added to 30 c.c. of liq. potassæ slightly warmed. The precipitate collected next day weighed, when dry, 0·151 gram = 15·1 per cent.

(2) Exhausted 1 gram in an exactly similar manner, evaporated to about 5 c.c., and added 60 c.c. of hot liq. potassæ. The precipitate collected next day weighed only 0·028 gram = 2·8 per cent.

The potash test was proposed by Morries in 1831; and Buchheim (1872) found that elaterin was decomposed by potash when added to a hot alcoholic solution.

The following is a detailed description of the method of assay finally adopted by ourselves:—

Macerate 1 gram of finely powdered elaterium with

chloroform in a covered dish for a few hours, transfer to a miniature glass percolator (*e.g.*, the barrel of a small glass syringe) plugged with wool, and wash with chloroform, allowing about 10 c.c. to pass through the marc after the menstruum has begun to pass in a colourless condition. Place the percolate in a small dish and evaporate off the chloroform at a gentle heat. Treat the residue with a small quantity of pure, absolute ether, and transfer to a small percolator or funnel, plugged with cotton wool. Wash with pure ether until at least 10 c.c. have passed through colourless, and reserve the ethereal washings. Redissolve the elaterin so obtained by passing chloroform through it whilst still in the funnel or percolator, and evaporate the chloroformic solution once more to dryness in a small dish. Treat the residue so obtained with ether, exactly as before.

Allow the united ethereal washings to evaporate *spontaneously*, until the bulk is reduced to about 3 c.c. Transfer to a small cylinder (*e.g.*, a 10 c.c. measure) and allow the separated elaterin to deposit. Carefully decant the coloured supernatant ethereal layer, add 4 c.c. of pure ether to the residue and again decant after deposition has taken place. Finally dissolve the elaterin in the cylinder with the aid of chloroform, and wash out the larger amount previously collected in the funnel with the same solvent. Unite the chloroformic solutions, evaporate at a gentle heat in a tared dish, dry on the water-bath and weigh. In a trial experiment we found elaterium recovered from the ether-washings equal to 1·9 per cent. A small amount will still be retained by the final small bulk of ether; and this, as far as we have been able to make out, will be equivalent to about 7 milligrams, indicating 0·7 per cent. more elaterin to be present in the sample than actually found; and that amount may be added by way of correction.

Attempts to improve the process by the employment of benzene, and of petroleum ether in place of ordinary ether, did not furnish any promising results. Both solvents remove colouring matter from the chloroformic residue to a certain extent only, and a final washing with ether is necessary. Owing to the solubility of elaterin in alcohol it is important that the ether employed should be free from that impurity, and throughout our experiments absolute ether has been used.

The standard of the Pharmacopœia of 1885 is 25 per cent.; and elaterium, it is stated, should not contain less than 20 per cent. of elaterin. The former amount represents in our opinion a fairly good article, whilst the latter indicates too low a percentage. A sample prepared by one of us in the season of 1885 yielded 29 per cent. when assayed by the method described.

In conjunction with the solubility of elaterin we hope to furnish on a future occasion some particulars of a chemical examination of the same substance.

The PRESIDENT, having moved a vote of thanks to the authors,

Mr. WILLIAMS said the process he had followed in extracting elaterin involved the use of caustic potash, in which elaterin was insoluble and remained undecomposed, whilst most of the colouring matter which accompanied it was decomposed. It was, therefore, the general practice to use caustic potash as a purifier and afterwards to take up the elaterin by chloroform or alcohol.

Mr. JONES said Mr. Ransom and he had found the potash process given in the Pharmacopœia of 1867 so unreliable that they discarded it altogether. They simply powdered up the elaterium and exhausted it directly with chloroform, and then operated directly on the residue with ether, but after washing it completely with pure anhydrous ether, and after every trace of colouring matter had been removed they still found it necessary to redissolve in chloroform, because a certain amount of colouring matter and impurity still remained after the first washing.

Mr. ALCOCK asked whether it would not be advisable to first wash the elaterium with ether to remove the chlorophyll and resinous matters, and then afterwards to treat the washed material with chloroform. He understood the process adopted was just the reverse of that.

Mr. JONES said this would involve the use of a very much larger amount of ether, besides which ether did not act so readily on elaterium as chloroform did. It could be exhausted readily with chloroform, but the bulk of it would scarcely be touched by ether.

Mr. LASCELLES-SCOTT asked if the authors had tried to remove the colouring matter and some resinoid matter with which the elaterin was associated by treating the elaterium in the first instance with bisulphide of carbon, and then exhausting it with chloroform.

Mr. JONES said they had tried bisulphide of carbon amongst other things, and found no advantage in it at all. It removed a small amount of colouring matter, but only that which would be removed otherwise.

The next paper read was on—

A FALSE PAREIRA BRAVA.

BY WILLIAM KIRKBY, F.R.M.S.

The history of pareira brava from its first introduction into Europe in the seventeenth century down to the present generation is one curiously burdened with mistakes and complications. It is not my intention to recapitulate the historical account of this drug which has been so concisely and lucidly given by Hanbury in his well-known paper on this subject (*Pharm. Journ.*, [3], iv., pp. 81 and 102). We are, however, indebted to Hanbury for something of more value than its history, and that is the determination of the botanical source and characters of the original pareira brava. It falls to my lot to have to chronicle another chapter in this unique history of errors, and, at the same time, to prevent if possible, the occurrence of some similar mishaps in the future. I say *some*, because it is perhaps too much to expect that henceforth pareira brava will have a clean and untarnished reputation, since its career hitherto has been so unsatisfactory.

Hanbury first demonstrated, in the paper referred to above, in 1873, that the true pareira brava is the root of *Chondrodendron tomentosum*, Ruiz et Pavon, and at the same time indicated how it differed from the substitutes then in the market.

Before proceeding to discuss the particular substitute forming the subject of this paper we will consider those that have preceded it.

As is well known, for a hundred and twenty years the plant producing pareira brava was said to be the *Cissampelos pareira*; but whether the root of this plant ever appeared in commerce before Messrs. Allen and Hanbury imported it from Jamaica is extremely doubtful; this can therefore scarcely be considered a substitute. Hanbury describes a drug which was very bitter and was stated to be the root of *Cissampelos*; and also another which he says was "completely devoid of medicinal power;" this was sold in the place of the bitter false drug. The botanical origin of these two substances is, as far as I know, still undetermined. Besides the foregoing there are the white and yellow pareira bravas; the former being the produce of *Abuta rufescens*, and the yellow of *Abuta amara*. Hanbury thought the latter was identical with a yellow pareira brava which he says was "marked internally by numerous concentric zones," and appeared in the market in 1873. Stillé and Maisch* record an instance of the appearance of a similar drug; they say:—"Recently a yellow pareira brava has been met with in commerce and was imported from Brazil. It consists of flat, often twisted stems, which Bentley and Trimen presumed to be obtained from *Abuta amara*, Aublet. This kind is easily recognized by the eccentricity of the woody zones, and by its bright yellow colour internally." They proceed to say that Morrison had

* 'National Dispensatory' (1879), p. 1037.

examined it chemically. Morrison in his paper* states that "the drug examined was of Brazilian origin, and sent to the United States as 'true pareira brava, obtained from *Cissampelos pareira*;' but it corresponded neither to the description of *Cissampelos* nor of *Chondodendron*. It consisted of the woody stem of a menispermaceous plant, was covered with a grey bark, and the bright yellow wood was formed of more or less eccentric layers of fibrovascular tissue." These descriptions agree fairly well with Hanbury's with the exception of the arrangement of the zones. There is therefore some little uncertainty whether the American is the same as the English yellow pareira brava, and if not, which, if either, of them is identical with the *Pareira brava jaune* (*Abuta amara*) of Aublet. The stems of *C. tomentosum* have been largely imported into this country during recent years as a substitute for the root. In America, however, this appears to have been a common practice for many years. Dr. Squibb† says that for twelve or fourteen years prior to 1871 nothing but the stems of true pareira brava had been known in American commerce; but in that year a shipment of the root was imported which he was able to identify as the genuine drug from the plate in Pomet's 'Histoire des Drogues.' Mr. J. Moss (*Pharm. Journ.*, [3], iv., 911) in 1874 reported that he had found stems mixed with the root to the extent of an equal proportion; and again in 1876 to the extent of 75 per cent.

In February of the present year Mr. E. M. Holmes, of the Pharmaceutical Society's Museum, sent me, for examination, a specimen of a drug which had appeared in the market as pareira brava, and was said to be imported from West Africa. It is to this substitute and the means of identifying it so as to distinguish it from genuine pareira brava that I shall direct your attention. But before doing so it is necessary that I should describe the microscopical characters of the genuine drug. This, I believe, has never yet been done. Mr. John Moss has described the microscopical characters of the stem (*Pharm. Journ.*, [3], vi., 702), and promised that he would perform the same duty for the root; this promise, I think, still remains unredeemed. As one or two errors have crept into Mr. Moss's paper I shall refer to it occasionally as I proceed.

The growth of the secondary wood of the *Menispermaceæ* is abnormal in a remarkable degree. In the young plants surrounding the pith is a normal ring of wood with, relatively, broad medullary rays and narrow vascular bundles. The phloem is on the exterior of the xylem; each portion of the soft bast is limited, on the outside by a thick crescent-shaped layer of hard bast fibres. Surrounding this woody zone is the cortex consisting of several rows of cortical parenchyma and the epidermis. As far as is known the growth of the primary ring of wood lasts from one to two years. Towards the end of this time the inner rows of the cortical tissue become meristematic and a cambium is formed; the outer rows, however, remain unaltered. Immediately within this unaltered region and exterior to the cambium two or three rows of the soft parenchyma become converted into rows of hard sclerenchymatous cells, which form a more or less continuous ring. An inner portion of the cambium also becomes converted into a similar ring. Between these two rings is produced a fresh zone of vascular bundles. After some time the cortical tissue again becomes active and the formation of sclerenchymatous ring and vascular bundles is repeated.

Having obtained a general idea of the structure of the stems of the *Menispermaceæ*, we may now fill in the details and take the stem of *Chondrodendron tomentosum* as an example. In a section having a diameter of 22 mm. the pith measures 1·5 mm. and occupies a position not quite central. Surrounding this are two, three, or four well-defined zones of woody tissue of variable thickness, the outer zone often being reduced to the appearance of a thick line. These zones are divided from each other by undulating lines of a different colour. The whole is enclosed by a narrow cortical portion.

The pith is composed of polyhedral, almost round, thin walled cells; in the centre are a number of strongly thickened sclerotic cells, which are either isolated or, more frequently, in groups forming strands, the cells being elongated vertically and are in some instances ten times the length of their diameter. A small quantity of starch is present in some of the cells; numerous small crystals of calcium oxalate are found, especially in the peripheral thin walled cells; occasionally a cell is seen which contains a brown granular colouring matter. Opposite the apex of the vascular bundles the medulla cells are generally of a smaller diameter, and their walls gradually become thicker as they approach the centre of the pith until they appear to reach a maximum and suddenly cease. The woody bundles consist of xylem fibres with oblique slits, and large pitted vessels with transverse slits, tracheides with bordered pits are occasionally found; the larger vessels are found towards the base of the wedges. At the base of each wedge is a more or less hemispherical mass of thin walled tissue, the outer part of which is somewhat pressed together; this is what Mr. Moss has called the procambium. It is really the soft bast, and in the zones other than the primary one is all that represents the phloem of the vascular bundles. It is composed chiefly of sieve tubes; the sieve plates lie on the radial walls of the tubes and are only demonstrated with difficulty, as is frequently the case in dried material. I was successful in seeing them with tolerable distinctness by treating radial vertical sections with either strong nitric acid or a solution of iodine. On the exterior of each strand of soft bast in the primary ring is a mass of hard bast fibres; this is not always homogeneous as sclerenchymatous cells are sometimes mixed with the fibres. The bast fibres are absent from the other zones. The medullary rays are usually from seven to twelve cells thick; the cells are chiefly thin-walled, and tubular in form; those in contact with the wood are always lignified and pitted; occasionally, especially in the older zones, the lignification extends to the neighbouring cells in such a manner as to form bridges from one vascular bundle to another. The rays contain a small quantity of starch, and a large number of crystals. Forming a continuous ring around the tissues already described is a structure to which Mr. Moss has applied the name of bundle sheath, which I think is somewhat unfortunate as this term is usually used with reference to the inner limiting row of cells of the cortex, otherwise it is called the endodermis, a structure I have not succeeded in making out in this stem. This ring is made up from three to five rows of stone cells arranged very irregularly; it is broader opposite the medullary rays, into which it branches for some little distance. In the primary ring its continuity is interrupted by the masses of hard bast; in the rings outside the primary one it is separated from the soft bast by two or three rows of thin walled tissue. From the fact that this sclerenchyma has the same origin as the medullary rays, it would be better to consider it as the pericycle, a structure which has been recognized in the root under the name of the pericambium, and which M. Morot* has shown to be also present in the stem and leaves, it being the outer limiting tissue of the bundle cylinder; this he terms, in whichever organ it appears, the pericycle. Each zone of wood is a repetition of the first with the exception of the bast fibres which are absent from all others. The cortex consists of cortical parenchyma, together with many stone cells, and a narrow band of cork cells. The inner three or four rows of the cortical parenchyma are free from stone cells; and

* *Amer. Journ. Pharm.*, copied in *Pharm. Journ.*, [3], ix., p. 290.

† *Amer. Journ. Pharm.*, copied in *Pharm. Journ.*, [3], ii., p. 846.

* *Annales des Sci. Nat. Bot.*, tom. xx.

bordering externally on this homogeneous layer are a few scattered groups of sclerenchymatous fibres. A small quantity of starch is found in the pith and medullary rays. Crystals are found in great abundance in the pith and medullary rays, but more especially in the sclerenchyma. Mr. Moss mentions that he observed globoid bodies in the vessels. What he has perhaps mistaken for them are tyloses.*

True Pareira Brava.—Considering the good descriptions of the appearances of the root of *C. tomentosum* already published it is unnecessary that I should do more than just remind you that the number of zones of wood is generally three or four ; that the internal colour is yellowish or greenish-brown, occasionally dark brown, the woody bundles appearing light on a darker ground ; also that externally it has a black-brown colour, and has numerous transverse ridges and deep longitudinal furrows. Examined microscopically it is seen to have no pith. The xylem bundles have the same elements as in the stem ; the vessels are distributed in an irregular manner, the larger ones being at the base of the wedges.

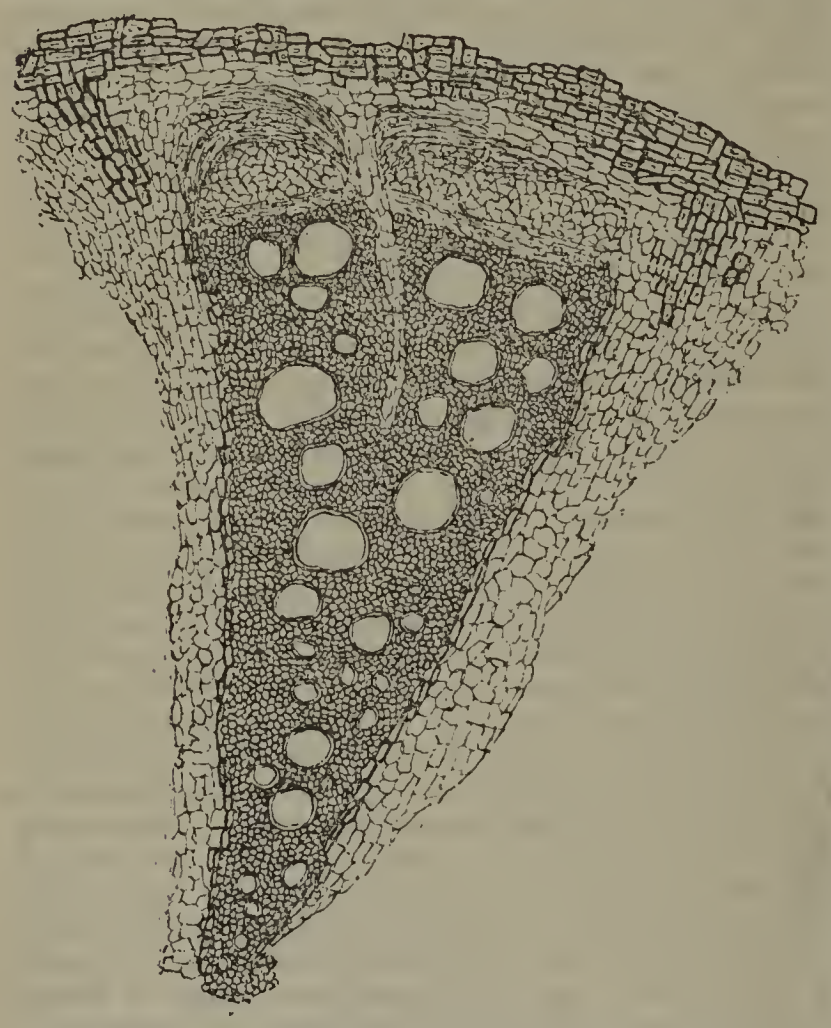

Fig. 1.—Vascular Bundle of Inner Zone of Root of *Chondrodendron tomentosum*, Ruiz et Pav. × 32.

The diameter of the lumen of the vessels varies from 20 μ to 192 μ. By measuring all the vessels in an inner and in an outer bundle we get an average diameter of 108 μ; this is not a constant figure, but it is of some value under certain conditions as we shall see when we use it for the purpose of comparis n. The bundles are distinctly wedge-shaped ; those in the primary zone are frequently split at the base by a ray of parenchyma passing inwards towards the pith. Some of the xylem fibres contain a dark brown colouring matter. The outer layers of the bast strands are coloured yellow ; the inner layers are open, the individual elements being easily seen. Bast fibres are altogether absent from the root. The medullary rays are considerably broader than in the stem, and the cell walls are much coloured ; with the exception of a few cells between the soft bast strands and which are joined to the ring of stone cells, only those cells which are in immediate contact with the wood fibres are lignified. The rings of sclerenchyma are continuous and narrow, being two or three cells thick. The cortex is narrow and consists of about seven rows of parenchyma, with which are found a few stone cells, and a layer of cork of equal thickness ; the cork has a tendency to exfoliate. Starch is very abundant ; the granules are usually round or elliptical ; other forms are by no means rare, many granules being truncated at one end and much longer than broad. Compound granules are common and these give rise to the truncated forms. Single granules measure as much as 23 μ ; the majority, however, are between 12 μ and 20 μ. The hilum is generally eccentric and distinct. Crystals are very abundant wherever sclerenchyma is found.

The drug which Mr. Holmes sent me under the name of West African pareira brava, and of which I have been fortunate enough to obtain a small parcel in the course of business, is a mixture of several stems and roots. Of these two kinds greatly predominate. I have divided the several kinds into groups, and numbered them consecutively from 1 to 5.

1. This is a stem occurring in pieces varying from about 5 mm. to 25 mm. in diameter. Some pieces are very knobby from the remains of the branches. Externally it is of a chocolate-brown colour and marked by longitudinal furrows ; internally the colour is brownish-yellow. There is a friable pith which is very eccentric, having in a section of 25 mm. diameter only four zones of wood on one side while there are fifteen on the opposite side. It is thus seen that the woody zones are very narrow. The woody bundles are also narrow and very numerous, and are but slightly broader at the outer than at the inner end. The vessels are only seen with difficulty with an ordinary lens. In the young stems the tissue of the pith is thin walled, hexagonal parenchyma ; but in older stems it is somewhat thickened in a regular manner, there being no strands of very thick sclerotic cells. The vascular bundles in the primary ring having no mass of sclerotic cells, distinguishable from the remainder of the medulla tissue, at their apex, and the spiral vessels being very small, appear to commence rather abruptly. These primary bundles are narrow, and have the larger vessels in a narrow radical row. This is also usually the case in the secondary bundles ; but exceptions are not infrequent. The vessels are small. The hard bast is only about six fibres in thickness. The cortex is almost entirely devoid of stone cells ; occasionally a group is seen, and here and there a long solitary, branched fibre. Many of the cortical cells contain a brown colouring matter. The corky layer is very narrow. Starch is very abundant in the pith and medullary rays of the young stems ; in the old stems it is absent from the pith. The granules are rather large, more or less round, and frequently compound. Crystals are present in the sclerenchymatous rings and the thickened parts of medullary rays.

2. This is a root, and varies in diameter to the same extent as the previous specimen. It is marked by rather inconspicuous transverse ridges and longitudinal furrows. Externally it has a dark brown colour ; internally yellow or brownish-yellow. The woody zones are very similar in appearance and width to those of the stem described above ; but there is no distinct pith. The primary zone is generally composed of eight or ten narrow wedges of wood, and a corresponding number of broad masses of fundamental tissue, forming a star of reddish-yellow set in a ground of pale yellow ; sometimes the rays of the star are more numerous. The fundamental tissue divides the bundles of the primary zone from one another completely at the centre, and this under the microscope appears as a sort of pith, in which sclerotic cells are occasionally found. The medullary rays are broad, and consist of thin-walled tissue ; there are no lignified cells between the phloem masses. The soft bast is much crowded together. The vascular bundles are narrow, and, with the exception of the primary ones, of nearly uniform

* Tyloses, or thyloses, are caused by the growing of the surrounding wood cells through the pits in the walls of the vessels. These cells sometimes divide in the vessel cavity and so give rise to several cells.

width. The vessels are small, the diameter of the lumen varying from 16 μ to 72 μ, giving an average diameter of 50 μ. Thus it appears that they are only about half the width of those of the root of *C. tomentosum*. The cells of the stone rings are small, and only two or three rows deep. There are no bast fibres. The cortex consists of about five rows of cortical parenchyma, and about an equal number of rows of closely adherent cork cells.

Fig 2.—Vascular Bundle of Inner Zone of Root of West African Pareira Brava. × 32.

Starch is very abundant; the granules are round or elliptical; the larger ones measure about 16 μ; compound granules are common. Crystals accompany the sclerenchyma rings. The general appearance and structure of

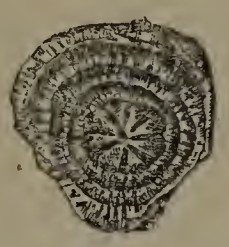

Fig. 3.—Transverse Section of Root of West African Pareira Brava. Nat. size.

this root lead me to think that it belongs to the same plant as the stem just described.

3. This stem is very similar in many respects to the first one, but it differs to so great an extent as to warrant a doubt as to its being produced by the same plant. It is possible that variations in the environment may be sufficient to account for these differences; still the peculiarities are so constant in the material in my hands that I cannot possibly ignore them. Internally it is of a pale yellow colour. The woody zones are broader, nine measuring as much as fifteen in the other stem. The pith is very compact with a crenate margin. The wedges of wood are broader, and have vessels very easily seen with a lens. The cells of the pith are much thickened, and are pitted; some contain starch, others a brown colouring matter. The cells opposite the vascular bundles are smaller and thickened to a greater extent; sometimes these are only noticeable at the sides of the protoxylem. The primary vascular bundles are broad and short, and have a pegtop shape, caused by there being two, three, or four vessels across the apex immediately behind the spiral vessels, of which there are commonly three arranged in a triangle. It is this arrangement that imparts the crenate appearance to the pith. The bast fibres are very strongly developed, there being eight or ten rows. The cortex contains many stone cells. Many of the parenchymatous cells contain colouring matter. The suberous layer is broader than in the other stem.

4. This may be dismissed in a very few words as it is true pareira brava. Only a small percentage is present. The most probable explanation of its presence is that it has been mixed with the false drug after its importation.

5. This is not of much importance, as I have only found one small piece with a semi-diameter of 15 mm.; but it serves to show the heterogeneous character of the so-called West African pareira brava. It is a portion of a root, and has four zones of wood bundles, each of which is of two colours, the inner portion being light brown and the outer dark brown. There is no distinct line separating the zones. The woody bundles are very narrow, and are separated by considerable masses of starch-parenchyma, they cannot possibly be called rays. The most remarkable feature is that instead of the stone cells appearing in compact rings between the woody zones they are much scattered and mixed with the parenchyma.

The portions I have numbered 1 and 2 form by far the greater portion of the drug. That marked 3 may possibly be the same as 1; but I am at present inclined to think that it is more likely to be derived from another plant, especially as other roots such as 5 are present.

It was my intention to have pointed out how the West African drug differs in microscopical characters from the other false pareira bravas; but my paper has already assumed a greater length than I expected, and the general appearances are quite sufficient to distinguish them, I may just say that it is very different from the following specimens which I have, through the kindness of Mr. Holmes, been enabled to examine:—Stem of the bitter false pareira brava; stem of the inert false pareira brava; and stem and root of white pareira brava (*Abuta rufescens*).

The stem of the West African substitute differs from that of *C. tomentosum* in not having the very characteristic strands of sclerotic cells in the pith; in the smaller diameter of its vessels; in the absence of the great number of stone cells in the cortex. Starch is more abundant in the false stem, and it does not exhibit any long truncated granules. The root differs in having a distinct central point free from wood; in the smaller width and length of the vascular bundles, and smaller diameter of the vessels; in the narrow cork layer being closely adherent, and in exhibiting, the same difference in the granules of starch as the stem.

In conclusion, I will summarize the peculiar physical characteristics of this false pareira brava. It has a chocolate-brown colour externally, and a yellow or brownish-yellow colour internally. It has a great number of woody zones instead of three or four. In the larger pieces there is an eccentric arrangement of the zones. The root portions have a star of small size in the centre with a variable number of straight, not twisted, rays. And, finally, the woody wedges are narrow, and have vessels with a small diameter. These are the most striking characters, and will serve to readily identify the substitute.

The PRESIDENT, in proposing a vote of thanks to Mr. Kirkby, remarked that, being familiar with researches of this character, where the microscope was involved, he could well understand what an amount of labour was required in preparing such a paper. This was an instance in which the microscope might be very valuable in detecting adulteration, substitution, or careless harvesting, by which one root got mixed with another, or the stems with the roots. It was utterly impossible that anyone, even acquainted with the working of the microscope, could follow a paper of this description unless it were accompanied by drawings, as it would be when printed.

Mr. Moss concurred in the remark of the President

that this paper represented an immense amount of work. When he worked on the subject many years ago he cut hundreds and hundreds of sections before he could find what he wanted, and at the end of the time he was so thoroughly sick of it that if, as stated by Mr. Kirkby, he had promised to do the same kind of work on the root he was very glad to forget it. He did promise to make a complete chemical examination of the stem with a view to ascertain whether it was therapeutically as valuable as the root. He commenced and worked at it for several months, when circumstances prevented his continuing the investigation. Mr. Kirkby must remember that botany, like chemistry, was a progressive science, and its terminology varied to some extent at different times. When he wrote his paper he applied the names "procambium" and "bundle sheath," because a very high authority used those same terms with reference to the same structures. At that time Sachs' excellent work had just appeared in Germany, and he adopted the terms Sachs used, and the paper itself received the general approval of Professor Flückiger. It was quite impossible to criticize a paper of this kind on simply hearing it, but he was glad to notice that the author had at the conclusion pointed out the characteristics of false pareira. He had not himself met with this kind of false pareira in the market, but it was very useful to have such indications given. At the same time a good deal of pareira which had been described as false had been in his opinion quite genuine. He was glad Mr. Kirkby had taken up the subject, and hoped he would continue it.

Mr. KIRKBY said in reference to Mr. Moss's paper he had not intended to criticize it at all, but rather to bring it down to the present state of knowledge.

(*To be continued.*)

The British Association for the Advancement of Science.

FIFTY-FIFTH ANNUAL MEETING.

THE PRESIDENT'S ADDRESS.

(*Continued from page* 204.)

I wish to formulate these principles as distinctly as possible, and as the result of all the long series of observations, calculations, and discussions since the time of Werner and Hutton, and in which a vast number of able physicists and naturalists have borne a part, because they may be considered as certain deductions from our actual knowledge, and because they lie at the foundation of a rational physical geology.

We may popularize these deductions by comparing the earth to a drupe or stone-fruit, such as a plum or peach, somewhat dried up. It has a large and intensely hard stone and kernel, a thin pulp made up of two layers, an inner more dense and dark-coloured, and an outer less dense and lighter-coloured. These constitute the under-crust. On the outside it has a thin membrane or over-crust. In the process of drying it has slightly shrunk, so as to produce ridges and hollows of the outer crust. and this outer crust has cracked in some places, allowing portions of the pulp to ooze out—in some of these its lower dark substance, in others its upper and lighter material. The analogy extends no farther, for there is nothing in our withered fruit to represent the oceans occupying the lower parts of the surface or the deposits which they have laid down.

Keeping in view these general conclusions, let us now turn to their bearing on the origin and history of the North Atlantic.

Though the Atlantic is a deep ocean, its basin does not constitute so much a depression of the crust of the earth as a flattening of it, and this, as recent soundings have shown, with a slight ridge or elevation along its middle, and banks or terraces fringing the edges, so that its form is not so much that of a basin as that of a shallow plate with its middle a little raised. Its true permanent margins are composed of portions of the over-crust folded, ridged up and crushed, as if by lateral pressure emanating from the sea itself. We cannot, for example, look at a geological map of America without perceiving that the Appalachian ridges, which intervene between the Atlantic and the St. Lawrence valley, have been driven bodily back by a force acting from the east, and that they have resisted this pressure only where, as in the Gulf of St. Lawrence and the Catskill region of New York, they have been protected by outlying masses of very old rocks, as, for example, by that of the island of Newfoundland and that of the Adirondack Mountains. The admirable work begun by my friend and fellow-student Professor James Nicol, followed up by Hicks, Lapworth, and others, and now, after long controversy, fully confirmed by the recent observations of the geological survey of Scotland, has shown the most intense action of the same kind on the east side of the ocean in the Scottish highlands; and the more widely distributed Eozoic rocks of Scandinavia may be appealed to in further evidence of this.*

If we now inquire as to the cause of the Atlantic depression, we must go back to a time when the areas occupied by the Atlantic and its bounding coasts were parts of a shoreless sea in which the earliest gneisses or stratified granites of the Laurentian age were being laid down in vastly extended beds. These ancient crystalline rocks have been the subject of much discussion and controversy, and as they constitute the lowest and probably the firmest part of the Atlantic sea-bed, it is necessary to inquire as to their origin and history. Dr. Bonney, the late President of the Geological Society, in his anniversary address, and Dr. Sterry Hunt, in an elaborate paper communicated to the Royal Society of Canada, have ably summed up the hypotheses as to the origin of the oldest Laurentian beds. At the basis of these hypotheses lies the admission that the immensely thick beds of orthoclase gneiss, which are the oldest stratified rocks known to us, are substantially the same in composition with the upper or siliceous magma or layer of the under-crust. They are, in short, its materials either in their primitive condition or merely rearranged. One theory considers them as original products of cooling, owing their lamination merely to the successive stages of the process. Another view refers them to the waste and rearrangement of the materials of a previously massive granite. Still another holds that all our granites really arise from the fusion of old gneisses of originally aqueous origin, while a fourth refers the gneisses themselves to molecular changes effected in granite by pressure. These several views, in so far as they relate to the oldest or fundamental Laurentian gneiss, may be arranged under the following heads: (1) *Endoplutonic*, or that which regards all the old gneisses as molten rocks cooled from without inward in successive layers.† (2) *Exoplutonic*, or that which considers them as made up of matter ejected from below the upper crust in the manner of volcanic action.‡ (3) *Metamorphic*, which supposes the old gneisses to arise from the crystallization of detrital matter spread over the sea-bottom, and either igneous or derived from the decay of igneous rocks.§ (4) *Chaotic* or *Thermo-chaotic*, or the theory of deposit from the turbid waters from a primeval ocean either with or without the aid of heat. In one form this was the old theory of Werner.‖ (5) *Crenitic* or hydro-thermic, which supposes the action of heated waters penetrating below the crust

* Address to the Geological Section, by Professor Judd, Aberdeen Meeting, 1885. According to Rogers, the Crumpling of the Appalachians has reduced a breadth of one hundred and fifty-eight miles to about sixty.

† Naumann, Phillips, Durocher, McFarlane, etc.

‡ Clarence King, Tornebohm, Marr, etc.

§ Lyell, Kopp, Reusch, Judd, etc.

‖ Scrope, Delabeche, Daubrée.

to be constantly bringing up to the surface mineral matters in solution and depositing these so as to form feldspathic and other rocks.*

It will be observed, in regard to these theories, that none of them supposes that the old gneiss is an ordinary sediment, but that all regard it as formed in exceptional circumstances, these circumstances being the absence of land and of sub-aërial decay of rock, and the presence wholly or principally of the material of the upper surface of the recently hardened crust. This being granted, the question arises, Ought we not to combine these several theories and to believe that the cooling crust has hardened in successive layers from without inward; that at the same time fissures were locally discharging igneous matter to the surface; that matter held in suspension in the ocean and matter held in solution by heated waters rising from beneath the outer crust were mingling their materials in the deposits of the primitive ocean? It would seem that the combination of all these agencies may safely be invoked as causes of the pre-Atlantic deposits. This is the eclectic position which I endeavoured to maintain in my address before the Minneapolis Meeting of the American Association in 1883, and which I still hold to be in every way probable.

A word here as to metamorphism, a theory which, like many others, has been first run to death and then discredited, but which to the moderate degree in which it was originally held by Lyell is still valid Nothing can be more certain than that the composition of the Laurentian gneisses forbids us to suppose that they can be ordinary sediments metamorphosed. They are rocks peculiar in their origin, and not paralleled unless exceptionally in later times. On the other hand, they have undoubtedly experienced very important changes, more especially as to crystallization, the state of combination of their ingredients, and the development of disseminated minerals;† and while this may in part be attributed to the mechanical pressure to which they have been subjected, it requires also the action of hydrothermic agencies. Any theory which fails to invoke both of these kinds of force must necessarily be partial and imperfect.

But all metamorphic rocks are not of the same character with the gneisses of the Lower Laurentian. Even in the Middle and Upper Laurentian we have metamorphic rocks, *e.g.*, quartzite and limestone, which must originally have been ordinary aqueous deposits. Still more in the succeeding Huronian and its associated series of beds, and in the Lower Palæozoic, local metamorphic change has been undergone by rocks quite similar to those which in their unaltered state constitute regular sedimentary deposits. In the case of these later rocks it is to be borne in mind that while some may have been of volcanic origin others may have been sediments rich in undecomposed fragments of silicates. It is a mistake to suppose that the ordinary decay of stratified siliceous rocks is a process of kaolinization so perfect as to eliminate all alkaline matters. On the contrary, the fact, which Judd has recently well illustrated in the case of the mud of the Nile, applies to a great number of similar deposits in all parts of the world, and shows that the finest sediments have not always been so completely lixiviated as to be destitute of the basic matters necessary for their conversion into gneiss, mica-schist, and similar rocks when the necessary agencies of metamorphism are applied to them, and this quite independently of any extraneous matters introduced into them by water or otherwise. Still it must be steadily kept in view that many of the old pre-Cambrian crystalline rocks must have been different originally from those succeeding them, and that consequently these last even when metamorphosed present different characters.

I may remark here that, though a palæontologist rather than a lithologist, it gives me great pleasure to find so much attention now given in this country to the old crystalline rocks, and to their study microscopically and chemically as well as in the field, a work in which Sorby and Allport were pioneers. As a pupil of the late Professor Jameson, of Edinburgh, my own attention was early attracted to the study of minerals and rocks as the stable soundations of geological science; and as far back as 1841 I had learnt of the late Mr. Sanderson, of Edinburgh, who worked at Nicol's sections,* how to slice rocks and fossils; and since that time I have been in the habit of examining everything with the microscope. The modern developments in this direction are therefore very gratifying to me, even though, as is natural, they may sometimes appear to be pushed too far or their value over-estimated.

That these old gneisses were deposited not only in what is now the bed of the Atlantic, but also on the great continental areas of America and Europe, anyone who considers the wide extent of these rocks represented on the map recently published by Professor Hull can readily understand. It is true that Hull supposes that the basin of the Atlantic itself may have been land at this time, but there is no evidence of this, more especially as the material of the gneiss could not have been detritus derived from sub-aërial decay of rock.

Let us suppose then the floor of old ocean covered with a flat pavement of gneiss, or of that material which is now gneiss, the next question is how and when did this original bed become converted into sea and land. Here we have some things certain, others most debatable. That the cooling mass, especially if it was sending out volumes of softened rocky material, either in the exoplutonic or in the crenitic way, and piling this on the surface, must soon become too small for its shell, is apparent; but when and where would the collapse, crushing and wrinkling inevitable from this cause begin? Where they did begin is indicated by the lines of mountain-chains which traverse the Laurentian districts; but the reason why is less apparent. The more or less unequal cooling, hardening and conductive power of the outer crust we may readily assume. The driftage unequally of water-borne detritus to the south-west by the bottom currents of the sea is another cause, and, as we shall soon see, most effective. Still another is the greater cooling and hardening of the crust in the polar regions, and the tendency to collapse of the equatorial protuberance from the slackening of the earth's rotation. Besides these the

* Hunt, *loc. cit.* The following is Dr. Hunt's summary statement of this theory: "The globe consolidating at the centre left, it is conceived, a superficial layer of basic silicates, which has yielded all the fixed elements of the earth's crust. This layer formed the first land and the floor of the primeval sea, the acid waters of which, permeating and partially decomposing it, became thereby chemically neutralized. This last-cooled layer, mechanically disintegrated, saturated with water, and heated by the central mass, was the source of mineral springs, holding in solution the silicates which built up the ancient gneisses and similar rocks. Granitic veins and zeolites are due to survivals of the process which generated the gneissic rocks. The hypothesis of their formation from materials brought to the surface by mineral springs from the primitive basic layer affords, it is claimed, the elements of a complete and intelligible explanation of the origin of the Eozoic rocks. This upward lixiviation of the primitive mass, and the deposition over it of an acidic granite-like rock, would leave below a highly basic material, and the division of the mass thus established would correspond to that of the trachytic and doleritic magmas, which have been conjectured to be the sources of two great types of eruptive rocks. Inasmuch, however, as according to the present hypothesis these two layers of basic and acidic matters are the results of aqueous action, and not of an original separation in a plutonic mass, as imagined by Phillips and Durocher, their composition would be subject to many local variations."

† The first of these is what Bonney has called *Metastasis*. The second and third come under the name *Metacrasis*. *Methylosis*, or change of substance, is altogether exceptional, and not to be credited except on the best evidence, or in cases where volatile matters have been expelled, as in the change of Hematite into Magnetite, or of bituminous coal into anthracite.

* And I believe at Witham's also.

internal tides of the earth's substance at the times of solstice would exert an oblique pulling force on the crust, which might tend to crack it along diagonal lines. From whichever of these causes or the combination of the whole, we know that within the Laurentian time folded portions of the earth's crust began to rise above the general surface in broad belts running from N.E. to S.W., and from N.W. to S.E., where the older mountains of Eastern America and Western Europe now stand, and that the subsidence of the oceanic areas allowed by this crumpling of the crust permitted other areas on both sides of what is now the Atlantic to form limited table-lands.* This was the beginning of a process repeated again and again in subsequent times, and which began in the Middle Laurentian, when for the first time we find beds of quartzite, limestone, and iron ore, and graphitic beds, indicating that there was already land and water, and that the sea, and perhaps the land, swarmed with animal and plant life of forms unknown to us, for the most part, now. Independently of the questions as to the animal nature of Eozoon, I hold that we know, as certainly as we can know anything inferentially, the existence of these primitive forms of life. If I were to conjecture what were the early forms of plant and animal life, I would suppose that just as in the Palæozoic the acrogens culminated in gigantic and complex forest trees, so in the Laurentian the algæ, the lichens, and the mosses grew to dimensions and assumed complexity of structure unexampled in later times, and that in the sea the humbler forms of Protozoa and Hydrozoa were the dominant types, but in gigantic and complex forms. The land of this period was probably limited, for the most part, to high latitudes, and its aspect, though more rugged and abrupt, and of greater elevation, must have been of that character which we still see in the Laurentian hills. The distribution of this ancient land is indicated by the long lines of old Laurentian rock extending from the Labrador coast and the north shore of the St. Lawrence, and along the eastern slopes of the Appalachians in America, and the like rocks of the Hebrides, the Western Highlands, and the Scandinavian mountains. A small but interesting remnant is that in the Malvern Hills, so well described by Hull. It will be well to note here and to fix on our minds that these ancient ridges of Eastern America and Western Europe have been greatly denuded and wasted since Laurentian times, and that it is along their eastern sides that the greatest sedimentary accumulations have been deposited.

(*To be continued.*)

Parliamentary and Law Proceedings.

Prosecutions under the Pharmacy Act and Sale of Poisons Act, Ireland.

At the Oldcastle Petty Sessions held on Monday, August 30, Mr. Sullivan, solicitor on behalf of the Pharmaceutical Society of Ireland, appeared to prosecute Philip Gaynor and Eliza Harte, merchants trading in Oldcastle, for selling poisons without the proper conditions. Three summonses were issued against each defendant, the first for selling the poison not being a registered chemist; the second for not labelling upon the bottle or other vessel containing the poison the name and address of the seller; and the third for not making an entry of the sale in a book.

The Court having held the offences proved, inflicted the following fines upon each defendant—for first offence, £5 with £1 costs; for second offence 1*s.* with 7*s.* 6*d.* costs; and for the third 1*s.* with costs.

* Daubrée's curious experiments on the contraction of caoutchouc balloons, partially hardened by coating with varnish, show how small inequalities of the crust, from whatever cause arising, might affect the formation of wrinkles, and also that transverse as well as longitudinal wrinkling might occur.

Alleged Death through a Powder.

An adjourned inquest was held on Wednesday by Dr. Diplock at Kensal Green, on the body of Emily Jenkins, 14 months, a labourer's child, who died on the 1st inst. On the Monday prior to the child's decease the infant was seized with illness, and subsequently the mother went to a chemist at Kilburn, where the assistant or chemist—the mother could not say which—gave a powder and some lime water.

Dr. Carr H. Roberts, who made the *post-mortem* examination, gave it as his opinion that death was accelerated by the powder, which he thought was calomel, and the inquiry was accordingly adjourned for the chemist's attendance.

Mr. W. E. Hartley (who was cautioned by the Coroner) said he was a chemist, and resided at 34, Canterbury Road, Kilburn. On the 31st ultimo a woman (mother of the child) called at his shop. Witness did not know if she brought the child with her. She said her infant was suffering from diarrhœa. Witness gave her a powder and some lime water. The powder consisted of calomel and a little sugar. Witness inquired as to the symptoms and the age of the child.

The Coroner: And did you recommend the lime water, or did she ask for that?

Witness: I recommended the lime water, knowing it was a very good thing for the sickness. I have given hundreds of those powders before, and there has been no ill effect.

After other evidence, the Jury returned a verdict of "Death from Muco-enteritis," adding, "We are of opinion that no blame attaches to the chemist who sold the powder."

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Flowers frequented by Bees.

Sir,—In notes of "The Month," August 26, you mention the omission of the sunflower from the Exhibition at South Kensington of flowers frequented by bees. I have five or six sorts of sunflower, and notice that humble bees are constantly busy upon them, but never the hive bee, though I have hives near them. If this is usual it should not be counted a bee flower.

Woodend, near Towcester. W. H. Brown.

E. J. King.—The successful candidates have to enter upon the scholarships in the session next after the date of competition.

A. F. B. is thanked for his communication.

Dispenser.—We cannot assist you in obtaining the unpublished formula followed by any particular maker, but you will find a paper on pepsin and bismuth preparations in the *Pharmaceutical Journal* for September 26 last, p. 266.

Watson, L'pool, is recommended to consult his friends, who would be better acquainted with the terms of the agreement than we are.

F. W. Doubleday.—(1) *Erythræa Centaurium.* (2) *Spiranthes autumnalis.*

Student.—We know of no "treatise" on the subject, but you will find a short paper on the use of the mullein plant in medicine, by Dr. Quinlan, in the *Pharmaceutical Journal* for October 20, 1883, p. 309.

An Apprentice Member.—We should prefer to see the prescription before expressing an opinion.

Communications, Letters, etc., have been received from Messrs. J. F. Brown, Short, Dott, Edwards, Naylor, Moss, Umney, Symes, Groves, Conroy, Watson.

THE COLONIAL AND INDIAN EXHIBITION AT SOUTH KENSINGTON.

Victoria—*continued.*

Other objects contained in this interesting exhibit are perfumes extracted from the flowers of *Boronia Megastigma* and *Acacia pycnantha*, also poppy heads grown in Victoria and opium prepared in that colony. The dried Boronia flowers have a very pleasant odour which is quite *sui generis*, but suggestive of the possibility of its use as a flavouring agent for tea, since it somewhat resembles that of *Chloranthus inconspicuus*, which is used in China for that purpose. The opium poppy appears to grow very luxuriantly in Victoria, specimens brought to the Exhibition by Mr. Bosisto being over six feet high. At present sufficient opium is not made in the colony for home consumption, although protected by a tax of 20*s.* per lb. levied on foreign opium. In colour, odour, and "touch" the Australian opium is superior to most of the Turkey opium of commerce and contains on an average 10 per cent. of morphia in the fresh or 11·5 per cent. in the dried opium, and sometimes even more. The excellent quality of this commodity leads to the hope that the time may yet come when this colony will supply the opium at present imported from foreign countries. The chief difficulty is the expense of labour.

A species of sandarac here shown is in larger tears than the ordinary sandarac or gum juniper of commerce. It is perfectly and easily soluble in methylated spirit, and with the addition of a little true Venice turpentine, to give it elasticity, would form an excellent pale varnish. The species of *Callitris* yielding Australian sandarac are stated by Mr. J. Cosmo Newbery, the Superintendent of the Melbourne Technological Museum, to be *Callitris verrucosa*, R.B., and *C. cupressiformis*, these species being said to afford it in considerable abundance, 8 or 10 ounces being frequently found at the foot of a single tree; it exudes naturally but the flow is sometimes stimulated by incisions. The *Callitris* timber is much prized for its beauty, and its odour appears to be obnoxious to insects; a specimen of essential oil obtained from these trees is also shown.

The violet-scented wood known as myall wood (*Acacia homalophylla*) is said to afford a gum somewhat copiously throughout the summer season. The same is stated to be the case with *A. decurrens*. Several of the timbers appear to be odoriferous and might afford fragrant volatile oils. The flowers of *Pittosporum undulatum* are also said to yield an essential oil of exquisite fragrance, to the extent of 2 ozs. per 100 lb. of flowers.

Oil of lavender, distilled from the plant grown in Australia, is exhibited; also oil of peppermint of excellent quality, and possessing the true flavour. The latter was at one time sent to the English market, but the price realized (25*s.* per lb.) was not such as to be profitable to the distillers.

Oil of sandal wood, distilled in Victoria from the wood of *Fusanus spicatus*, is shown, and though slightly different in odour from that of *Santalum album*, it is very fragrant and would pass with anyone not an expert for the true oil of the latter species.

Amongst other articles exhibited is the bark of *Drimys aromatica*, a veritable pepper bark, whose pungent taste is almost unbearable. The chemical relationship of this pungent principle to those already examined by Dr. Thresh might prove worthy of investigation, seeing that it belongs to an order (*Magnoliaceæ*) far removed from either the *Piperaceæ* or *Zingiberaceæ*.

A series of the specimens above described has been most liberally promised by Mr. J. Bosisto to the Museum of the Pharmaceutical Society at the close of the Exhibition, in sufficient quantity, where possible, for chemical examination.

It is worthy of note that mineral acids and bisulphide of carbon are already prepared in Victoria in considerable quantities. Specimens of these colonial products are exhibited by the well-known firm, Messrs. Felton, Grimwade and Co.

Pandanus odoratissimus, from which a peculiarly sweet essential oil is obtained in India, is also a native of Victoria, although more abundant in Queensland, but no oil appears as yet to have been prepared from it.

It is interesting to notice amongst the specimens contributed by the Department of Agriculture, Victorian grown linseed, caraway and coriander seeds, castor oil seeds, arrowroot, almonds and olive oil. An important collection, including thirty-six of the Australian resins, kinos, and gums is contributed by Baron F. von Mueller.

New South Wales.

The exhibits of pharmaceutical products or crude drugs in this Court is comparatively a small one. A collection of tanning and other barks contributed by the Minister for Mines at Sydney includes specimens of the bark of *Alstonia constricta* and of *Tabernæmontana orientalis*, decoctions of which are sometimes sold in the colony as bitters. Sassafras bark (*Doryphora Sassafras*) contains a volatile oil, in addition to a bitter principle, and is consequently used in the form of infusion only. Hickory bark (*Acacia falcata*), which is rich in tannin, was formerly used by the aborigines to poison fish and for curing skin diseases; it seems to merit a chemical investigation. This collection also includes tanning barks derived from a tree of *A. decurrens* ten years old, from *A. binervata* five years old, and from *A. dealbata* seven years old. Twenty-four specimens of gums from the same exhibitor include those of *Eucalyptus populifolia*, *E. pilularis*, *Acacia hakeoides* and *A. glaucescens*, the balsamic resins of *Xanthorrhœa minor* and *X. arborea* and the resin of *Callitris robusta*.

A specimen of pulu or silky hairs from the base of the leaves of *Macrozamia spiralis* is also shown. This is used occasionally for mattress and couch-stuffing, but would probably act well as a mechanical styptic. Several of the timbers exhibited are described in the official catalogue as fragrant, and might possibly be worth distilling for an essential oil. Of these may be noticed *Daphnandra micrantha*, belonging to the same natural order as boldo; *Acacia pendula*, having a well-marked violet odour; yarren wood (*Acacia homalophylla*?); *Dysoxylon Fraserianum*, having a rose perfume; *Litsœa dealbata* (*Laurineæ*), *Cryptocarpa glaucescens*, and *Endiandra glauca*, belonging to the same natural order.

Specimens of olive oil and beeswax, from the Camden Park Estate, Menangee, are also shown.

New Zealand.

In this Court also there are very few articles of a pharmaceutical character, although the exhibit is a very interesting one to the general public. The elegant furniture made from the extremely beauti-

ful woods of the island can scarcely escape admiration, and the drawings of the singular volcanic basins of hot water, known as the White Terraces, which have so recently become a scene of destruction, are sure to interest visitors. Kauri gum is exhibited in great variety, also a portion of a tree showing its growth, and the formation of kauri gum in the Auckland district. The only purely medicinal exhibit seems to be that by Mr. W. C. Fitzgerald, of Wellington, who shows specimens of fluid extract of koromiko, dried leaves of *Veronica arborea*, kava kava and *Eucalyptus globulus*. Several specimens of hops and honey are also exhibited, and some extracts and alkaloids obtained from forest trees.

An edible fungus which is here shown (*Hirneola polytricha*) forms an article of considerable export to China, where it is used largely as an ingredient in soups, etc., and also as a dye for silks. It is imported from New Zealand to the extent of about 100 tons per annum. This fact suggests that other objects of Chinese commerce might be worthy of cultivation in the colonies, such as the true ginseng. A full account of this fungus may be found in a previous volume of this Journal ([3], xii., p. 866). It bears considerable resemblance to the Jew's ear fungus of this country, which is common on elder trees in damp shady places. Whale oil is another product exhibited in this court.

Visitors to this Court should not fail to see the skeletons of the gigantic extinct birds of the island, including the *Dinornis maximus*, *D. elephantopus* and *D. didiformis*, and the enormous eggs of the moa. These specimens belong to the Canterbury Museum in New Zealand, and indicate perhaps more than anything else in the Court the liberal manner in which the colony has contributed to the Exhibition, since if lost or injured on the long journey, they could hardly be replaced.

Two vegetable curiosities may be seen in this Court, one of which is the *Raoulia eximia*, or "vegetable sheep" of the colonists, so called from its occurring in large dense white tufts, which grow in a scattered manner on elevated sheep runs, and can be easily mistaken at a distance for sheep. The other is a fungus (*Sphœria Robertsii*) which grows on the larva of a moth, whence it is sometimes called a vegetable caterpillar. This curious fungus is closely allied to one (*Sphœria sinensis*, Berk.) which is highly esteemed as a medicine by the Chinese, and is fully described by Pereira in his 'Materia Medica' (vol. ii., pt. i., p. 52). The latter fungus also grows on the larva of a moth, and appears to be very scarce, since old and rotten specimens are worth four times their weight in silver. An account of both these curious products may be found, together with a figure both of the larvæ and fungi, in an early volume of this Journal ([1], ii., 591, 593). The insect on which the Chinese fungus grows is supposed to be a species of *Agrotis*, but the one on which the New Zealand species (*Sphœria Robertsii*) grows has been shown by Mr. Doubleday to be *Hepialus virescens*, a repretation of which is given in the *Pharmaceutical Journal*, [1], iv., 206. The moth is said to have been found only in the northern part of the north island.

Fiji.

The articles most largely exported from this colony consist of sugar, copra (dried cocoanut kernel), green fruits and cotton. The green fruits include limes, lemons, oranges bananas and vine apples, for which Sydney is the chief market. Nevertheless there are a few objects of pharmaceutical interest in this Court. Several logs of sandal wood from the province of Ba are shown, derived probably from *Santalum Yasi*. Ginger, arrowroot, turmeric, cinnamon, nutmegs, mace and cayenne pepper are all cultivated in these islands; they are exhibited by the Mango Island Company.

The Executive Commissioner exhibits several products, and evidently takes an interest in developing the resources of the colony. One of the more important articles exhibited by him is cinchona bark, chiefly that of *C. succirubra*. According to the official catalogue the climate of Fiji is more favourable for the growth of cinchona than even Ceylon and India, the trees thriving "with wonderful vigour and an amazing growth for their age, far surpassing anything to be seen in Asia."

From fifty trees of *C. succirubra* cut at four years old on the Savu Savu estate 188 lbs. of stem bark were obtained. Both this species and *C. Calisaya* are grown at Serua Navua and Taviuni. The trees begin seeding when only eighteen to twenty-four months old, and most of the seeds germinate on the ground where they fall. The young plants, when about eight inches high, are planted out in rows six feet by six feet apart, which give about twelve hundred plants to the acre. Lime juice, gigia nuts, and vegetable ivory nuts are exhibited.

Kava root, of much greater pungency than it is usually found to possess in commerce in this country, is shown in a variety of forms; also the large wooden shallow bowls in which the liquor is prepared, and the smaller cocoa nut bowls, with which it is ladled out. Both of these presented a polished white coat on their inner surface, due probably to the deposit of the kava resin. Candle nuts (*Aleurites*, sp.) are also a prominent exhibit, and the oil could doubtless be obtained in considerable quantity if a demand were to arise for it for soap-making, illuminating, or other purposes. The nuts themselves strung on a slender stick form an excellent torch. Dilo seeds (*Calophyllum inophyllum*) are shown, both in the shell and husked, also the oil obtained from them.

ZINC SALICYLATE.

BY F. H. ALCOCK.

Zinc salicylate appears to be coming into general use in medicine and is prescribed in the form of a solution in water. Recently several cases have come under my notice which seem to show that this substance is not of constant composition, and that it differs much with regard to solubility and other general characters. Two samples were examined: A was fairly soluble in warm water and on cooling crystallized out in the form of long needles; B did not dissolve in water so readily and in so large a proportion as A, and left behind what appeared to be zinc oxide. The filtered supernatant liquor crystallized in a similar manner to A.

By careful incineration at as low a temperature as possible A emitted an agreeable odour, assumed a pink colour as the ignition proceeded, and left a residue of zinc oxide equal to 20·8 per cent. of the amount incinerated.

B, when similarly treated, did not give off the same peculiar odour, nor did it show the same colour, but became black and left a residue of zinc oxide equal to 25·3 per cent. the salicylate taken. The price in both cases was the same.

The Pharmaceutical Journal.

SATURDAY, SEPTEMBER 18, 1886.

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POISONING BY SQUILL.

SOME months ago a very remarkable case of poisoning of several children occurred at Nottingham, which attracted considerable attention at the time because of a suspicion that some mistake had been made in the preparation of a medicine that had been given to the children for whooping cough. This was a mixture containing almond oil, syrup of violets, ipecacuanha wine and syrup of squills. Two of the children who had taken it died, and the symptoms were of such a nature that it was at first supposed the fatal effect might have been due to digitalis. A very careful inquiry was instituted by the medical man holding the office of public analyst for the borough of Nottingham and it was eventually ascertained that there was no ground for supposing that any mistake had been made in preparing the medicine. In accordance with the desire expressed by the Coroner's jury, Dr. TRUMAN examined the remainder of the medicine, and, by means of physiological experiments on frogs, he found it to contain a cardiac poison which caused the heart-beats to fall, and finally to stop in systole, as was observed in the *post-mortem* examination to have been the case with the children who died. This phenomenon is a result of poisoning by only three drugs in the British Pharmacopœia, viz., digitalis, veratrum viride, and squills. In comparative experiments on frogs, ·001 gram of digitalin was injected into one, and an extract prepared from 110 grains of the medicine in question was injected into another, the result showing that in the mixture there was a powerful cardiac poison. To clear up the question whether this was digitalis, a fresh quantity of the medicine was procured from the chemist who had previously made it up, and another supply from an independent source. Another series of experiments upon frogs was then made with the extracts from both of these mixtures and with an extract prepared from 110 grains of veratrum viride. Again the presence of a powerful cardiac poison was detected in the fresh quantity of mixture obtained from the original source, but this was not the case with the mixture obtained from the other source It then remained to ascertain to which of the four ingredients of the original mixture the toxic property was due. The almond oil and syrup of violets appeared to be out of question, there being no preparation of digitalis or veratrum sufficiently thick to be mistakenly mixed up with either of the two. The choice lay between the ipecacuanha wine, into which some digitalis might have found its way, and the syrup of squills. Accordingly, some of the ipecacuanha wine and of the syrup of squills used in making up the original mixture were obtained and further experiments upon frogs were made with extracts prepared from these as well as with extracts from ipecacuanha wine and syrup of squills from another source. It was only in the case of the syrup of squills used in the original medicine that a stoppage of the heart in systole was produced, and thus it became evident that this was the toxic agent. It had also been noticed that both the syrup of squills used in making the original medicine and the mixture itself were much more bitter than those obtained from the other source. After repeating these experiments in order to eliminate any possible error arising from differences in the physical conditions, and to ensure better comparison of the results, it became evident that 110 grains of the mixture in question, or 45 minims of the syrup of squills, contained a dose of the toxic agent more powerful than ·015 grain of digitalin, causing in a frog a cessation of the heart's action in twenty minutes, whilst the digitalin took twice that time to produce the same effect. Hence it was inferred that the dose of the original mixture given to the children would contain a dose of the toxic agent equal in potency to one-sixtieth of a grain of digitalin, or ten minims of tincture of digitalis, a full dose for a child.

In all the experiments the action of digitalin, of the mixture, and of the syrup of squills on the frog's heart was identical. The first change was an irregularity in the contraction of the muscular surface, part contracted and part did not; the systole gradually became lengthened in duration and recurred less frequently, until at last the diastole never supervened, the heart becoming tetanized, this final contraction coming on suddenly. In the experiments with veratrum viride a marked distinction from the action of digitalis or of the syrup of squills was recognizable, the voluntary and reflex movements being the first to cease and the heart the last to die in veratrum poisoning; while in digitalis poisoning and in poisoning by squills, as ascertained by the experiments, the heart is the first to die, respiratory and other muscular movements continuing for some length of time after the heart's action has ceased. Another result of considerable interest was the fact that the action of syrup of squills obtained from three different sources differed very materially, in one case the heart-beats only fell from 38 to 36 in forty minutes, in another they fell from 31 to 10 in forty-seven minutes, while in the case of the syrup

used in the medicine in question the heart-beats fell from 36 to cessation in thirty-eight minutes.

Of the other cardiac poisons which cause a final arrest of the heart in systole most of them may be excluded from consideration in this case as being most unlikely to be found in a chemist's shop, perhaps with the exception of *Convallaria majalis*. It has been suggested that some bulbs of this plant may have been accidentally mixed with the squills used in making the syrup. But Dr. TRUMAN doubts the probability, and he concludes that the toxic agent was really syrup of squills of exceptional strength, though no evidence of want of care in preparing it could be found. So far as the suspicion of digitalis is concerned it is also worthy of note that some of the symptoms produced by it were not present in the cases now referred to, viz., insensibility and dilatation of the pupils, the *post-mortem* appearances being consonant with what little we know of squill poisoning, and of those observed the following have been mentioned by authorities: paralysis of the legs, by ORFILA, PEREIRA, FAGGE, and STEVENSON; nausea and vomiting, by ORFILA, CHRISTISON, PEREIRA, FAGGE, and STEVENSON; drowsiness, by ORFILA and CHRISTISON; sudden accession of death, by ORFILA, FAGGE, and STEVENSON; hurried respiration, by ORFILA and PEREIRA.

It may be useful as well as interesting to supplement the account of this case with some reference to the present state of our knowledge as to the constituents of the squill to which the names of scillipicrin, scillitoxin and scillin have been given by MERCK, who several years since undertook the investigation of this subject in consequence of the unsatisfactory nature of the preparation then bearing the name of scillitin, which was considered at least to contain the active principle of squills in a concentrated form. The three substances which MERCK obtained were at the time employed in some physiological experiments made by Professor HUSEMANN, of Göttingen, and the following results were obtained:—

Scillipicrin, a yellowish-white, amorphous powder having a bitter taste, hygroscopic and very soluble in water: it has a definite action upon the heart, causing a slackening of the beats and eventual cessation in diastole with a sufficient dose which was found to be for frogs from ·01 to ·02 gram.

Scillitoxin, a cinnamon-brown powder, insoluble in water and ether, but soluble in alcohol. The alcoholic solution has a lasting bitter and burning taste. This substance in a dry state has a powerfully irritating action upon the mucous membrane of the nose. Aqueous solutions of the alkalies dissolve scillitoxin readily, but not completely. Concentrated sulphuric acid gives with scillitoxin a red coloration, which afterwards becomes brown. This substance was found to act upon the heart much more powerfully than scillipicrin, one-eighth of a milligram sufficing to bring the heart of a frog to a standstill, and it also differed from scillipicrin by causing the stoppage in systole.

Scillin, a pale yellow crystalline powder, tasteless, sparingly soluble in water, but soluble in alcohol and in boiling ether, from which it is again deposited in a crystalline state on cooling. It is less active than either of the other substances obtained from squill, but it appears to produce the injurious subsidiary effects of squill, such as numbness, vomiting, etc.

The free solubility of scillipicrin in water admitted of its being easily administered by subcutaneous injection, but the very sparing solubility of scillitoxin prevented this mode of administration. However, when this substance was introduced under the skin of frogs in the solid state it was rapidly absorbed. MERCK came to the conclusion that in these two substances reside the chief active properties of the squill, and he considered that their very marked antagonism in paralysing the heart—one causing cessation in diastole and the other in systole—might be taken as proof that neither the extract of squills, the so-called scillitin, nor even the squill itself present the best form for administration, but that the use of the active constituents in a separate state was to be preferred. The cases of poisoning above referred to also serve to show that the use of preparations of squill is not devoid of danger, and that under certain conditions the amount of the toxic constituents in this drug may be so large as to require more adequate provision for regulating the strength of its preparations.

From the Third Annual Report of the Comptroller of Patents, Designs and Trade Marks, it appears that there were 176 trade marks registered during the year 1885 in respect to "chemical substances prepared for use in medicine and pharmacy," bringing the total since the passing of the Act up to 1634. The total number of applications for trade marks during the year was 8026, being an increase of 922 as compared with the previous year. During the same period 4776 marks were advertised and 4332 marks were registered. A large balance of applications were, therefore, evidently unsuccessful. In fact, as many as 3232 applications were demurred to, the applicants being offered a hearing by the Comptroller according to the provisions of the Act. But of these 1853 applicants abandoned their applications without further effort, while of the 1379 who attended hearings only 114 were successful in getting the trade mark applied for registered. The year's receipts at the trade marks registry branch amounted to £7032.

* * *

During the recent Pharmaceutical Conference at Birmingham it was pretty broadly hinted that the educational facilities available for pharmaceutical students in that town are not so well appreciated as they ought to be. It may be hoped that this indifference does not extend to the evening classes organized in connection with the Midland Counties Chemists' Association, which will commence a fresh session on Monday, October 4, since they have the

advantage of supervision by practical pharmacists, and the arrangements seem to be very convenient and comprehensive. Besides a Preliminary Class meeting on Monday and Wednesday evenings, there are "Minor" courses on Chemistry and Chemical Physics (Mr. Stokes Dewson), Botany and Materia Medica (Mr. F. H. Alcock), and Pharmacy (Mr. G. E. Perry, and "Major" courses on Chemistry and Physics and Practical Chemistry (Mr. A. E. Robinson), and Botany and Materia Medica (Mr. Stokes Dewson). Further particulars may be obtained from the Honorary Secretary to the Association. Mr. Charles Thompson, 159, Stratford Road, Sparkbrook, Birmingham.

* * *

Instruction adapted to the requirements of pharmaceutical students is also given in both day and evening classes at Owens College, Manchester. In the day classes the first year's course is devoted to Theoretical and Practical Chemistry and Botany, and the second year's course to Pharmaceutical Chemistry, Materia Medica, Pharmacy and Dispensing and Laboratory work. Particulars may be obtained from the Assistant Lecturer, Mr. W. Elborne, at the College.

* * *

We understand that the Leicester Chemists' Assistants and Apprentices' Association has been merged in the Leicester and Leicestershire Chemists' Association, of which Mr. J. G. F. Richardson is President. Rooms for the Association have been taken at St. George's Chambers, Grey Friars, Leicester. It is intended that the members shall dine together on Thursday next, the 23rd inst.

* * *

The first examination held by the Pharmacy Board in Queensland has been followed by the appearance in the *Brisbane Courier* of a letter from an unsuccessful candidate, complaining of the stringency of the examination and especially of the questions relating to botany. This has called forth a reply from one of the examiners which, however questionable in policy, appears to demolish the complainant's case. Mr. Ellison says the only question to which any plausible objection could be raised was, What are phyllodes? But as these organs are so essentially Australian he thought it appropriate. He continues, "Quite a quarter of the candidates, and, I believe, many more, did not know that the potato was a tuber, or that an onion was a bulb, or what were the names of the different parts of a flower, which was the calyx or the corolla, the petals or stamens." Only one man knew what a corm was. One can hardly understand how these men could have pretended to possess any knowledge of botany, and Mr. Ellison seems justified in remarking that it would be impossible to set any paper in botany that they could answer.

* * *

The "Priestley Scholarship" of the value of £50 per annum, tenable for two years, which is granted biennially to a student in chemistry of the Birmingham and Midland Institute, has just been awarded to Mr. H. Holbsche, a pupil of Mr. G. E. Perry, pharmaceutical chemist, Edgbaston.

* * *

It helps us to realize the wonderfully rapid growth of some American cities to learn that the first person to open a drug store in Chicago—a Mr. Carpenter—died only last month.

British Pharmaceutical Conference.

TWENTY-THIRD ANNUAL MEETING.

(*Continued from page* 222.)

Tuesday, August 31.

The next paper read was on—

Ulexine: Its Extraction, Characters and Tests.

BY A. W. GERRARD, F.C.S.,

Teacher of Pharmacy, University College.

The first notice of Ulexine appeared in the *Pharmaceutical Journal* of August 7 last, where it was stated that it had been extracted by the author from the seeds of the *Ulex Europæus*, or furze, and proved to be a powerful organic base; a few of its characters were given and some crystalline salts that had been obtained were mentioned. Since the above communication a much larger quantity of the base has been made, the method of extracting it improved, its characters and those of its salts more minutely examined.

In my first experiments much of the ulexine was found to have been left in the oily matter of the alcoholic extract, water imperfectly dissolving it, hence the yield was low. With the object of preventing this loss, or recovering the base from the oil the following experiments were made:—Portions of crushed furze seed were macerated in water, acidulated water, and a mixture of equal volumes of alcohol and water; but in each case the mucilaginous matter of the seed gave such viscous mixtures as to render those solvents practically useless, so the experiment was abandoned.

A small portion of the seed was next percolated with petroleum ether, which removed the oil free from ulexine; percolation now being continued with alcohol the tincture on evaporation gave an extract yielding the base to water, but yielding it more freely to water containing hydrochloric acid. Finding that hydrochloric acid was a good solvent of the ulexine, I determined to try its effect on the oily alcoholic extract, and found that when this is shaken several times with 1 in 1000 hydrochloric acid the ulexine is completely removed in a condition well suited for further operations. On the foregoing results the following process is based, and gives at the same time the details of a working:—

Twelve kilograms of crushed furze seed was percolated to exhaustion with 84 per cent. alcohol; the percolate on distillation gave 916 grams of extract, which separated on standing into a porous brittle resin intermixed with much fixed oil. The extract was warmed and well shaken with six successive litres of 1 per 1000 hydrochloric acid; the separated mixed acid fluids were carefully made neutral with sodium carbonate, filtered and evaporated to one litre. On setting this aside for twenty-four hours it deposited much resin, from which the clear liquor was decanted and further evaporated to 500 c.c., and when cold treated with excess of caustic soda, then shaken well with three successive portions of chloroform. The separated and mixed chloroform was well shaken with dilute hydrochloric acid, which gave the ulexine in solution as a hydrochlorate; on evaporation it formed crystals. Whilst shaking the hydrochloric acid with the chloroform, a hitherto unobserved effect was produced; a peculiar milkiness developed itself in the chloroform, rendering it quite opaque. This peculiarity I attribute to the formation of minute particles of solid hydrochlorate of ulexine, which become mechanically attached to the chloroform; for on shaking with plenty of warm water the chloroform is restored to its original state, and the water found to contain hydrochlorate of ulexine. To obtain free ulexine in a condition of purity it is requisite to purify the hydrochlorate by several crystallizations from water, powdering, then washing the crystals with absolute alcohol; on re-solution in water the pure base is extracted by soda and chloroform. If the separated chloroform be allowed to evaporate spon-

taneously, compact masses of long crystals are formed, but if evaporation be done rapidly, as over a water-bath, a granular powder is the result. An experiment was made to remove the ulexine from the liquor made alkaline with soda, by means of other solvents than chloroform. Neither ether, benzine or benzole proved of any use; amylic alcohol was found a fair solvent, but not so good as chloroform.

The yield of ulexine by the new process was ·191 per cent. calculated on the seed, showing an increase of 33 per cent. on my first working. The result is satisfactory so far as the use of the hydrochloric acid is concerned, showing it to be a valuable solvent where alkaloids have to be separated from fats. In using the word solvent, I do not wish to create the impression that the hydrochloric acid has merely a mechanical action; no doubt in the present case it displaces an organic acid, itself uniting with the ulexine. There is some evidence in favour of this view, as after shaking the oily matter with the hydrochloric acid, the separated and washed oil slowly deposits an amorphous resin of distinctly acid character. To this acid body I provisionally give the name ulecic acid, reserving it for future investigation.

The bark and young tops of furze were both examined, and found to contain ulexine, but in much less quantity than the seed; the very young herbaceous green tops, as eaten by cattle, gave a very small proportion of the base.

Searching for a reagent to distinguish ulexine from other alkaloids one was soon found in ferric chloride, with which the pure base and all its salts give a deep red colour. The proper method of applying the reaction is to place a small solid particle of a ulexine salt on a white porcelain surface, adding a small drop of ferric chloride from a glass rod. There are other properties which particularize the base; it is soluble in its own weight of water, quite insoluble in pure ether, also slightly hygroscopic. Among the salts of ulexine, so far as they have been made, the finest crystals were yielded by the nitrate, hydrochloride, hydrobromide, sulphate and platino-chloride. The nitrate crystallizes from water in large oblique prisms, some of which are more than a centimetre in length; it is soluble in ten parts water, almost insoluble in alcohol. The chloride also forms prisms, more soluble in water and alcohol than the nitrate. The platinochloride is made by mixing solutions of the two chlorides, when it falls as an abundant yellow precipitate, dissolving easily when gently warmed, the solution on cooling rapidly depositing groups of fine crystals. Several grams of this salt have already been made for analytical purposes, the ease with which it forms crystals is fortunate as insuring its purity.

In view of galenical preparations of ulex seed being required, though not fully prepared to give formulæ, a few remarks may be ventured under the head of its pharmacy. Water is not a good solvent for the seeds. Rectified spirit gives an extract of far too oily a nature and soft consistence to be practically useful. An alcoholic liquid extract is also open to objection, it would give very unsightly turbid mixtures on dilution with water; for the same reason a tincture is not to be recommended. It is my opinion that the best preparation is to be obtained by washing the alcoholic extract with dilute hydrochloric acid, as done in making the alkaloid, then neutralizing the acid fluid with soda, finally evaporating till one weighed pound of the seed gave 12 fluid ounces of extract, and making this to 16 fluid ounces with spirit. In such a preparation most of the useless insoluble matter, which in many cases goes to make our liquid extracts and tinctures incompatible, inelegant and unnecessarily nasty, would be excluded, whilst the presence of the active principle would be fully insured.

A vote of thanks having been passed to Mr. Gerrard,

Mr. NAYLOR said it seemed somewhat remarkable that while *U. Europæus* should have been so carefully examined chemically with a view to ascertain its nutritive properties, and while a large percentage of nitrogen should have been found in the plant, no previous chemist should have thought it worth while to search for an alkaloidal substance. No doubt many present had had an opportunity of chewing a little of this *Ulex Europæus*, but he had never found that distinct bitterness which would have led him to expect the presence of an alkaloid and it would interest him to know what had induced Mr. Gerrard to search for a substance of this kind. A certain process was recommended for the preparation of this alkaloid, and special stress was laid on the point that there would be left behind all the useless extractive resinous inert matter, but he should like to know whether Mr. Gerrard had sufficient evidence to warrant that assertion. Had it been in any way proved that the ulexine was the physiologically active principle of the *U. Europæus*?

Mr. HOLMES asked if the alkaloid was absolutely obtained from *U. Europæus* or from the species of which Mr. Gerrard had placed a specimen on the table. Botanists considered the two species distinct, one, the *Ulex Europæus*, being in flower in April, and the *Ulex nanus* in August. Both species remained in flower for a considerable period, so that it was often stated that furze blossomed all the year round. It would be interesting if Mr. Gerrard would carry his investigation still further and ascertain if both species contain the alkaloid. As the author of the paper had alluded to the pharmacy of the subject, he should be glad to know whether any experiments had been made by Dr. Ringer and others as to the action of this alkaloid. Many plants of the Leguminosæ had a powerful action, some possessing narcotic and some diuretic properties.

Mr. BENGER said he had lately noticed amongst the Welsh mountains many acres covered with a blossom which he presumed was that of *U. nanus*.

Mr. ALCOCK asked whether the seeds were ripe when treated, or in what stage; secondly, had Mr. Gerrard conducted a process of combustion, and, if so, what was the formula arrived at; thirdly, as this was a Leguminous plant, closely allied to broom, might the alkaloid not be related to spartine. Mr. Gerrard had spoken of an oily liquid, and spartine had that characteristic.

Mr. GERRARD, in reply, said the history of the investigation was briefly this. He was purchasing a few seeds for his garden, and seeing a large bag of furze seed he took up some and chewed it, and it struck him there was something peculiar in its taste. He found it produced a peculiar sensation in the mouth, and a slight sensation of numbness on the tongue. He, therefore, purchased sixpennyworth of these furze seeds, took them home, and got sufficient alkaloid to warrant further experiment. With reference to what he had called inert matter, he did not suppose it was altogether inert, but the object of preparing a pharmaceutical preparation was to get into it the whole of the definite and active principles on which one could rely physiologically, and that was his aim in working out this process. With regard to its physiological action he had only recently obtained the alkaloid, and he could only say at present that its action on frogs was to paralyse them. His examination had been confined to the seeds of the *U. Europæus*, and he believed they were ripe. He was told they were sold for distribution amongst landowners for producing a kind of undercover for game and young trees. He had brought a specimen of *U. nanus* as being of local interest. He had walked long distances lately and searched closely for a flowering specimen of *U. Europæus*; singularly enough on a hill near Ambleside he found a flowering specimen high up in a sheltered position. He had not made any combustion, but had simply prepared the crystalline salts for the purpose.

An abstract of the next paper was read by Mr. Umney. It was entitled—

Notes on the Chemical Examination of the Fruits of Daphnidium Cubeba.

BY J. OLDHAM BRAITHWAITE AND E. H. FARR,

Pharmaceutical Chemists.

The occurrence some months ago of a considerable quantity of the fruits of *Daphnidium Cubeba* on the London drug market, apparently introduced under the idea that they were genuine cubebs, has enabled us to obtain sufficient for a preliminary chemical examination, and as no investigation of this nature appears to have been previously instituted, excepting a short note read at last year's Conference by Messrs. Elborne and Wilson, we have thought that possibly a few further notes thereon might prove of interest.

These fruits, kindly identified by Mr. E. M. Holmes, are not at first sight unlike the official drug, but inspection at once shows marked botanical distinctions. In form they are almost spherical, are of a dull reddish-brown colour, and have a marked pleasant odour, with a bitter aromatic taste; they are superior, one-celled, berry-like fruits, easily detached from the persistent calyx and its accompanying short stalk. The pericarp is rugose, soft and oily; the testa very hard and shell-like. The embryo is very oily. A microscopic examination of a transverse section of the integuments of the fruit shows further differences from that of *Piper Cubeba*. In *Daphnidium* the testa (A) is composed of a layer of extremely hard, elongated cells, placed with their extremities towards the axis, and having an interrupted layer of sclerenchymatous cells (B) on the exterior with a softer layer of tabular cells (C) next to the embryo. The pericarp (D) is very oily. In *Piper Cubeba* these elongated cells are not found, the testa being composed solely of hexagonal sclerenchymatous tissue.

A. Extraction by Petroleum Ether.

As a preliminary experiment 25 grams of the finely powdered drug was exhausted by maceration in a known volume of petroleum ether. A measured portion was evaporated, when it left a residue equivalent to 24·2 per cent. This residue consisted of a semi-solid unctuous mass of a deep sherry colour, having a peculiar aromatic odour and a bitter soapy taste. At 30° C. it melts into a deep amber fluid. Exposed in the melted state it gradually loses weight to the extent of 1·25 per cent. Examined under a two-inch objective by polarized light, the mass is seen to be semi-crystalline, giving indications of the presence of radiating needles.

It being evident that both fixed and volatile oils were present a further quantity of the original substance was treated for the extraction of each in sufficient quantity for examination.

Compared with the volatile oil of *Piper Cubeba* the following distinctive colour reactions were obtained.

Reagent employed.	Vol. oil Daphnidium Cubeba.	Vol. oil Piper Cubeba.
Sol. Br. in $CHCl_3$ (1 in 20).	Yellow.	Violet blue.
The same, the mixture afterwards diluted with absolute alcohol.	Canary yellow solution.	Violet blue solution.
Hydrochloric acid.	Yellow.	At first colourless, then violet.
Nitric acid.	Yellow to dull brown.	Yellow to bright violet.
H_2SO_4 and $CHCl_3$.	Rich umber brown.	Violet brown.
The same with excess of water.	Dull red brown.	Bright violet.

1. *Volatile Oil.* — Thirty-one ounces of the finely powdered drug was submitted to a current of steam; the volatile oil carried over, floating on the top of the water in the receiver, was partly removed by means of a separator, the water being afterwards shaken with petroleum ether to recover the last traces. By this means 1 per cent. of volatile oil was obtained. It is of a pale yellow colour having an agreeable characteristic odour between that of the oils of lemon and verbena. Below the temperature of 15·5° C. it is solid; it melts at 17° C. and has a specific gravity of 0·911 compared with water at that temperature. It is soluble in alcohol and in chloroform in all proportions, and is insoluble in bisulphide of carbon.

2. *Fixed Oil.*—In order to obtain a sufficiency of this body for examination a larger quantity of the fruit was exhausted by percolation with petroleum ether, by which means about 30 per cent. of oil was obtained containing, however, a large amount of resin in solution. It was found in subsequent experiments that when the fruits were exhausted by maceration only, the fatty bodies removed were much more free from resin than when percolation had been employed; the first portion of the percolate almost saturated with oil carries out with it a large amount of resin which may be subsequently precipitated by dilution with the menstruum.) On treating the semi-solid mass left after the evaporation of the petroleum ether with cold absolute alcohol a white insoluble residue was obtained equivalent to 15 per cent. of the fixed oil. This was readily soluble in hot alcohol from which it was deposited on cooling in groups of white radiating crystalline scales. After repeated crystallizations, several successive fractions had a melting point of 43·5° C. These physical characters rendered it probable that the body was lauric acid, a supposition which the determination of its saturating power, when titrated with standard alcoholic solution of potash, afterwards confirmed.

After the removal of this acid and the subsequent dissipation of the alcohol the oil again became pasty and threw out a further crop of crystals, which, however could not be removed by means of alcohol owing to their solubility in a mixture of that solvent with oil. When the mixed oils were treated with H_2SO_4, charring took place and SO_2 was evolved; with ether and a solution of sodic carbonate an emulsion was formed, CS_2 gave a cloudy solution, C_6H_6 a clear one unaffected by the addition of turpentine. The mixture was quite soluble in acetic ether and gave a slightly cloudy solution with amylic alcohol.

The presence of resins accompanying the fatty acids rendered the process of their separation and subsequent purification somewhat tedious; after many experiments the following method was found to give satisfactory results. After shaking the mixed fats with acidulated water they were saponified with NaOH in slight excess, the resulting soap was twice precipitated from solution by treatment with saturated solution of NaCl; the partially purified soap was collected, dried, dissolved in boiling alcohol and poured into cold mixture of ether and alcohol (five parts of ether to one of alcohol). After standing the precipitated soap was collected washed with ether-alcohol, decomposed with HCl, the free fatty acids dissolved in alcohol and precipitated in successive fractions as magnesium salts by means of solution of magnesium acetate.

It was found that, owing to the relatively large volume of ether-alcohol solution necessary to remove all the resin, some fatty acid was also taken into solution. The ether alcohol filtrates were therefore concentrated, and treated with powdered $AgNO_3$, the resulting precipitate washed with ether alcohol, decomposed with HCl, filtered and evaporated, when a liquid fat acid separated. This was converted into a magnesium salt and is represented as the last fraction in the list below.

The respective magnesium fractions were decomposed

and the melting points of the free fat acids determined as follows :—

	Melting point.
Fractions A. . .	43° to 45°C. = Lauric acid.
Fractions B. . .	28° to 30°C. = Capric acid.
Fractions C. . .	25° = Capric and oleic acid.
Fractions D. . .	freezes at 3°C. = Oleic acid.

Under each heading several successive fractions were examined.

The last of the series when heated with PbO formed a soap which was entirely soluble in ether, in turpentine, and petroleum. The other fractions were not obtained in sufficient quantity to permit of the determination of their saturating power by titration, but their physical characteristics are sufficient to identify them with the acids named. The lauric acid, as already mentioned, was obtained in greater quantity by separation from the alcoholic solution of the mixed fats.

The acid water with which the oil was shaken before saponification gave slight precipitates with alkaloidal reagents.

B. Extraction with Ether.

After exhaustion with petroleum ether the powder was dried and extracted by maceration with ether. By this means about 11·5 per cent. of extract was obtained consisting of a dark red-brown mass having an aromatic very bitter taste and a slight odour. Less than a decigramme gave rise to marked vomiting and purging on two separate occasions in different individuals. This effect was traced to the bitter acid resins subsequently separated. It is entirely soluble in absolute alcohol. When treated with water in the cold very little is dissolved, but the solution has a markedly acid reaction and a bitter taste.

A portion of the original extract treated with caustic soda and boiled with Fehling's solution gave a faint reduction ; when previously heated for some hours with dilute H_2SO_4 a peculiar aromatic odour is evolved, and the solution darkens in colour on adding an excess of alkali, and gives a faint reduction with Fehling's solution.

Another portion was then treated with successive quantities of dilute H_2SO_4. The straw-coloured solution thus obtained was shaken with $CHCl_3$ which removed a trace of resin. The resulting acid solution was tested with alkaloidal reagents with which it gave marked precipitates. The remainder of this solution was treated with excess of $BaCO_3$ filtered, and $Pb2C_2H_3O_2$ added to the filtrate ; the precipitate was collected and the filtrate decomposed with H_2S, filtered and warmed until all gas was driven off ; it still gave marked alkaloidal reactions, that with solution of iodine and potassium iodide being most delicate.

Having obtained these indications of the presence of alkaloid, an attempt was made to isolate it in larger quantity. 500 grams of the powdered fruit was percolated with petroleum ether and the concentrated oily percolate shaken with successive portions of acidulated water. The oil-free marc was now exhausted by percolation with ether and the concentrated ethereal percolate similarly treated with acid water ; considerable difficulty having been previously found in treating the viscid ether residue with the solvent it was thought preferable in this case to so agitate it before all the ether was evaporated. The acid solution came away nearly colourless, and it, together with that from the oil, was treated with excess of ammonia and shaken with $CHCl_3$; the residue after evaporation was dissolved in water acidulated with $HC_2H_3O_2$; $Pb2C_2H_3O_2$ was added in slight excess to this solution, and the copious lead precipitate collected and washed.

The filtrate was decomposed by H_2S, warmed, and a slight excess of AmHO added, shaken with $CHCl_3$, the resulting solution washed with water until free from the last trace of colouring matter, and then allowed to evaporate spontaneously under a bell jar. The residue consisted of a colourless varnish-like body showing no signs of crystallization, even when dissolved in ether, in which it was sparingly soluble, and the ethereal solution allowed to evaporate slowly. It is sparingly soluble in water, the solution having a very faint alkaline reaction and a very bitter taste. Neutralized with hydrochloric acid it readily gives crystals on evaporation in the form of branching arborescent needles. The acetate also readily crystallizes in needles of a very similar character. In acid solutions it gives distinct well-formed crystals with platinic and with auric chlorides.

With the following alkaloidal reagents the subjoined results were obtained with the hydrochlorate :—

Solution of iodine and potass. iodide.	Reddish-brown precipitate.
Solution of KI.	White precipitate.
Solution of ammon. phosphomolybdate.	White precipitate (permanent).
Alkaline solution potassiomercuric iodide.	Yellowish-white precipitate
Mercuric chloride.	White precipitate.

When treated for colour reactions as far as the amount of material at command would allow, the following chiefly negative results were obtained :—

With strong H_2SO_4 .	A yellowish solution.
" " HNO_3 .	A colourless solution.
" " HCl .	" "
" " $H_2SO_4 + K_2Cr_2O_7$	No marked colour reaction.
" " H_2SO_4 + Sugar	" "
" " Fe_2Cl_6 .	" "

The precipitate thrown down by lead acetate solution was next examined. It was decomposed by H_2S, filtered, and gas having been driven off by heat, the solution was treated with ammonia, when it gave a copious white precipitate consisting of minute crystalline plates. This precipitate was collected and dried over sulphuric acid, when it formed a greyish-white, odourless, tasteless powder, practically insoluble in water, but extremely soluble in faintly acid solutions, upon which it exercises feeble neutralizing powers, and from which it readily gives well-formed crystals on evaporation. In these crystals, after washing with ether, the respective acids are readily detected by suitable reagents. The hydrochlorate especially crystallizes with great ease in well-formed prisms, which decompose the ray of polarized light. With alkaloidal reagents, however, it fails to give precipitates, nor have we succeeded in obtaining crystals with platinic or auric chloride. Picric acid, however, gives well-formed crystals. A portion of this body fused with metallic sodium gave abundant evidence of the presence of nitrogen both by the prussian blue and the ferric sulphocyanate tests.

It gives negative results with all the colour reagents applied.

In applying the above tests we regret to state that our supply of both these bodies was exhausted. The quantity present in the original fruit is so small (under 0·1 per cent.), and from the fact that they are accompanied by so large an excess of resinoid bodies, difficult to obtain in a state of purity, that, to obtain a sufficiency of either to submit to ultimate analysis, a far larger quantity of material than that at our disposal would be necessary.

After the removal of the alkaloidal portion attention was directed to the resinous extract. From this, however, results of but little interest were obtained. It was evidently composed of mixed hard and soft resins, some of an acid nature, others faintly glucosidal. These we have partially separated by means of various solvents. None of them give any signs of crystallizing when neutralized separately with alcoholic potash, and after saponifying and decomposing with acid they are reprecipitated as resinous masses, the soft acid resins forming a rather permanent emulsion with water.

Ether soluble resins 11·5 per cent.
- Soluble in C_6H_6 = 4·91 per cent. Soluble in AmHO. A soft extract, and very bitter, acid, causes sickness and purging when taken in small quantities. CS_2 splits it up into two parts.
  - Soluble in CS_2. A soft sticky red-brown mass markedly acid, very bitter = 2·86.
  - Insoluble in CS_2. Pilular consistence, red-brown, slightly acid = 2·05.
- Insoluble in C_6H_6. Soft pilular consistence, dark red-brown colour, insoluble in AmHO = 6·59.

The above char with nitric acid and with sulphuric acid much more readily than the two resins subsequently extracted from the alcohol extract, and when so treated form oily drops, whereas the alcohol resins char, leaving a skeleton-like network of charred matter.

C. Alcohol Extract.

After treatment with ether, and allowing that solvent to dissipate, the marc was exhausted with alcohol, which yielded after evaporation 3·5 per cent. of residue. This consisted of a red-brown resinous extract with a bitter taste. The acid aqueous solution gave only a faint trace of alkaloidal reaction when free from resin, almost all the alkaloid having been removed by the acid resin in the ether extract; rendered alkaline, however, it copiously reduced Fehling's solution. At first, water removes but little of this reducing body, but upon standing the solution becomes of a sherry yellow colour and very bitter; the amount of reduction is not apparently increased after prolonged boiling with acid. This reducing body is not removed from acid solutions by petroleum ether or by chloroform. In alkaline solution traces are removed by chloroform, but the relative volume of the fluids and the proportion of acid or alkali present seems greatly to influence the solubility, which is somewhat evenly balanced. The simple aqueous solution of the alcohol extract, however, when treated with chloroform gave up a portion of soft bitter resin which gave a copious reduction with Fehling's solution. This would appear to be the source of the glucosidal reactions obtained.

After the removal of this body by treatment with water it was found that chloroform resolved the alcohol extract into two portions, one soluble, the other insoluble in that menstruum. Of these, the former was acid, the latter neutral in reaction. Both were of pilular consistence, red-brown in colour and bitter in taste; both are soluble in ammonia.

D. Aqueous Extract.

The residue exhausted by alcohol was dried and macerated with a known volume of water, by which means 5·8 per cent. of extract was obtained.

A further portion of the aqueous extract treated with absolute alcohol, and the resulting precipitate weighed and dried, it was found to be equivalent to 1·6 per cent. This precipitate was soluble in water.

The alcoholic solution gave no precipitate after boiling. Sugar was not found to be present in any form. Starch was present in the fruit in very small quantity.

From the above results we conclude that the following may be taken as a preliminary statement of the constituents of the fruit :—

Petroleum ether extract 24·2 per cent.
- Comprising volatile oil 1·25 per cent.
- Non-volatile fats consisting chiefly of lauric, capric and oleic acids. } 23·95

Ether extract 11·5 per cent.
- Comprising three resins separable by solvents.
- Two alkaloidal bodies, one precipitated by lead acetate, the other not.
- Traces of glucosidal resin.

Alcohol extract 3·5 per cent.
- Comprising faint traces of alkaloid.
- A glucosidal resin.
- Two neutral resins.

Aqueous extract 5·8 per cent.
- Consisting chiefly of extractive with some mucilage, contains no alkaloid or glucosidal matter. Free from sugar.

The moisture was estimated to be equal to 5·34 per cent. Upon incineration the fruits left 5·998 per cent. of ash.

A vote of thanks having been passed to the authors,

Mr. NAYLOR asked if the authors could give any specific test for distinguishing between the false cubebs and the true in mixtures of the two as they occurred in commerce. He had often applied the test of iodine to the decoction, but did not think it at all satisfactory. He gathered that it could be recognized by distillation, but if there were any specific test easily applied he should be glad to hear it.

Mr. MACEWAN said the fact that this new chemical contained an alkaloid while the true cubebs did not would be a good test.

Mr. JONES remarked that attention had also been drawn to the microscopical character of the plant.

Dr. SYMES said he was pleased to hear from Mr. Umney that these cubebs were imported under the impression that they were genuine. Drugs were frequently sent from abroad in the place of similar drugs, not with the view of substitution, but frequently because there was some resemblance, and they were supposed to possess similar medicinal properties. He remembered a case in which a quantity of pao-pereiro was sent over under the impression that it was cinchona bark, containing a large quantity of quinine. When a drug came over which had some resemblance to another the term false or spurious was immediately applied to stigmatize it, sometimes unjustly, and he feared that rather tended to prevent enterprise in the way of importing unrecognized substances.

Mr. MOSS asked if Mr. Naylor meant that a mixture of cubebs with this daphnidium occurred in commerce. He had never met with such, although he had met with a mixture of the ordinary cubebs with *Piper crassipes*, which could be distinguished by the flat pedicel and the piney odour when crushed. These could be picked out without much difficulty if you were well acquainted with the general appearance.

Mr. ALCOCK said Dr. Shillitoe drew attention to the dangerous character of this admixture, and he presumed Mr. Naylor wanted to know how to detect the mixture when in powder. He should like to know if the authors had noticed the specific gravity of the oil.

Mr. GROVES said he had recently noticed the statement that a parcel of cubebs stalks had come over, but as no one appeared to be wanting cubebs for grinding, the stalks were withdrawn. He should like to know if there was any justification for this insinuation, and if not, what the stalks were used for.

Mr. HOLMES said there was at the present time a third false cubebs in the market which had come in large quantities, and which differed in size from either of these, being larger, and having a stalk twice as long as the ordinary cubebs. With regard to distinguishing powdered cubebs, to which Mr. Naylor no doubt alluded, from a mixture with daphnidium, it would hardly be posssible to do so, except in the way Mr. MacEwan had pointed out. He had endeavoured to distinguish it chemically, but found the daphnidium gave negative tests only.

Mr. ELRORNE thought the daphnidium fruit was so

unlike cubebs, that no powdered cubebs in commerce could possibly be adulterated with it, simply because the fruit was of such an oily nature that it would altogether destroy the character of any powder with which it was mixed. The ordinary adulterant was the fruit of the *Piper crassipes*. This root was altogether so unlike cubebs that a critical examination would be quite sufficient to distinguish it.

The PRESIDENT said the point mentioned by Mr. Naylor was very important, a mixed oil was in fact coming into the market. It was much more difficult now to bring adulterated articles into the market than formerly. Many of these things were sent from abroad, with a view to ascertaining whether there was a market for them in this country, not necessarily as adulterants, or substitutes. What was done with them afterwards he did not know.

Mr. UMNEY said he would reply as far as he could to the points which had been raised. He could quite corroborate what Mr. Moss said, that there was no difficulty in picking out from true cubebs the *Piper crassipes*. In order to do so readily it was necessary to crush the fruits, and in his rounds, inspecting drugs, he invariably took a coin from his pocket, put the cubebs under the coin, and then crushed them with his heel. There was then no difficulty in detecting the presence of *Piper crassipes*, because there was a very camphoraceous odour from the powder so produced. As to this drug no one who had really examined it could mistake it for true cubebs. It perhaps could hardly be said that these drugs came in from absolute ignorance, because unfortunately they generally came in when the drug which they resembled was very dear. He had known cubebs at 25*s*. per cwt., and he had known them at £20, and it was generally when abnormally high that spurious drugs came in. With reference to the stalks which Mr. Groves had referred to, there was a large parcel offered recently for sale. By the side of those stalks were the cubebs from which they were sifted. Most people who knew how drugs were disposed of in London were aware that these stalks were simply put into the still to be worked for essential oil. Chemically there was little difference between the essential oil of the cubebs stalk and that of the fruit; not so much in fact as between the essential oil of cloves and of clove stalks. The essential oil of clove stalks was drawn to a very large extent in England and on the continent. He had never known a mixture of daphnidium with cubebs.

The last paper read at this sitting was—

NOTES ON TRADE SAMPLES OF CITRATE OF IRON AND QUININE.

BY F. H. ALCOCK.

The subject I have ventured to bring before you is one which is not new to the Conference, for in several forms it has appeared on three or more occasions at these meetings. Of former papers there are those of Schweitzer, Braithwaite, Fletcher and de Vrij, but the points which they discussed had reference chiefly to the amount and nature of the alkaloidal constituent.

During an inquiry into the cause of the variation of different samples of citrate of iron and quinine, with regard to solubility and other characters, I was led to examine specimens of the official kind which were to be found in commerce. The results of my examination of these were thought of interest and are embodied in the following notes.

Source.—The samples were procured from well-known manufacturers, and by label and otherwise were considered to be typical representatives of the B.P. (1885) kind.

Appearance.—The appearance of all was very much alike but the scales were not by any means what would be called "fine." It was also noticed that some samples changed colour much more rapidly by sunlight than others and became of a dark brown colour.

Solubility.—This was ascertained by preparing a solution containing 1 drachm of substance in 4 fluid drachms of distilled water. It will be seen from the table that two formed clear solutions and four were not so satisfactory.

Ferric Oxide.—Under this head is included the ash obtained by igniting in the ordinary way a definite quantity of material and weighing the residue. The amount obtained, it will be seen, does not vary very greatly, the lowest being F. which is 16·4 per cent., the highest being D. which is 21·1 per cent. On adding water to the residue and testing the clear liquor with litmus paper it was found that F. was strongly alkaline, while the others were but feebly so, if at all. The ferric hydrate is sometimes obtained by using sodium hydrate in place of the B.P. precipitant, but if such is the case, most of the alkali is removed during the washing process as there was little or no evidence of the presence of soda in the ash. The alkalinity of F. I am inclined to think, was due to potash, this being sometimes used to assist in the partial reduction of the ferric salt in order to impart a tinge of green to the golden yellow scales as required by the B.P.

Alkaloidal Constituent.—As the nature of the alkaloid present in my samples was not to me at the time of the first importance, I contented myself with simply estimating its amount according to the B.P. process, using chloroform as the solvent, allowing the greater portion of the chloroform to evaporate spontaneously in a current of air and then drying the solid residue to practical constancy at 212° F.

The "deficiency of alkaloid" in this preparation has been called by a prominent member of the Conference a threadbare subject, so that I hardly dare to say much on this point. The amount of alkaloid still seems to be variable, but not to a very great extent when compared with results previously published; but it is evident, presuming that the B.P. process abstracts all the alkaloid and sufficient manipulative care has been used, that there is still an imperfect understanding amongst manufacturers as to the percentage of alkaloid required by the B.P., even after the lively correspondence which has delighted the readers of our journals, and the official dictum of Professor Attfield. I may be allowed to say that I think it is desirable that tests should be adopted in the Pharmacopœia to ascertain the nature of the alkaloid, and also that we should be informed as to how and at what temperature we must dry the alkaloidal residue.

The figures obtained show an average of 14·2 per cent. of alkaloid, and we may ask, would not a standard of 14 per cent. be much more convenient to adopt and more practicable to obtain, than 16 per cent. or even the 15 per cent. as more recently authorized.

Abnormal Constituent.—Perhaps this is to me the most interesting portion of the paper. Under this name I include the presence of sulphate, for although the literature concerning this remedial agent is somewhat voluminous, yet I have not been able to find the amount or even the presence of sulphate alluded to. In all samples as may be expected, sulphate was found but in variable quantities. As the B.P. tests are silent on this part of the subject, we may conclude that the manufacturer has consent "by authority" to leave a little in the finished product, but that there should be such wide differences in amount is not so intelligible, especially when its presence in more than traces does not indicate careful manipulation during the process of manufacture. There are many ways by which sulphate finds admittance into the preparation, but it is unnecessary for me to relate them. One question, however, suggests itself to me, viz., could the sulphate of quinine be used without first converting it into the alkaloid and thus avoiding a loss of quinine which is inevitable in the official process? It will be seen in four instances that the amount of SO_3 is

somewhat high, and not far off the amount contained in the quinine sulphate used, if we suppose that the "mud" has been previously well washed. On the latter point one manufacturer is reported to have said that the B.P. authorities have retained the same vain attempt to get rid of every trace of sulphate from the ferric hydrate, but my results will show that if we cannot obtain absolute freedom from this impurity, yet we may arrive very near to that desirable state. The sample marked C. contained but a mere trace of sulphate, and as this was the best in every respect, I am of opinion that an article as free as possible from this radical is most likely to give the best results and the greatest satisfaction, *ceteris paribus*, to those who have to use citrate of iron and quinine.

Conclusion.—Since writing the above I find that Professor Prescott, of the United States, examined some samples of citrate of iron and quinine made according to the U.S.P. formula of 1870 and in them he found sulphate to the extent of less than 1 per cent. in three samples, and in three others 6·5 per cent., 3·5 and 1·3 per cent. respectively of that radical.

Tabulated Results.

Sample.	Solubility.	Ferric Oxide.	Alkaloid.	Sulphate. SO_3
A .	Clear	18·2	14·7	0·875
B .	Turbid and flocculent	20·0	14·0	1·812
C .	Very clear	19·8	15·3	0·141
D .	Clear but turbid on standing	21·0	13·0	2·386
E .	Ditto	19·0	14·6	2·467
F .	Very turbid	16·4	14·0	1·704

The PRESIDENT having moved a vote of thanks to Mr. Alcock,

Mr. UMNEY said he had had some experience in this preparation. Ten or twelve years since he pointed out that the last edition of the Pharmacopœia was in error in stating that the result after precipitation of the citrate of iron and quinine by ammonia was to give 16 per cent. of anhydrous quina. No experiment was necessary to show such was a mistake. Unquestionably it was worked out on paper and not in the laboratory, for it was presumed that if they started with 100 parts of quinine the product would be exactly 400 parts, and so it went on for years, but manufacturers well knew that 400 parts of quinine in the laboratory produced about 460 of scaled citrate, and, therefore, it was impossible that the final product should contain 16 per cent. of anhydrous quinia. This statement was left unaltered in the new edition. He challenged the accuracy of the statement, and those who remembered the position some of the authors took up on the question would also remember the result which followed, that the percentage was brought from 16 to 15. Having said thus much he was bound to stand up for the compilers of the Pharmacopœia, and to say that any citrate of iron and quinine that did not yield 15 per cent. quina had not been properly prepared. Of that he had no doubt whatever, and that the specimens here mentioned as containing only 13 per cent., and so on, of alkaloid were not properly made, and unless it arose from some accident such a practice was a disgrace to pharmacy. As the Medical Council had conceded the 15 per cent. pharmacists should be more than ever particular in insisting that the preparation should come up to what they themselves said it should be. Mr. Alcock alked if sulphate of quinine could be put in just as it was. He should say yes, repeating his statement of last October in Bloomsbury Square. If the sulphate quinine was put into ferric hydrate dissolved in citric acid the resulting preparation was fairly satisfactory; but such was not elegant pharmacy. It was quite possible to take sulphate of quinine, and to precipitate its quina on a large scale without losing some portion of the quina. He was sufficiently charitable to suppose that the alkaloid had been lost in some cases by carelessness, and that it did not result from downright fraud. With regard to turbidity, that to a great extent was due to improper precipitation of the ferric hydrate. Ferric hydrate precipitated on a large scale was not precipitated with caustic ammonia, but with caustic soda. It was put into large vats, ferric sulphate run in, stirring going on the whole time, and unless precipitation was carried on very slowly, and the alkali in excess, the precipitate would contain more or less of oxy-sulphate of iron, and the presence of this body in the final product would give a solution more or less turbid. Again, with regard to the addition of ammonia, operators were often liable to regard a strong solution of ammonia as a very definite body. Sometimes they employed it of a specific gravity of ·880, but that of the present Pharmacopœia was ·891, and in trade ammonia existed of very much greater strength than this or even ·880. If they were working during cold nights liquid ammonia was produced of much greater strength, and if an excess of ammonia by measure without estimation of its strength were put in the citrate of iron and quinine finally produced would not make an elegant solution. The subject need not be regarded in any way as threadbare, for the time had come when it ought to be looked at anew, since there was a new Pharmacopœia in which a mistake was originally made, and the authorities had now recognized that mistake. They now named a minimum of 15 per cent., and all should be on their guard. He for one should say that any pharmacist who sold citrate of iron and quinine which contained as little as 13 per cent. quina, ought to be punished, unless he could show some good cause for the deficiency.

Mr. CONROY said Mr. Alcock had done excellent service in bringing this important matter before the meeting. He had tested many samples of citrate of iron and quinine, and was surprised at the number that fell below the percentage of quinine given in the Pharmacopœia. The lowest figure he got was 12·8 out of fourteen samples, nine of them were below 14, and the others averaged a little over 15 per cent. He himself had made many experiments to see what the actual result would be, but he must say that he had never by following the Pharmacopœia process of manufacture obtained a sample which fell below 15 per cent., and he agreed with Mr. Umney that that percentage should be insisted upon. It was well known that samples which tested 13 per cent. or below 14 per cent. of quinine were those sold by manufacturers at a lower figure than that obtained for the 15 per cent. article. He always found more sulphuric acid in samples that were deficient in quinine, and this, to his mind, pointed to the fact that manufacturers who did not use the full percentage of quinine were also in the habit of adding it to the iron salt as sulphate. By that means such manufacturer would be at a great advantage as against one who followed the Pharmacopœia process.

Mr. LASCELLES-SCOTT asked whether Mr. Alcock ever found cinchonine in material quantity replacing—not chemically, but commercially—quinine. In the present year he had two samples given to him of German manufacture, in which the whole of one sample was replaced by cinchonine, and in the other about two-thirds of it, the total alkaloid in both instances not amounting to more than 13 per cent. He could quite confirm the last speaker that if made according to the Pharmacopœia process 15·3 or 15·4 was about the lowest percentage of quinine it should have. Out of twenty-two samples examined last year five were sufficiently near the standard, and the rest varied from only 4 per cent. to about 13.

Mr. H. W. JONES said from some little experience in this matter he could quite bear out what Mr. Umney and Mr. Conroy had stated. There was no difficulty in obtaining a product which should contain 15 per cent. He was rather struck with the fact that out of six samples purchased from different sources only one reached the

standard, and he should like to know if Mr. Alcock drew the inference that the citrate of iron and quinine as supplied by wholesale houses generally to retail druggists fell below the mark. He was well acquainted with samples supplied by three manufacturers well known in the trade, and he never in any instance found them to fall below 15 per cent.

Mr. ALCOCK said he was pleased to hear that the majority of speakers confirmed him that the samples were not up to standard. If Mr. Jones would tell him the source from which he obtained the three samples he referred to he should be very pleased to examine them so as to make his list complete. With regard to Mr. Scott's remark he might say that he had carefully avoided the examination of the alkaloidal residue. With regard to Mr. Jones's question he did not draw any inference—he simply stated the facts.

The Conference then adjourned.

Wednesday, September 1.

The PRESIDENT took the chair at ten o'clock. The first paper read was—

THE CORRELATION OF STUDY IN BOTANY AND MATERIA MEDICA.

BY W. HILLHOUSE, M.A., F.L.S.

Standing, as the pharmacists of this country hope and believe they do, not far from the brink of a great change, which will not merely alter the conditions of pharmaceutical study, but will greatly affect, and for the better, the status of the pharmacist, those responsible for pharmaceutical teaching have no doubt brought their matured experience collectively to bear upon the question of how best to plan out the future pharmacist's student career. Far be it from my thoughts to venture to teach to them what they are infinitely more competent to teach to such as I am. The fact of an outsider approaching at all such a subject as this may savour not a little of impertinence; but on the other hand it has been often recognized that nothing is lost by a subject being approached from many sides, and that the wider the angle from which two incident views are taken of any subject the more likely is it that the consideration will be comprehensive.

Perhaps it may still further help to disarm, not criticism, but hostility, if there be any, if I lay the responsibility for the germ of these thoughts upon the shoulders of a past president of this Conference, but a few short months ago borne to his last rest. Some two years ago the late Mr. W. Southall was, so far as his enfeebled health would admit, an earnest worker in the Botanical Laboratory, close by the room in which we are now assembled. While our intercourse opened up a wide field of investigation for him, it equally opened up a new field of thought for me,—thought which has practically germinated into this contribution to your Conference.

I take it that the main object of that curriculum at which you are aiming is *thoroughness*. Only by the way of the thorough student can one expect to become a thorough pharmacist. But life is short, a student's years, that is his years of systematic and trained study, are quickly told, while the realm of knowledge is ever broadening, the horizon in which ignorance and mystery dimly blend is being ever pushed further and further back. How, then, this great principle of thoroughness can be recognized, without unduly sacrificing the student's years, is a question deserving of the most anxious thought and keenest scrutiny.

I cannot help thinking that the changing times have not been sufficiently recognized by teachers of science. Time was, and not so very remotely either, when the sciences were thought of and spoken of as so many distinct and differing studies. But as research has at the same time broadened and deepened our knowledge the interdependence of all branches of scientific investigation has become increasingly manifest. Twenty years ago the botanical teacher was tolerably happy with his magnifying glass and, perhaps, a microscope; to-day he ought to be not merely microscopist, but chemist and physicist as well. The physicist tries still to occupy an independent position, but I cannot help believing that many of the phenomena of light, for example, would be far more firmly fixed in the student's appreciation as solid realities by seeing the effect of light rays on the vegetable organism, than by the most complex physical apparatus. To use a common but understandable phrase, the teachers of science have largely failed to "play into each others' hands," with the result that the students have largely failed also to grasp the fundamental truths of the correlation of sciences.

One cannot have been engaged in teaching botany for a decade of years without realizing what an admirable ground it is for experimenting upon these general principles, and finding out to what extent they are solidly founded. Not only is it by far the best known direction in which to become initiated into the difficulties of microscopical manipulation, but it gives also a broad field for chemical and physical experiment. In recent years methods of teaching have become increasingly more and more biological and experimental. Facts are no longer laid down empirically, but reasons are studied alongside of them. Structure is now studied side by side with function, the two mutually explaining each other,—and this both with external morphology and internal anatomy.

It is manifest that the plant has two great fundamental groups of functions, the one vegetative, tending to support the life and enable the growth of the individual, the other reproductive, for maintaining the continuity of species. Of these the former is the earlier, and involving the absorption and assimilation of food materials, probably food storage, secretions and excretions. In each of these functions the plant is dependent upon external conditions, quantitative and qualitative — light, heat, gravity, moisture, and each of these conditions is capable of isolation and separate experimentalization, both as to quality and quantity. But, given the conditions, the results depend on the nature of the plant itself, upon its structure and inherited tendencies. You may supply the motive power and the raw material, but the work done, the waste, and so on, will depend on the nature and quality of the machine, and the perfection of its structure.

Teaching must therefore be—1, experimental; 2, microscopical.

It is not possible to understand how the plant machine does its work without studying the structure of its chief working parts, especially, that is, the leaves, and secondarily the roots and stems. And, just as in the engine there is a certain construction which is essentially mechanical, a framework, that is, the purpose of which is to keep the actual working parts in their proper positions, in similar wise it becomes necessary to study in its general principles the mechanical structure of the plant.

But when this is done there still remains the question of the continuity of species, and this involves a study of spore, flower, fruit and seed, in addition to the general vegetative structure. Cases there are in which vegetative and reproductive life exist apparently simultaneously, and the student, beginning with these, might be led up step by step to the cases of flowering plants as generally studied, in which it is manifest that the two kinds of reproduction existing in them are separated either by time or by space, and it would perhaps hardly need a backward review to suggest to the student that such separation was, in time at least, probably universal.

Although I have thus far, and most cursorily, confined myself to the teaching of botany from the point of view of its scientific study and its value in scientific training, I shall, I hope, show you before long that this is not alone in my thoughts. To the pharmaceutical student botany is largely a means to an end, and that end the study, systematically and intelligently, of some portion of the

heterogeneous subject known as materia medica, and the real aim of this discussion is to see how by his botanical studies the student can be best armed for the attack, scientifically and not in desultory wise, of this (may I call it?) Giant Despair.

I am not in a position to say to what extent materia medicists are satisfied with the present method of teaching that subject. The collective wisdom of the conjoint colleges of physicians and surgeons has ordained that a branch of knowledge which most ordinary beings would consider to be dependent on prior chemical and botanical training shall henceforth, while retaining its chemical, be deprived of its botanical basis. But, according to the same collective wisdom, therapeutics—the physiological action of drugs as the basis of medicine—can be and has to be satisfactorily taught during the first year of the student's career! A body of men capable of such an intellectual monstrosity would be capable of anything—even, like the wise ones of Gotham, of cutting off the limb of a tree between themselves and the trunk.

Taking the knowledge of drugs collectively, the following appears to be a strict classification of what is required for a scientific knowledge of them and their action, such as ought to be at the command of one who has intelligently to handle them. In this classification again I deal only with the vegetable side of the question, but the parallelism of the other groups is readily manifest:—

(1.) Characters and means of recognition of the crude drug, including,

(*a.*) External appearance, feel, [taste], smell, weight, etc.

(*b.*) Microscopical characters and tests.

(*c.*) General adulterants and mode of detection.

(2.) To know whence and how the drug is obtained.

(3.) The general properties of the crude drug, and the source of its special properties, *i.e.*, its active principle, treated generally.

(4.) To know the method of development of the drug itself, so far as practicable, and the nature, anatomical and developmental, of the structures whence it is obtained.

(5.) The preparations in which the drug forms a part, the processes of preparation and their *rationale*; methods of manipulation, etc.

(6.) The doses of the drug and of its preparations.

(7.) The physiological action of the drug and its preparations.

Now the most cursory glance at such a scheme of classification will tend to show that there is work here, not for one individual of universal attainment, but, for at any rate four specialists. Including chemistry, but excluding zoology, the groups (1) to (4), as above, giving the groundwork for the residue, appeal especially to the chemist (proper) and the botanist; groups (4) and (5), including posology, appertain to the pharmacist; group (6), the old therapeutics, belongs to the physiologist. If it be a rational principle in education to give to each teacher that portion of teaching for which he is best qualified, the old, especially medical, conception of how to teach "materia medica" should be rooted out, and if the title itself were lost science would be not much the worse. Pharmacognosy could well replace it, with pharmacogenesis as a handmaiden, and pharmacy, posology, and therapeutics retaining their present position.

For our future considerations we will naturally confine our attention to pharmacognosy and pharmacogenesis.

In the theoretical scheme as laid down above I shall probably be asked if I recognize the continued existence of two stages of students in botany and pharmacognosy respectively. It appears to be both natural and essential that such should exist, for the encouragement of specialism and intellectual conflict, if for no other reason. But will you pardon my saying that I do not recognize the right or propriety of suppressing *principles* in the earlier stage. I would make the earlier teaching broad, even, and it may shock the prejudices of some of this audience, at the expense of its being somewhat shallower. The deepening of the teaching, accompanied, as it of necessity is, by still further broadening, I would leave for the higher grade. To use the power of thought and reasoning, this is a prime factor in true education, and I would rather have a man who thinks wrongly, than one who does not think at all. There is hope for the one, none for the other. Once get principles and reasons well grounded, and facts marshal themselves. Facts without reasons, are like a fleet of vessels without crews, capable of no concerted and intelligent action, but nevertheless readily capable of mutual destruction.

Thus I would attempt something as follows for the student of the earlier grade:—

1. Macroscopic characters of all important drugs.

2. Microscopic characters of the most important drugs.

3. General recognition of adulterants, not specialized.

4. Plants and countries from which the most important drugs are obtained, with a practical knowledge where practicable, and the natural history of some of the most important plants.

5. Mode of origin of a few typical drugs, as castor oil, an ethereal oil, a resin, opium, etc.

Similarly, for other branches of the subject, taking the mode of extraction of typical drugs, so as to cover all the general methods, and so on.

The second grade I would suggest should be an amplification, and accompanying deepening, of the first, with closer specialization, and more detail.

If now we bring into schedule form the subject of botany it will render clearer our purpose.

In the first or earlier stage I would include,

(1.) The natural history and biology of plants.

(2.) Structure of the most important parts, especially—

(*a*) Leaves, their anatomy and development.

(*b*) Floral organs and fruits, including the seeds, and micro-chemistry of the reserve food materials, and the chief cell-contents.

(*c*) Roots and stems.

(*d*) Bark, glands, and other secretory organs.

(3.) Systematic botany, including—

(*a*) Principles and objects of classification, and application of biology as above.

(*b*) Chief natural orders, especially those of economic or biological interest and importance, and the most important or illustrative plants they contain.

The second stage would be an amplification of this.

Every practical botanist will now at once recognize that it is quite possible to teach the subject of botany, especially in its anatomical and practical side, in such a way, and with such illustrations, as shall very materially help the student in his future work, without in any way militating against the thoroughness of his botanical training proper. It will, however, place the matter more clearly if I venture to add one more schedule, giving a list of plants, or of parts of plants, just as fully suited for microscopical study as those at present used, and yet which, as you will see, are entirely taken from the pages of a current 'Materia Medica.'

Roots.—*Aconitum Napellus.*
Glycyrrhiza glabra.
Taraxacum Dens-Leonis (also latex vessels).
Rhizome.—*Podophyllum peltatum.*
Corm.—*Colchicum officinale.*
Stem.—Twigs of *Solanum Dulcamara.*
Shoots of *Rosmarinus officinalis.*
Bark of *Daphne Laureola* or *D. Mezereon.*
,, *Salix Caprea.*
,, *Ulmus campestris* (stem also).
,, *Quercus pedunculata* (including tannin).
,, Flowering tops (♀) of *Cannabis sativa.*
Stem of *Pinus Pinaster* (including resin passages).
Saccharum officinarum (including wax).

Leaves.—*Thea sinensis* (incl. isolated branched idioblasts).
Ruta graveolens (incl. lysigenous oil-glands).
Prunus Lauro-cerasus.
Eucalyptus globulus (oil-glands and wax).
Rosmarinus officinalis.
Aloe barbadensis or *A. Socotrina.*
Inflorescence.—Catkins of *Humulus lupulus.*
Fruit of *Ficus carica.*
Petals.—*Papaver rhoeas.*
Stigma and Style.—*Crocus sativus.*
Fruit.—Capsules of *Papaver somniferum* (also latex system).
Citrus Aurantium (or *C. communis*, if possible).
Rosa canina.
Amygdalus communis.
Carum Carui (including, also, resin glands).
Triticum vulgare.
Seeds (often including fruits).—*Sinapis nigra* or *S. alba.*
Linum usitatissimum.
Strychnos nux-vomica.
Ricinus communis.
Areca catechu.
Gall.—Oak.
Entire plant of *Helleborus fœtidus*, including rootlets, leaves (morphology, including bract transition), flower, development of pollen, ovary, development of ovules, etc.
Filices.—*Aspidium filix-mas* (for anatomy, young plants).
Lichenes.—*Cetraria islandica.*
Fungi.—Sclerotium of *Claviceps purpurea.*

This list at least furnishes a skeleton which other, and more experienced, teachers could clothe with flesh and blood, and thus provide a basis for that common understanding between teachers and taught which would lead to the great desideratum which I hypothecated in commencing, viz., compactness combined with thoroughness.

I have, as you will have observed, only incidentally touched upon the recent exclusion from medical training of that branch of knowledge to which it is little or no exaggeration to say the practice of medicine owes its very existence. It is difficult to approach a matter in which one has pecuniary interests, however trivial those interests may comparatively be, without laying one's self open to the accusation of allowing interest to bias opinion, —an answer coming always very readily from those who have none other to give. But underlying this matter there is a grave principle at stake. Is it, or is it not, true that from the vegetable kingdom the physician draws, and will probably continue to draw, his most potent drugs, his most certain remedies, his only specifics? Is it, or is it not, true that the most valuable amplifications of medical knowledge, in the way of new modes of treatment, and of the ability to grapple with hitherto omnipotent forms of disease, have been, and increasingly are, most closely associated with a knowledge, a practical knowledge, of the phenomena of plant life? If this be true, is it not mortgaging the highest possibilities of the future for a mess of pottage to risk in even the smallest degree the powers of a grand profession for the sake of some fifty or sixty hours gained by excluding the subject of botany from the medical student's curriculum? Or at least let the medical authorities be consistent, and, by excising equally the subjects of chemistry, botany and physiology, the conjoint basis of medicine, send their students out armed with power of life and death, but without even the shadow of a preliminary scientific training.

The PRESIDENT proposed a vote of thanks to Professor Hillhouse for this very interesting and suggestive paper, which commended itself to every student of plant life in connection with materia medica.

Dr. TRIMEN said he had listened with very great interest to this paper, and would venture to make a remark on one or two points, although he agreed generally with the author. With regard to the title materia medica he would suggest that the term pharmacology should be used instead. Those engaged in pharmacy should remember that the study of drugs was especially the branch which pharmacists must follow very thoroughly; but for medical education this was much less important, and he should be glad to see the materia medica course entirely abolished in the education of medical students, and its place taken by therapeutics. The more the action of drugs was separated from the mere knowledge of their origin and structure the better it would be, and he should be very well satisfied if therapeutics were taught in medical schools, and not pharmacology at all. Botany was a different matter altogether, though he did not altogether agree with Professor Hillhouse in the remarks he had made with regard to the elimination of scientific botany from the ordinary curriculum of medical students. They must look a little at the history of the question, and the different position which the science of botany held now in the medical profession and pharmacy to what it did formerly when botany first became a part of the medical curriculum. In those days medicine was considered to be almost founded on botany. He was old enough to remember when the kind of botany taught to medical students consisted of recognition of the kind of drugs used in medicine; but he did not consider that very important for medical men to know. Of course it was soon recognized that that was not the kind of botany that ought to be taught, and then there was an attempt to teach in the ordinary summer session of the medical schools a complete course of botany. Of course, this was utterly impossible, but in London alone some fifteen courses of lectures were delivered at medical schools, and they each professed to give a complete course of study. The thing was absurd, and he, himself, when he used to lecture at St. Mary's, thought the course was altogether unworthy of the subject, for it was not possible to teach botany as it ought to be taught with the means at their disposal, or the time given to it. During this time botany was making enormous strides, and became more and more a separate science, and at last it was thought that to attempt to teach the whole of such a subject in the medical school was a mistake. If men wished to go in for the science of botany they might do so, but it was impossible to make it a necessary part of medical school education. In former days science was looked upon entirely as an appendage to medicine; all scientific men were medical men, their training was that of medical men, and they took to science afterwards from a predilection for it. But that state of things was now gone by, and science was a separate profession with separate teachers, and a separate mode of teaching, and, therefore, he could not altogether regret that pure botanical science was lost from the medical curriculum. He should be glad to see medical education confined to anatomy, physiology, pathology and therapeutics, but with pure science eliminated and relegated to some earlier period of the student's education, between his school period and the time of his introduction to a hospital; but this, of course, was a medical matter hardly to be dwelt upon in that Conference. With regard to physiological studies the case was widely different. Botany ought to be specially studied by the pharmacologist. That and chemistry were the two principal subjects to which the pharmacist ought to devote his time, and he should like to see botany made for him a much more thoroughgoing course of study than it had been hitherto, and especially, as suggested by the President in his address on the previous day, the study of histology. A histological laboratory ought, in his opinion, to be attached to all pharmaceutical schools. It was of the utmost importance that pharmacists should learn to recognize plants by minute portions of their structures, and all the various vegetable substances used for medical purposes. Students should also be encouraged to go into the history and origin of drugs. He could not speak on this subject without thinking of his old friend,

Daniel Hanbury. Of course, they could not all be Hanburys, and perhaps it was not desirable that they should, but if more pharmacists would work in his spirit it would add enormously to the interest of the profession, and to its value.

Mr. HOLMES desired to express his indebtedness to Mr. Hillhouse for the very able manner in which he had dealt with this subject. He had long felt that the teaching of botany as conducted during many years past by the old school of botanists was not so practical as it might be. One used to hear of plants, but saw very few of them. Professor Hillhouse represented the modern school, in which attention was paid more particularly to the practical knowledge of plants, and that seemed to him exactly what was required in the study of materia medica, and he was very glad that so high an authority had called attention to it. He gathered from the paper that Professor Hillhouse would prefer the term pharmacognosy, and that was the term generally used now for the study of materia medica in that direction. Pharmacology had a different sense in the present day, and was applied rather to medical treatment than to the knowledge of drugs.

Mr. ELBORNE said the term pharmacology as at present used was applied simply to the physiological action of drugs, whilst pharmacognosy referred to the means and processes of ascertaining the purity of drugs used in medicine, whilst pharmacy of course referred to the alteration of the crude drug into suitable material for medicinal purposes. Consequently the subject of materia medica might be divided into three branches, pharmacology, the physiological; pharmacognosy, the means of ascertaining the purity of drugs; and pharmacy, the proper means of preparing them. He quite agreed with Dr. Trimen in dismissing the subject of botany from the course of study of medical students. They had already quite sufficient to do in connection with chemistry, anatomy and physiology, and his experience of seeing botany taught to medical students was that it was simply a waste of time.

Mr. MARTINDALE agreed with Professor Hillhouse that it was a pity that the subject of therapeutics was now taught before students had any knowledge of drugs, according to the last curriculum issued by the Colleges of Surgeons and Physicians. Every day they saw the effects of want of knowledge of drugs by medical men, and of course a knowledge of materia medica could not be attained without having some knowledge of botany. It was possible that in some preliminary scientific examinations, such as those of the London University, botany might still be included, but it was found that life was too short for the ordinary medical practitioner to go through the whole course that was desired, and there were more important subjects than botany in the curing of disease and the treatment of wounds in surgical cases, so that the Medical Council had somewhat given way on this point. Since Pereira's time a great change had taken place in the medical view of the subject. In his day in the University of London, materia medica was the first subject, and Pereira's book had to be ground up by all who passed the examination; he had heard from those who had done so that that was the hardest work, and of less use to them than anything they did in their student career. Now that this was thrown over by the medical profession in their training, it was all the more important that the pharmacists should take up the subject. He must say that he looked upon the work of the Pharmaceutical Council in the way of working up botany with regret. It had not pushed the subject to the extent that it might be, especially the histological work which was not required of the candidates. In the Major examination, histology should certainly form a part of the examination. He was very pleased to have this sketch of what Professor Hillhouse would recommend, which seemed to him a first-class one. It was just such a course that a Major candidate should go through, and would require him to possess such a knowledge of drugs as would make him equal to the pharmacists on the continent. At present England was very much behind Germany in botanical work. He looked forward to the Council taking up the matter at no distant day, and trying to develop the subject much more than it was at the present time.

Mr. SHENSTONE (Colchester) said he had listened with very great interest to this paper. He did not feel himself competent to criticize it in any way, because personally he had had very little experience in teaching; but he had had some experience in the result of teaching botany, and had always observed one great want, a matter respecting which he sent a contribution to the Journal some time ago, that want being a knowledge of how practically to apply the information acquired at lectures. He noticed that large numbers of students who had attended lectures, if they were shown plants presenting distinct characteristics, could give at once the name for the character of any particular organ, and any portion which distinctly came under any botanical term they could name properly. But if they were taken into a field and asked to name the different plants found there, without the aid of illustrations, they had great difficulty in doing so. The characteristics of a plant were not found, except in special cases, to agree exactly with the types as shown in the class room. Every course of teaching in botany ought to include a few practical lessons. Five or six walks in the country with an experienced practical botanist would give a man confidence in the application of the terms he had learnt. The same thing applied to histological work. Unless a man had ordinary material given to him, and had to show how to exhibit the microscopical characters, it did not matter what course of lectures he had attended, he would not be able to do it properly; but a very few lessons of a practical nature would enable him to turn his book-work to advantage.

Mr. ALCOCK said he had very frequently found that pharmaceutical students hated botany, and in the London schools there was very little to assist them in overcoming that hatred. When he attended probably the best course of lectures in London the students were shown during the course of three months of histological work two small objects which of course were very interesting, but if there had been two hundred, instead of two, they would have been appreciated very much more. The teaching of botany should be thoroughly practical, and not very far from the room in which the Conference was assembled a well-equipped laboratory could be seen specially set apart for the students of botany. He was surprised to see the number of microscopes and other appliances provided. Every student sat down and his work was superintended by the professor. Although he had attended good classes in London he had never seen anything of the sort before. If this were introduced into pharmaceutical schools he had not the least doubt the embryo pharmacist would learn to like botany very much better. In Birmingham the students and pupils were very well off indeed. They had simply to go to Sutton Coldfield, or, if they desired to find a systematic arrangement of plants, to betake themselves to the Cannon Hill Park, or go to the Botanical Gardens, where every facility was afforded. All the material was found for the students, but where were the students? Although they had all these facilities the students did not come forward as well as they might do, and he thought if they could infuse, not only into the stundets, but into the employers, a little more enthusiasm they would soon have some good botanists in the pharmaceutical world.

Mr. SCHACHT said the subject matter of this address was beyond the sphere of his criticism, but it was very suggestive and afforded ample material for thought. Throughout it all he was struck with the pervading tone which seemed to supply a very strong argument for a favourite doctrine of his own, which he must be for-

given for repeating, viz., that pharmacy must now and ever be considered as an essential part of the medical art. The various subjects connected with the art of medicine were very numerous, and very important, and it was impossible for any one single mind to comprehend well the whole of them, and the author of this paper seemed in a thoroughly philosophic vein to contend that it was the duty of the individual to study special subjects rather than that the whole profession should be supposed to be masters of them all. That occurred to him as a strong argument why pharmacists should specially devote themselves to this particular line of study.

The PRESIDENT said he greatly sympathized with Professor Hillhouse's views as expressed in the paper, which contained in it sufficient matter to occupy the whole morning, if not more, but unfortunately they could not spare more time to it. He had little doubt that when there was room in Bloomsbury Square this subject would receive more attention at the hands of the Council.

Professor HILLHOUSE, in reply, said he felt that in intruding his own opinions on the Conference he had taken a somewhat bold step. The opinions of outsiders were usually disregarded, or if regarded at all, it was with feelings something between contempt and that which was generally excited by impertinence. But this subject was not one which had been concocted alone in the botanical laboratory or his own private room. His Birmingham friends would bear him out in saying that he had for some time taken a deep and practical interest in pharmaceutical work, and the more he considered the matter, the more he felt sure that pharmacists would in the long run have to take up certain portions of work which heretofore had been taken in hand by the so-called medical man. Hence the subject to him was not a new one. He had heard with some sorrow, though not with surprise, that there were many students who had been known to study botany for a certain time, and finish with a sense of cordial hatred to it. He believed that he hated it himself at one time owing to the fashion in which it was taught. It was the teachers who had been to blame for the results. The results had not been due in any sense to want of interest in the subject, or to want of interest on the part of the students, but almost wholly to the lack of enthusiasm imparted by the teachers, and to the absence of a proper scientific method of teaching. Teaching had progressed like other things, and it was time to shake free from the old processes and with the broadening and re-opening of the subject, to broaden and re-open the method of teaching. He had very little to say on the subject of the discussion, which had been perhaps too brief, but on the whole he was not surprised at it, because the paper was not one which would commend itself to instant discussion, and was not written with that view. It was with the hope that it might contain some seeds for future harvest that he ventured to lay the paper before the Conference. Perhaps the only point touched upon was one brought in quite incidentally, viz., the relation between botanical teaching and medical studies; and there he must express his complete and absolute opposition to the view of his friend Dr. Trimen. He started from a slightly different basis. He did not think that the medical man, as a medical man pure and simple, needed to know botany, but perhaps in the same sense he hardly needed half a dozen other things he was taught; but if he were to be a scientific man, if he were to look on medicine as a branch of science, he must start with a scientific training. He ought to give up one year prior to entering on his medical studies to get the basis of a sound scientific training, otherwise he would be simply an empiricist, little better than the old quacks with which the country was at one time filled. Every man who worked with tools, whether of iron or intellectual tools, must understand his tools before he understood how to use them. Bearing in mind the enormous power put by modern legislation into the hands of the doctor, who was qualified to kill everybody if he chose to do it, and nobody could say him nay, he thought there had been too much of late of letting him down easily in medicine. They had forgotten that the dignity of a great profession was at stake (and that applied, although in a smaller degree, to the profession of the pharmacist), as well as the reputation, life, property had health of the public, and there ought to be no safeguard left out, no chance door left open for the possibility of the rubbish of the intellectual world getting into a profession which had such enormous powers. It was sometimes said that in the case of a country medical man he had such comparatively small returns for his labour that he could not be expected to do so much; but he ventured to suggest that the country pratitioner was the one who, of all men, got the most profit from the study of botany, and he was just in the position in which he could study it. However, this was rather wandering from the scope of the Conference, but one could hardly approach the subject without incidentally touching on the subject of medicine. If he had expressed any warm feelings he must be pardoned, because he felt warmly about it; he had spoken all the more openly, because thus far he believed no one had attempted to discuss in plain, simple terms the action of the Medical Council in their recent alterations, and he hoped this communication would not be without some future value as well as being of present interest.

(*To be continued.*)

The British Association for the Advancement of Science.

FIFTY-FIFTH ANNUAL MEETING.

THE PRESIDENT'S ADDRESS.

(*Continued from page* 224.)

From this time dates the introduction of that dominance of existing causes which forms the basis of uniformitarianism in geology, and which had to go on with various and great modifications of detail, through the successive stages of the geological history, till the land and water of the northern hemisphere attained to their present complex structure.

So soon as we have a circumpolar belt or patches of Eozoic* land and ridges running southward from it, we enter on new and more complicated methods of growth of the continents and seas. Here we are indebted to Le Conte for clearly pointing out that our original Eozoic tracts of continent were in the earliest times areas of deposition, and that the first elevations of land out of the primeval ocean must have differed in important points from all that have succeeded them; but they were equally amenable to the ordinary laws of denudation. Portions of these oldest crystalline rocks, raised out of the protecting water, were now eroded by atmospheric agents, and especially by the carbonic acid, then existing in the atmosphere perhaps more abundantly than at present, under whose influence the hardest of the gneissic rocks gradually decay. The Arctic lands were subjected in addition to the powerful mechanical force of frost and thaw. Thus every shower of rain and every swollen stream would carry into the sea the products of the waste of land, sorting them into fine clays and coarser sands; and the cold currents which cling to the ocean bottom, now determined in their courses, not merely by the earth's rotation, but also by the lines of folding on both sides of the Atlantic, would carry south-westward, and pile up in marginal banks of great thickness, the *débris* produced from the rapid waste of the land already existing in the Arctic regions. The Atlantic, opening widely

* Or Archæan, or pre-Cambrian, if these terms are preferred.

to the north, and having large rivers pouring into it, was especially the ocean characterized, as time advanced, by the prevalence of these phenomena. Thus throughout the geological history it has happened that, while the middle of the Atlantic has received merely organic deposits of shells of Foraminifera and similar organisms, and this probably only to a small amount, its margins have had piled upon them beds of detritus of immense thickness. Professor Hall, of Albany, was the first geologist who pointed out the vast cosmic importance of these deposits, and that the mountains of both sides of the Atlantic owe their origin to these great lines of deposition, along with the fact, afterwards more fully insisted on by Rogers, that the portions of the crust which received these masses of *débris* became thereby weighted down and softened, and were more liable than other parts to lateral crushing.*

Thus in the later Eozoic and early Palæozoic times, which succeeded the first foldings of the oldest Laurentian, great ridges were thrown up, along the edges of which were beds of limestone, and on their summits and sides thick masses of ejected igneous rocks. In the bed of the central Atlantic there are no such accumulations. It must have been a flat, or slightly ridged, plate of the ancient gneiss, hard and resisting, though perhaps with a few cracks, through which igneous matter welled up, as in Iceland and the Azores in more modern times. In this condition of things we have causes tending to perpetuate and extend the distinctions of ocean and continent, mountain and plain, already begun ; and of these we may more especially note the continued subsidence of the areas of greatest marine deposition. This has long attracted attention, and affords very convincing evidence of the connection of sedimentary deposit as a cause with the subsidence of the crust.†

We are indebted to French physicist, M. Faye,‡ for an important suggestion on this subject. It is that the sediment accumulated along the shores of the ocean presented an obstacle to radiation, and consequently to cooling of the crust, while the ocean floor, unprotected and unweighted, and constantly bathed with currents of cold water, having great power of convection of heat, would be more rapidly cooled, and so would become thicker and stronger. This suggestion is complementary to the theory of Professor Hall, that the areas of greatest deposit on the margins of the ocean are necessarily those of greatest folding and consequent elevation. We have thus a hard, thick, resisting ocean-bottom which, as it settles down toward the interior, under the influence of gravity, squeezes upward and folds and plicates all the soft sediments deposited on its edges. The Atlantic area is almost an unbroken cake of this kind. The Pacific area has cracked in many places, allowing the interior fluid matter to ooze out in volcanic ejections.

It may be said that all this supposes a permanent continuance of the ocean-basins, whereas many geologists postulate a mid-Atlantic continent* to give the thick masses of detritus found in the older formations both in Eastern America and Western Europe, and which thin off in proceeding into the interior of both continents. I prefer, with Hall, to consider these belts of sediment as in the main the deposits of northern currents, and derived from Arctic land, and that like the great banks of the American coast at the present day, which are being built up by the present Arctic current, they had little to do with any direct drainage from the adjacent shore. We need not deny, however, that such ridges of land as existed along the Atlantic margins were contributing their quota of river-borne material just as on a still greater scale the Amazon and Mississippi are doing now, and this especially on the sides towards the present continental plateaus, though the greater part must have been derived from the wide tracts of Laurentian land within the Arctic Circle or near to it. It is further obvious that the ordinary reasoning respecting the necessity of continental areas in the present ocean basins would actually oblige us to suppose that the whole of the oceans and continents had repeatedly changed places. This consideration opposes enormous physical difficulties to any theory of alternations of the oceanic and continental areas, except locally at their margins. I would, however, refer you for a more full discussion of these points to the address to be delivered to-morrow by the President of the Geological Section.

But the permanence of the Atlantic depression does not exclude the idea of successive submergences of the continental plateaus and marginal slopes, alternating with periods of elevation, when the ocean retreated from the continents and contracted its limits. In this respect the Atlantic of to-day is much smaller than it was in those times when it spread widely over the continental plains and slopes, and much larger than it has been in times of continental elevation. This leads us to the further consideration that, while the ocean-beds have been sinking, other areas have been better supported, and constitute the continental plateaus ; and that it has been at or near the junctions of these sinking and rising areas that the thickest deposits of detritus, the most extensive foldings, and the greatest ejections of volcanic matter have occurred. There has thus been a permanence of the position of the continents and oceans throughout geological time, but with many oscillations of these areas, producing submergences and emergences of the land. In this way we can reconcile the vast vicissitudes of the continental areas in different geological periods with that continuity of development from north to south, and from the interiors to the margins, which is so marked a feature. We have for this reason to formulate another apparent geological paradox, namely, that while in one sense the continental and oceanic areas are permanent, in another they have been in continual movement. Nor

* The connection of accumulation with subsidence was always a familiar consideration with geologists; but Hall seems to have been the first to state its true significance as a geological factor, and to see that those portions of the crust which are weighted down by great detrital accumulations are necessarily those which, in succeeding movements, were elevated into mountains. Other American geologists, as Dana, Rogers, Hunt, Le Conte, Crosby, etc., have followed up Hall's primary suggestion, and in England, Hicks, Fisher, Starkie Gardiner, Hull and others, have brought it under notice, and it enters into the great generalizations of Lyell on these subjects.

† Dutton in 'Report of U.S. Geological Survey,' 1881. From facts stated in this report and in my 'Acadian Geology,' it is apparent that in the Western States and in the coalfield of Nova Scotia shallow-water deposits have been laid down up to thicknesses of 10,000 to 20,000 feet in connection with continuous subsidence. See also a paper by Ricketts in the *Geol. Mag.*, 1883. It may be well to add here that this doctrine of the subsidence of wide areas being caused by deposition does not justify the conclusion of certain glacialists that snow and ice have exercised a like power in glacial periods. In truth, as will appear in the sequel, great accumulations of snow and ice require to be preceded by subsidence, and wide continental areas can never be covered with deep snow, while, of course, ice can cause no addition of weight to submerged areas.

‡ *Revue Scientifique*, 1886.

* Among American geologists, Dana and Le Conte, though from somewhat different premises, maintain continental permanence. Crosby has argued on the other side. In Britain, Hull has elaborated the idea of interchange of oceanic and continental areas in his memoir in *Trans. Dublin Society*, and in his work entitled 'The Physical History of the British Islands.' Godwin-Austin argues powerfully for the permanence of the Atlantic basin (*Q. J. Geol. Society*, vol. xii., p. 42). Mellard Reade ably advocates the theory of mutation. The two views require, in my judgment, to be combined. More especially it is necessary to take into the account the existence of an Atlantic ridge of Laurentian rock on the west side of Europe, of which the Hebrides and the oldest rocks of Wales, Ireland, Western France, and Portugal are remnants.

does this view exclude extension of the continental borders or of chains of islands beyond their present limits, at certain periods; and indeed the general principle already stated, that subsidence of the ocean-bed has produced elevation of the land, implies in earlier periods a shallower ocean and many possibilities as to volcanic islands, and low continental margins creeping out into the sea; while it is also to be noted that there are, as already stated, bordering shelves, constituting shallows in the ocean, which at certain periods have emerged as land.

We are thus compelled to believe in the contemporaneous existence in all geological periods, except perhaps the earliest of them, of three distinct conditions of areas on the surface of the earth. (1) Oceanic areas of deep sea, which always continued to occupy in whole or in part the bed of the present ocean. (2) Continental plateaus and marginal shelves, existing as low flats or higher table-lands liable to periodical submergence and emergence. (3) Lines of plication and folding, more especially along the borders of the oceans, forming elevated portions of land, rarely altogether submerged and constantly affording the material of sedimentary accumulations, while they were also the seats of powerful volcanic ejections.

In the successive geological periods the continental plateaus when submerged, owing to their vast extent of warm and shallow sea, have been the great theatres of the development of marine life and of the deposition of organic limestones, and when elevated they have furnished the abodes of the noblest land faunas and floras. The mountain belts, especially in the north, have been the refuge and stronghold of land life in periods of submergence, and the deep ocean basins have been the perennial abodes of pelagic and abyssal creatures, and the refuge of multitudes of other marine animals and plants in times of continental elevation. These general facts are full of importance with reference to the question of the succession of formations and of life in the geological history of the earth.

So much time has been occupied with these general views that it would be impossible to trace the history of the Atlantic in detail through the ages of the Palæozoic, Mesozoic, and Tertiary. We may, however, shortly glance at the changes of the three kinds of surface already referred to. The bed of the ocean seems to have remained on the whole abyssal, but there were probably periods when those shallow reaches of the Atlantic which stretch across its most northern portion, and partly separate it from the Arctic basin, presented connecting coasts or continuous chains of island sufficient to permit animals and plants to pass over.* At certain periods also there were not unlikely groups of volcanic islands, like the Azores, in the temperate or tropical Atlantic. More especially might this be the case in that early time when it was more like the present Pacific; and the line of the great volcanic belt of the Mediterranean, the mid-Atlantic banks, the Azores, and the West India Islands point to the possibility of such partial connections. These were stepping-stones, so to speak, over which land organisms might cross, and some of these may be connected with the fabulous or prehistoric Atlantis.†

In the Cambrian and Ordovician periods the distinctions, already referred to, into continental plateaus, mountain ridges, and ocean depths were first developed, and we find already great masses of sediment accumulating on the seaward sides of the old Laurentian ridges, and internal deposits thinning away from these ridges over the submerged continental areas, and presenting very dissimilar conditions of sedimentation. It would seem also that, as Hicks has argued for Europe, and Logan and Hall for America, this Cambrian age was one of slow subsidence of the land previously elevated, accompanied with or caused by thick deposits of detritus along the borders of the subsiding land, which was probably covered with the decomposing rock arising from long ages of sub-aërial waste.

In the coal-formation age, its characteristic swampy flats stretched in some places far into the shallower parts of the ocean.* In the Jurassic the American continent probably extended further to sea than at present. In the Wealden age there was much land to the west and north of Great Britain, and Professor Bonney has directed attention to the evidence of the existence of this land as far back as the Trias, while Mr. Starkie Gardiner has insisted on connecting links to the southward as evidenced by fossil plants. So late as the post-Glacial, or early human period, large tracts now submerged formed portions of the continents. On the other hand the internal plains of America and Europe were often submerged. Such submergencies are indicated by the great limestones of the Palæozoic, by the chalk and its representative beds in the Cretaceous, by the Nummulitic formation in the Eocene, and lastly by the great Pleistocene submergence, one of the most remarkable of all, one in which nearly the whole northern hemisphere participated, and which was probably separated from the present time by only a few thousands of years.† These submergences and elevations were not always alike on the two sides of the Atlantic. The Salina period of the Silurian, for example, and the Jurassic, show continental elevation in America not shared by Europe. The great subsidences of the Cretaceous and Eocene were proportionally deeper and wider on the eastern continent, and this and the direction of the land being from north to south cause more ancient forms of life to survive in America. These elevations and submergences of the plateaus alternated with the periods of mountain-making plication, which was going on at intervals at the close of the Eozoic, at the beginning of the Cambrian, at the close of the Siluro-Cambrian, in the Permian, and in Europe and Western America in the Tertiary. The series of changes, however, affecting all these areas was of a highly complex character, and embraces the whole physical history of the geological ages.

We may note here that the unconformities caused by these movements and by subsequent denudation constitute what Le Conte has called "lost intervals," one of the most important of which is supposed to have occurred at the end of the Eozoic. It is to be observed, however, that as every such movement is followed by a gradual subsidence, the seeming loss is caused merely by the overlapping of the successive beds deposited.

We may also note a fact which I have long ago insisted on,‡ the regular pulsations of the continental areas, giving us alternations in each great system of formations of deep-sea and shallow-water beds, so that the successive groups of formations may be divided into triplets of shallow-

* It would seem, from Geikie's description of the Faroe Islands, that they may be a remnant of such connecting land, dating from the Cretaceous or Eocene period.

† Dr. Wilson has recently argued that the Atlantis of tradition was really America, and Mr. Hyde Clarke has associated this idea with the early dominance in Western Europe of the Iberian race, which Dawkins connects with the Neolithic and Bronze ages of archæology. My own attention has recently been directed, through specimens presented to the McGill College Museum, to the remarkable resemblances in cranial characters, wampum, and other particulars of the Guanches of the Canaries with aborigines of Eastern America—resemblances which cannot be accidental.

* I have shown the evidence of this in the remnants of Carboniferous districts once more extensive on the Atlantic coast of Novia Scotia and Cape Breton ('Acadian Geology').

† The recent surveys of the Falls of Niagara coincide with a great many evidences to which I have elsewhere referred in proving that the Pleistocene submergence of America and Europe came to an end not more than ten thousand years ago, and was itself not of very great duration. Thus in Pleistocene times the land must have been submerged and re-elevated in a very rapid manner.

‡ 'Acadian Geology,' 1865.

water, deep-water, and shallow-water strata, alternating in each period.

But I must here call your attention to still another geological paradox, namely, that the deep sea, which is so great a barrier to the passage of the shallow-water animals, seems, under certain conditions, to afford facilities for the transmission of land animals and plants. The connections established by the observations of the *Challenger*, and so well expounded by Wallace and Hemsley,* between the floras of oceanic islands and the continents, establish this conclusively. Thus the Bermudas, altogether recent islands, have been stocked by the agency chiefly of the ocean currents and of birds, with nearly one hundred and fifty species of continental plants, and the facts collected by Hemsley as to the present facilities of transmission, along with the evidence afforded by older oceanic islands which have been receiving animal and vegetable colonists for longer periods, go far to show that, time being given, the sea actually affords facilities for the migrations of the inhabitants of the land, greater than those of continuous continents.

In referring to the ocean basins we should bear in mind that there are three of these in the northern hemisphere—the Arctic, the Pacific and the Atlantic. De Rance has ably summoned up the known facts as to Arctic geology, and more recently Dr. G. M. Dawson has prepared for the Royal Society of Canada a *résumé* and map of what is known of the geology of the Arctic basin,† in comparison with Canadian geology. From this it appears that this area presents from without inwards a succession of older and newer formations from the Eozoic to the Tertiary, and that its extent must have been greater in former periods than at present, while it must have enjoyed a comparatively warm climate. The relations of its deposits and fossils are closer with those of the Atlantic than with those of the Pacific, as might be anticipated from its wider opening into the former. Blandford has recently remarked on the correspondence of the marginal deposits around the Pacific and Indian oceans,‡ and Dr. Dawson informs me that this is equally marked in comparison with the west coast of America,§ but these marginal areas have not yet gained much on the ocean. In the North Atlantic, on the other hand, there is a wide belt of comparatively modern rocks on both sides, more especially towards the south, and on the American side; but while there appears to be a perfect correspondence on both sides of the Atlantic, and around the Pacific respectively, there seems to be less parallelism between the deposits and forms of life of the two oceans as compared with each other, and less correspondence in forms of life, especially in modern times. Still in the earlier geological ages, as might have been anticipated from the imperfect development of the continents, the same forms of life characterize the whole ocean from Australia to Arctic America, and indicate a grand unity of Pacific and Atlantic life not equalled in later times,* and which speaks of contemporaneity rather than of what has been termed homotaxis.

We may pause here for a moment to notice some of the effects of Atlantic growth on modern geography. It has given us rugged and broken shores composed of old rocks in the north, and newer formations and softer features toward the south. It has given us marginal mountain ridges and internal plateaus on both sides of the sea. It has produced certain curious and by no means accidental correspondences of the eastern and western sides. Thus the solid basis on which the British Islands stand may be compared with Newfoundland and Labrador, the English Channel with the Gulf of St. Lawrence, the Bay of Biscay with the Bay of Maine, Spain with the projection of the American land at Cape Hatteras, the Mediterranean with the Gulf of Mexico. The special conditions of deposition and plication necessary to these results, and their bearing on the character and productions of the Atlantic basin would require a volume for their detailed elucidation.

Thus far our discussion has been limited almost entirely to physical causes and effects. If we now turn to the life-history of the Atlantic, we are met at the threshold with the question of climate, not as a thing fixed and immutable, but as changing from age to age in harmony with geographical mutations, and producing long cosmic summers and winters of alternate warmth and refrigeration.

We can scarcely doubt that the close connection of the Atlantic and Arctic oceans is one factor in those remarkable vicissitudes of climate experienced by the former, and in which the Pacific area has also shared in connection with the Antarctic Sea. No geological facts are indeed at first sight more strange and inexplicable than the changes of climate in the Atlantic area, even in comparatively modern periods. We know that in the early Tertiary perpetual summer reigned as far north as the middle of Greenland, and that in the Pleistocene the arctic cold advanced, until an almost perennial winter prevailed, half-way to the equator. It is no wonder that nearly every cause available in the heavens and the earth has been invoked to account for these astounding facts.

It will, I hope, meet with the approval of your veteran glaciologist Dr. Crosskey, if, neglecting most of these theoretical views, I venture to invite your attention in connection with this question chiefly to the old Lyellian doctrine of the modification of climate by geographical changes. Let us, at least, consider how much these are able to account for.†

The ocean is a great equalizer of extremes of temperature. It does this by its great capacity for heat and by its cooling and heating power when passing from the solid into the liquid and gaseous states, and the reverse. It also acts by its mobility, its currents serving to convey heat to great distances, or to cool the air by the movement of cold icy waters. The land on the other hand cools or

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* 'Continental and Island Life; Botany of the *Challenger* Expedition.'

† Meeting of May, 1886. The paper is not yet published.

‡ A singular example is the recurrence in New Zealand of Triassic rocks and fossils of types corresponding to those of British Columbia. A curous modern analogy appears in the works of art of the Maoris with those of the Haida Indians of the Queen Charlotte Islands, and both are emimently Pacific in contradistinction to Atlantic.

§ *Journal of Geological Society*, 1886. Blandford's statement respecting the mechanical deposits of the close of the Palæozoic in the Pacific area, whether these are glacial or not, would seem to show a correspondence with the Permian conglomerates and earth-movements of the Atlantic area; but since that time the Atlantic has enjoyed comparative repose. The Pacific also seems to have reproduced the conditions of the Carboniferous in the Cretaceous age, and seems to have been less affected by the great changes of the Pleistocene.

* Daintree and Etheridge, "Queensland Geology," *Journal Geological Society*, August, 1872; R. Etheridge, junior, "Australian Fossils," *Trans. Phys. Soc. Edin.*, 1880.

† The late Mr. Searles V. Wood, in an able summary of the possible causes of the succession of cold and warm climates in the northern hemisphere, enumerates no fewer than seven theories which have met with more or less acceptance. These are:—

1. The gradual cooling of the earth from a condition of original incandescence.
2. Changes in the obliquity of the ecliptic.
3. Changes in the position of the earth's axis of rotation.
4. The effect of the precession of the equinoxes along with changes of the eccentricity of the earth's orbit.
5. Variations in the amount of heat given off by the sun.
6. Differences in the temperature of portions of space passed through by the earth.
7. Differences in the distribution of land and water in connection with the flow of oceanic currents.

warms rapidly, and can transmit its influence to a distance only by the winds, and the influence so transmitted is rather in the nature of a disturbing than of an equalizing cause. It follows that any change in the distribution of land and water must affect climate, more especially if it changes the character or course of the ocean currents.*

(*To be continued.*)

Obituary.

Notice has been received of the death of the following :—

On the 22nd of August, Mr. Job Chappell, Chemist and Druggist, Brighouse. Aged 39 years.

On the 26th of August, Mr. Charles Tucker, Chemist and Druggist, Isle of Wight. Aged 65 years.

On the 31st of August, Mr. Hugh Munro, Chemist and Druggist, Gloucester Place, London. Aged 27 years.

On the 31st of August, Mr. Peter Oldham, Chemist and Druggist, Bolton. Aged 80 years.

Parliamentary and Law Proceedings.

Poisoning by Laudanum.

At Scarborough on the 8th inst., an inquest was held relative to the death of a Mrs. Gaunt, who it was supposed had committed suicide by means of laudanum. It appeared that the deceased had been drinking for some time previous to her death and one of the witnesses stated that she was intoxicated when the purchase of laudanum was made.

Thomas Pratt, apprentice with Mr. Robson, chemist and druggist, said that he knew the deceased as a customer. He had never before supplied her with any poisonous article. He sold her on Monday night an ounce and a half of laudanum for which she paid 6*d.* She did not appear to be in a state of intoxication. It was a practice with him to ask strangers the purpose for which they required such a large quantity, but he would not ask a regular customer.

A juryman : Do you receive any instructions restricting the sale of the quantity of laudanum ?

Witness replied no.

Mr. Robson was, at the request of the jury, called and was asked by a juryman if there were not some restrictions respecting the sale of laudanum.

Mr. Robson replied in the negative, and said that he was in the habit of supplying such large quantities as sixpennyworth to people, but unless he knew them he inquired of them the use to which they were going to apply it. Sixpennyworth was not a large quantity to sell at a time. In the case of a private individual whom he knew perfectly well he should not ask what it was wanted for. He was not in the shop when the deceased went in, but if he had been he should certainly have sold her the same quantity. There were no restrictions respecting the sale and quantity, except those which came under Schedule A. of the Chemists and Druggists Act, which only required the vendor to label it "Poison," and attach his own name and address. In answer to another juryman, Mr. Robson stated that if the woman had been observed to be suffering under the influence of liquor the drug would not have been supplied.

Dr. Cuff having deposed that death had resulted from the effects of a very large dose of laudadum,—

A juryman asked if it would not be of benefit to the people at large if druggists should not be able to sell laudanum without the acquiescence of a doctor.

Dr. Cuff said it would no doubt be beneficial.

After consultation the jury returned a verdict to the effect that the deceased had poisoned herself by taking a large quantity of laudanum whilst in a state of temporary mental derangement from the influence of drink ; and added the following rider :—"In the face of the medical evidence that the prohibition of the sale of laudanum in large quantities would be beneficial to the community at large, the jury earnestly call the attention of the press and the general public to the fact."—*Scarborough Weekly Post.*

* Von Wœickoff has very strongly put these principles in a Review of Croll's recent book, 'Climate and Cosmology ;' *American Journal of Science*, March, 1886.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer ; not necessarily for publication, but as a guarantee of good faith.*

Pil. Aloes et Myrrhæ.

Sir,—It has been a general custom for dispensers to keep, amongst others, this pill in the form of species, and to add the excipient extemporaneously.

As the formula stood in the Pharmacopœia just superseded, it was a matter of simple calculation that for every 12 grains required 7 grains of the species must be taken ; a definite weight, 2½ oz., of confection of roses having been ordered, to the total weight, 3½ oz., of the active ingredients.

Since in the new B.P. 1 oz. of treacle and a sufficiency of glycerine take the place of the confection, it becomes necessary to revise this proportion.

I find that, with 7 parts of species and 2 parts of treacle, 1 part of glycerine is amply sufficient to make a mass ; therefore 7 grains of species should be taken for every 10 grains of the pill required.

It is obvious that the new pill is 20 per cent. stronger than the old.

Market Square, Dover. J. F. Brown.

Bees and Sunflowers.

Sir,—My experience is rather different from that of Mr. W. H. Brown.

I find the sunflowers in my garden are very much visited by the honey bee ; it is a common thing to see three or four on one flower at once. I get a good many humble bees as well, but by far the greater number of honey bees. They seem particularly fond of the flower, and evidently find a good amount of honey in it, as they spend a lot of time going from floret to floret, until a circuit has been made of the whole flower.

I believe bees are as a rule partial to composite flowers. I noticed they worked well on the marigolds when they were in bloom.

Addiscombe. J. S. Culverwell.

T. W. Horsley.—*Eupatorium cannabinum.*

G. S. Fuller.—The second edition of 'Pharmacographia' was published in 1879. We do not know that there is any probability of the issue of a third edition at present.

P. Q.—Menthol is soluble in fixed and volatile oils, rectified spirit, ether and chloroform. It is sometimes used in solution in olive oil, and a solution of one part of menthol in four volumes of chloroform and twelve volumes of olive oil has been recommended for treatment of ringworm of the scalp.

Angus.—Babington's 'Manual of British Botany.'

C. W. Warriner.—We would remind you that the British Pharmacopœia now contains a formula for a strong solution of acetate of ammonia.

W. Baxter, jun., is recommended to forward his suggestions to the Secretary for the consideration of the Library, Museum, Laboratory and House Committee.

G. Maddock.—We would suggest that Mr. Berry would be the best authority to consult.

A Russian before Herat.—The name "cocaine" is frequently applied loosely to the hydrochlorate, and there is little doubt that the salt is meant in the prescription sent. The free alkaloid is not soluble in water to nearly the extent ordered.

Communications, Letters, etc., have been received from Messrs. Moss, Hodgkin, Williams, Willmott, Thompson, Alcock, Mason, Marsden, Moeller, Dott, Symes, Warden, Culverwell, Southall, Barron, Lucas, Ransom, Saul, Robinson, Groves, Scott, Thresh, Woolley.

THE COLONIAL AND INDIAN EXHIBITION AT SOUTH KENSINGTON.

West Indies.

Under this heading the following colonies will be included:—Jamaica, Trinidad, Barbadoes, the Windward Islands (consisting of Grenada, St. Lucia, St. Vincent and Tobago), the Leeward Islands (comprising Antigua, St. Kitts, Dominica, Montserrat and the Virgin Islands), the Bahamas and British Honduras. The whole of the West Indian Court has been most tastefully arranged under the personal superintendence of the Executive Commissioner, so that the exhibits appear to the very best advantage. The specimens are numbered according to the catalogue, so that it is an easy matter to refer to the information contained in the catalogue. The West Indies may be congratulated on being represented by a Royal Commissioner (Sir A. J. Adderley) who is always at his post, and spares neither time nor trouble in furnishing information concerning the exhibits, and who evidently takes the greatest interest in developing the resources of the colonies. Through the courtesy of this gentleman and of the Assistant Commissioner, Mr. J. MacCarthy, the writer has been permitted to examine many of the products of pharmaceutical interest, concerning which it would otherwise have been impossible to give a report, many of the specimens having been labelled by the exhibitors with merely the vernacular names. Much useful information has also been afforded by these gentlemen.

Jamaica.

In this Court the efforts of the Executive Commissioner to make an effective display of Jamaica products has been seconded by the Honorary Commissioner (Mr. C. Washington Eves), to whom acknowledgments are made by Sir Augustus Adderley in the official catalogue "for many decorative objects loaned to the section and for arranging them at his own expense."

Rum, sugar, tropical fruits, coffee, and dye-woods, with pimento and ginger form the principal exports from this island, and it is not surprising, therefore, to see the first-named article figure largely in the exhibits. Were it not for this product the sugar industry in the island, under the present depressed prices, could not have held its own.

Materia medica and allied economic products are, however, well represented in this Court.

Several specimens of annatto are shown, all of which are of very good colour and appear to be the best in the Exhibition. A specimen of the colouring matter in the form of a dry red powder is worthy of notice as being likely to be useful for colouring oils, and as a paint. It is free from the peculiar and somewhat disagreeable odour possessed by the solid form usually met with. This specimen was prepared by the Government Chemist, Mr. J. J. Bowrey.

Allspice is shown by several exhibitors. The tree, which grows on warm limestone hills in the island at an elevation of 1500 to 2500 feet, appears not to flourish so well anywhere else, so that Jamaica practically supplies the whole world. According to the official catalogue the export of this spice from the island during the year 1885 was valued at £53,867; ginger being exported during the same period from Jamaica to the extent of £20,168. Several other spices are exhibited as produced in the island, including some fine nutmegs, also cardamoms, cinnamon, and cassia. The clove, black pepper, and vanilla are also established in the island.

The samples of cardamoms exhibited are small and not well filled with seeds.

Neither the cinnamon nor the cassia exhibited by the Botanical Department present the aspect of the commercial product; indeed it would be difficult to judge from the appearance alone which is cassia and which cinnamon. They are also very deficient in aroma. Unless the cinnamon could be obtained richer in essential oil and prepared in fine quills, as in Ceylon, it is hardly likely to be received in English commerce.

Dyewoods, including logwood, fustic and sappan wood, are exported from Jamaica to the extent of about £100,000 annually. The logwood tree was introduced from British Honduras in 1715, and has spread spontaneously over the island to such an extent that the export of logwood now exceeds that from British Honduras.

Starches are well represented by arrowroot, tous-les-mois, cassava, curcuma, sago, plantain, coco, breadfruit, pumpkin, and other plants. A specimen of sarsaparilla, shown by Mr. A. Berry, does not resemble what is known in commerce as Jamaica sarsaparilla (which is produced on the mainland), but rather that known as Honduras sarsaparilla, having a white and mealy bark; another specimen exhibited by the Botanical Department is so mouldy that its characters cannot be distinguished. Among the other specimens exhibited by this department, some of which, however, are carefully selected and well dried, are the following: chew stick, bastard cabbage bark, bitter dan bark, adrue, "cow itch" pods, guaco leaves and roots, cacoon, guinea-hen weed, fitweed root and numerous others. Many of these specimens are without either the botanical names or any description of the uses of the drugs. A few notes concerning these products, derived chiefly from Lunan's 'Hortus Jamaicensis,' may therefore be admissible here.

The "chew-stick" of Jamaica is the stem of *Gouania Domingensis*, a plant belonging to the Rhamnaceæ; the stems have a pleasant bitter taste and contain apparently some variety of saponin, since the infusion readily becomes frothy. They are used as a substitute for tooth brushes, and the powder and tincture of the stem have already been introduced into this country by a well-known dentist.

"Bitter dan" is the bark of *Simaruba glauca*, which closely resembles *Simaruba amara* in appearance and probably has the same therapeutic action. It differs chiefly in the leaflets being pale underneath and not mucronate, but rounded at the top.

Prunus occidentalis is said to be used for flavouring noyeau. According to Dr. Trimen, however, this is incorrect, the *Cerasus sphænocarpa* being the noyeau cherry of the West Indies, which in some way not known to him has got mixed up with *Cerasus* (*Prunus*) *occidentalis* (*Ph. J.*, [3], xv., 147).

"Majoe bitters" is the bark of *Picramnia antidesma*, which has recently been introduced into medicine in the United States under the name of "Honduras bark" or "casca amarga."

Under the name of "bastard cabbage bark," *Andira inermis* has long been known as a powerful and somewhat dangerous anthelmintic, and lately was in demand in this country as the principal ingredient in a nostrum for the cure of obesity. A full

account of the uses of the bark was published in the 'Philosophical Transactions,' 1777 (p. 507).

"Fitweed root" is obtained from *Eryngium fœtidum*. According to Lunan "all parts of the plant are reckoned powerfully antihysteric and anti-epileptic, and the decoction has been found useful in asthmatic complaints." It appears to be a powerful antispasmodic and worthy of investigation.

"Adrue" is the rhizome of *Cyperus articulatus*. Lunan quotes a surprising statement by Dr. Howell, of Jamaica, to the effect that "a strong decoction or infusion of this plant is as much a specific in restraining vomiting in yellow fever as the Peruvian bark in the cure of remittents. The first teacupful of the decoction represses the vomiting and the second or third cures. The decoction is made by boiling two handfuls of the plant in three pints of water down to one-third." It has lately been introduced to the notice of the medical profession in the United States as a remedy for nausea and vomiting.

"Dogwood root bark" is the drug better known as *Piscidia erythrina*, which has lately been recommended as a hypnotic in insomnia arising from mental worry and as a positive anodyne in the more purely idiopathic neuralgic affections (*Pharm. Journ.*, [3], xiii., p. 798).

What tree the specimen of "balsam tree bark" is derived from it is impossible to say in the absence of a botanical name on the label, several different plants being known under this name in the West Indies. Probably *Amyris balsamifera* is intended, although Grisebach gives the balsam tree as a synonym for *Clusia rosea*.

"Wild wormwood" is the *Parthenium Hysterophorus*, lately mentioned in this Journal ([3], xvi., p. 1086) as the source of a new alkaloid, parthenine, said to have been found useful in the treatment of neuralgia. Both Barham and Lunan speak highly of the value of the plant in healing ulcerated sores.

"Guinea-hen weed" is the *Petiveria alliacea*, the root of which is said to be used to procure abortion. It is extremely acrid.

"Bocconia root" is derived from *Bocconia frutescens*, a papaveraceous plant known in Jamaica as "celandine" or "parrot weed," and possessing similar properties to *Chelidonium*. It is used for ringworm, warts, etc.

The specimens of pomegranate root bark are much finer pieces than those usually met with in commerce, but the cascarilla bark does not present the characteristic appearance of the drug, the white chalky surface not being noticeable. Coca leaves in two qualities, kola nuts and hog gum are shown by the Rev. J. S. Roberts. Hog gum is a product that has already been noticed under British Guiana, as the principal ingredient in karamanni wax. It is a resin which might probably find many useful applications if better known in this country.

Several interesting exhibits are shown by Mr. J. J. Bowrey, the Government Analytical Chemist, including the fragrant volatile oils of the cigar bush (*Critonea Dalea*), of the mountain cigar bush (*Hedyosmum nutans*), of the mountain thyme (*Micromeria obovata*), and juniper cedar (*Juniperus Bermudiana*); also the oils of *Eucalyptus globulus*, lemon grass, bay (*Pimenta acris*), and bitter orange peel, and the fixed oils of *Hura crepitans*, *Calophyllum Calaba*, *Aleurites triloba*, oil of ben, and the solid fat of the "antidote cacoon" (*Feuillea cordifolia*). This is probably the first time that the solid oil of the last-named seed has been exhibited in this country. In Trinidad it is used to prevent steel and iron from rusting. It is white, and of the consistence of cocoa-nut butter, without having any special odour. The seeds are excessively bitter, like colocynth, and appear to be a good purgative of considerable value in dropsy. The seeds contain, according to an unpublished analysis by Mr. E. C. C. Stanford, about half their weight of fatty oil, which if the seeds could be procured in sufficient quantity would probably find a use in commerce. Similar specimens are exhibited by the Botanical Department. The oil of ben has been stated to be the oil used by watchmakers, but this is not correct. Until filtered it contains a considerable fatty deposit.

Another oil not often seen is one prepared from the pulp of the fruit of the alligator pear (*Persea gratissima*), a lauraceous tree. It is suitable for illuminating purposes and for soap making, and could be obtained in large quantities. The seeds of the tree are said to yield an indelible black stain and to be used for marking linen. This oil is shown by Mr. Schaarschmidt.

Turtle liver oil is shown by the Kingston Preserved Turtle Factory, also various other preparations of that famous reptile. These include green and yellow turtle fat, calipash and calipee, turtle diamonds, turtle soup in tablets and turtle eggs. Probably the last three articles might be worthy of attention for invalid diet. The eggs consist entirely of yolk. In the mature state the eggs have a tough skin, and contain a white albumen which does not become opaque when the eggs are boiled. To obtain the eggs without the albumen they are extracted from the interior of the turtle, and in this state are about one inch in diameter. These immature eggs are considered a great luxury. They appear to be preserved in brine. An interesting account of the different modes of preparing turtle eggs in the East and West Indies may be found in P. L. Simmond's 'Animal Food Resources of Different Nations,' p. 205. The turtle liver oil is given in consumption instead of cod liver oil, and is said to be more palatable than it when fresh. The dose is a tablespoonful three times a day. It is also used by the natives of Tortola, Virgin Islands, as an alterative in syphilis and rheumatism.*

A fine show of turtle preparations is also made by Mr. T. K. Bellis, including calipash and calipee, turtle fins, green and yellow turtle fat, turtle herbs and spices, extract of the meat of the turtle, turtle soup for invalids and epicures and turtle oil in capsules. According to information furnished by this gentleman, who is one of the largest importers of turtle in this country, calipash consists of the gelatinous matter next the upper shell or back of the reptile, and is of a darker colour than the calipee, which is the same substance next to the lower shell. These preparations are dried in the sun and then assume a horny consistence. A turtle weighing 120 lbs. is said to yield only about 4 lbs. of the dried article; hence the high price of the soup, as it takes one lb. to make a gallon of soup. The green and yellow fat lies inside the calipash; and it is this layer that yields the turtle oil, which is separated by boiling and skimming it off the surface of the liquid when cold. The extract is made from the flesh of the reptile, which would otherwise be wasted.

* *Pharm. Journ.*, [3], xv., p. 573.

The Pharmaceutical Journal.

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Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

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THE PROPOSED NON-OFFICIAL FORMULARY.

IN publishing this week a report of the discussion that took place upon Mr. REYNOLDS'S motion in reference to non-official remedies, opportunity will be afforded for a careful consideration of this subject by those who were not present at the Conference, and as it is one of considerable importance to dispensers of medicine further expressions of opinion may be expected to follow the publication of this report. Already one letter on this subject has been received from Mr. Moss, who confesses that he has been so far unable to obtain a clear and definite idea as to the scope of the resolution passed that he has had recourse to a scientific use of the imagination to ascertain what were the views of its author and of those who took part in the discussion. The remarks of some of the speakers certainly furnish opportunity for the inference that considerable difference prevailed as to the particular class of preparations referred to by some of them. Something of the same kind of difference obtains also between the reference made by Mr. REYNOLDS to new preparations in which uniformity was held to be desirable and the mention made by the President of the Conference to another class of preparations designed, as it would seem, for taking the exercise of the art of prescribing out of the hands of medical men. Preparations of this kind are now constantly forced upon the notice of prescribers, and though, in many instances, merely proprietary nostrums, they are recommended even in medical journals as being calculated to meet a want felt by prescribers in the treatment of disease. This is probably a result of the system of editorial advertisement which has been introduced of late and bids fair to be productive of very mischievous consequences; but, at any rate, the way in which such proprietary medicines are being forced on the medical profession and medical men are induced to prescribe them is contrary to the general interests of prescribers and dispensers. As against this practice the influence of the Pharmaceutical Conference may be usefully directed, and few of our readers will fail to appreciate the benefit that might thus be effected. But, at the same time, there is a class of preparations, avowedly proprietary, though by no means partaking of the character of nostrums, which recommend themselves to medical men as being good representatives of particular drugs. Whether they be preparations of new remedies or not, they have a claim to consideration by reason of the repute of their makers and their own intrinsic merit, and as Mr. Moss justly remarks, it would not be advisable to strive to deprive successful workers in this direction of the result of their labours by proposing formulæ to supersede their products. Nor can there be any objection to such preparations being prescribed with an indication of the maker's name.

It is in regard to this point that there seems to be some obscurity in the terms of the resolution passed at the Conference, and it would probably have met all the requirements of the case if the words "and without indicating any particular maker" had not been introduced. The objects of securing greater uniformity in the composition and strength of non-official preparations and of enabling medical men to prescribe them with definite knowledge of their qualities in that respect would be amply secured by the publication of a formulary of such preparations, while at the same time there would not be any semblance of an attempt to interfere with legitimate claims to recognition of special excellence in the preparations of simple drugs that were free from the reproach of being nostrums. It would indeed seem essential that some discrimination should be exercised in this respect, in order to ensure the possibility of some practical work being done by the Conference, for, as Mr. NAYLOR pointed out, many of the members present at the meeting had a pecuniary interest in non-official preparations, and it would be inconsistent for the body to express in too sweeping a manner the opinion that "indicating any particular maker of a preparation" was objectionable. But keeping the assertion of proprietary rights within reasonable limits would, however, be a very useful mode of exercising the influence of the Pharmaceutical Conference.

Another aspect of this subject has recently been dealt with by Dr. VULPIUS, the Chairman of the Pharmacopœia Committee of the German Apotheker-Verein, who raises the question whether substances and preparations made by processes that are either kept secret or patented can be admitted to the Pharmacopœia? The advance of synthetic chemistry has led to the production of several compounds whose constitution gave promise of their having physiological actions that would be of value in medicine. When that anticipation has been confirmed by experiment the substance in question has been introduced either under the protection of a patent or as the production of a particular maker. In such instances the manufacturer will determine, not only the price of the article, but also the extent of the supply, since all competition would be ex-

cluded. How is the Pharmacopœia to deal with such a case; and, even if an article of this kind be admitted into the Pharmacopœia on the ground of its intrinsic merit, how is it to be defined in regard to purity and characters? Suppose, for instance, to take an illustration given by Dr. VULPIUS, there is nothing to prevent a manufacturer from placing on the market a substance as a yellowish crystalline powder contaminated with iron, although he might just as well, and as easily, prepare the substance in a purer state, as large, colourless, well-defined crystals should the Pharmacopœia Commission describe this substance as it actually occurs, or in the state of purity that it should possess? The opinion expressed by Dr. VULPIUS is that it would be unwise even if it were possible to ignore the existence of such preparations when they are of unquestionable medicinal value, and that the fact of their being the subjects of patents ought not in such cases to prevent their admission into the Pharmacopœia, but that their admission ought to be made an inducement to the manufacturers to raise the standard of purity, if at all practicable, so as to meet the judicious criticism of the Pharmacopœia Commission. It is probable that the growing use of some preparations of the kind now referred to may give rise to the consideration of the question whether they are to be made official in the British Pharmacopœia, and in any case the probability of such a result will serve to show that some consideration for proprietary right must be conceded, while endeavouring to repress practices that are spoken of by the President of the Conference as sapping the foundations of true pharmacy and at the same time depriving the pharmacist of the legitimate exercise of his calling.

According to the usual custom, the first Evening Meeting of the Pharmaceutical Society in the new session will be devoted to the presentation of prizes to past students in the Society's School of Pharmacy, and the welcoming and advising of those who are just entering it. The meeting this year will take place on Wednesday evening, the 6th of October, and we have great pleasure in calling attention to the official notice, from which it will be seen that the Inaugural Address to the Students on that occasion is to be delivered by Sir HENRY W. ACLAND, K.C.B., M.D., F.R.S., President of the Medical Council.

* * *

The school in connection with the Sheffield Pharmaceutical and Chemical Society will begin a new session on Wednesday evening, the 13th of October, when the prizes won by students in last session will be presented, and an inaugural address will be delivered by Mr. THOMAS GREENISH. The classes, which commence on the succeeding evening, are for the study of Materia Medica, meeting on Mondays (Mr. Furness); Practical Chemistry, meeting on Tuesdays (Mr. Morrison); Theoretical Chemistry, meeting on Thursdays (Mr. Rhoden); and Botany, meeting on Fridays (Mr. Grierson). The Society holds its ordinary meetings on Wednesday evenings, and a synopsis of lectures, papers, etc., for the session 1886-7 has been issued. The Honorary Secretary is Mr. J. H. Bradwall, 158, Ecclesall Road, Sheffield.

We have also received a syllabus of the arrangements for the second session of the school in connection with the North of England Pharmaceutical Association, from which it would appear that the students in that district are exceptionally fortunate. There are to be three successive courses of lectures on Friday evenings, commencing with ten lectures on Pharmacy by Mr. B. S. Proctor; followed by thirty lectures on Materia Medica by Mr. N. H. Martin, and then thirty-five lectures on Botany by Mr. Stuart. A course of forty lectures on Chemistry and the Physics of Chemistry will be delivered on Friday mornings by Professor Bedson, of the Durham College of Science; in addition to which arrangements have been made for practical work in the chemical laboratory of the College. Further particulars may be obtained from the Honorary Librarian to the Association, Mr. A. Wright, 29, Mosley, Newcastle-upon-Tyne.

* * *

The new salt field on the borders of Yorkshire and Durham, near Middlesborough (*Pharm. Journ.*, [3], xiv., 567), has now been pierced by fourteen bore-holes, through eleven of which brine is pumped to the surface. The amount of salt produced at the commencement of the year was two thousand tons weekly, and it is expected that by the end of the year the yield will reach seven thousand tons weekly, or about one-fourth as much as is yielded by the large Cheshire field.

* * *

The adoption of improved methods for the removal of arsenic from sulphuric acid manufactured from pyrites has had the effect of diminishing the use of sulphur in making the acid very considerably. The process usually followed in the purification of pyrites acid depends upon the formation of insoluble sulphide of arsenic and its removal by subsidence and filtration. The production of sulphate of ammonia from the waste gases of iron blast furnaces is steadily increasing.

* * *

By a recent French ministerial decree silver medals have been awarded to M. Capdeville, pharmacist, Aix; M. Maurin, pharmacist, Marseilles; and Messrs. Maurin and Bec, pharmaceutical pupils, in acknowledgment of their devotion during the cholera epidemics of the last three years. M. Magnan, another pupil, has received a bronze medal for the same reason.

* * *

A fatal case of poisoning is reported from San Antonio, Texas, consequent upon an apothecary dispensing two ounces of a concentrated solution of chloral hydrate instead of the same quantity of sulphate of magnesia as a purgative dose. The mistake is attributed to the bottle containing the solution of chloral hydrate having, during some alterations, been misplaced on a wrong shelf next to the one for which it was mistaken. But even then the dispenser must have failed to look at the label.

* * *

The death is reported of Dr. Alexander von Butlerow, Professor of Organic Chemistry in the University of St. Petersburg.

* * *

We regret to have to record the death on the 26th ultimo of Mr. Charles Tucker, who in 1883 was elected an annuitant on the Benevolent Fund.

British Pharmaceutical Conference.

TWENTY-THIRD ANNUAL MEETING.

(*Continued from page* 240.)

Wednesday, September 1.

An Unofficial Formulary.

The President then called upon Mr. Reynolds to move the resolution to which he had referred on the previous day.

Mr. R. Reynolds said if he adopted a somewhat confident tone on the previous day in speaking on the subject of a formulary of non-official remedies as being something desirable, it was from having thought of this matter for a considerable time, from having observed what had been done in other countries, and from feeling that the matter, when placed before the meeting, fell on receptive soil, and that the President's remarks on the subject met with general approval. Five years ago, when presiding at the York meeting, he alluded to what was done in France in connection with non-official remedies. For some years the Pharmaceutical Society of Paris had taken charge of this subject, in order to obtain uniformity of strength in new preparations, and he recollected using as an illustration the great inconvenience which English pharmacists were feeling from variations in the amount of the acid and the strength of that numerous class, the syrups of the phosphates. It was manifestly most desirable that uniformity should be obtained, especially in the case of new remedies which were going through the stage of probation. If there were a diversity of composition, it was evident that the reputation of any remedy must be judged from a very unfair standard, and that in many cases deserving medicines might get into evil repute from not having been fairly tested. The fact that five or six years ago some consent among pharmacists, who were the most likely to undertake this duty, was found to be necessary, and that it was carried out successfully in France, was a strong argument in its favour. Last year their American friends made a considerable advance in this matter. In the Report of the Pittsburg Meeting of the American Pharmaceutical Association, which only reached England this year, there was an account of what they did on this subject. They accepted a formulary which had been prepared and issued for two years by the pharmacists of New York and Brooklyn, as an appendix to their annual report. This contained eighty-one preparations. The nature of these was of course very much dependent on the nature of American pharmacy. There were fifty-two elixirs, ten emulsions, six syrups, and three wines. The feeling expressed at Pittsburg was unanimous and cordial towards this step being taken, and he felt the greatest confidence, without arguing the whole question, that there was a feeling on the part of English pharmacists that something ought to be done—that the evil was a very great one, that the way in which proprietary medicines were forced on the medical professsion, and the way in which medical men were induced to prescribe particular makes was one which was contrary to the general interests of the body, and very damaging to physicians themselves. The resolution he had to move was this :—

> "That in order to secure greater uniformity in composition and strength in non-official remedies, and also to enable the medical profession to prescribe them with definite knowledge of those qualities and without indicating any particular maker, the Conference undertakes the preparation of a formulary of non-official remedies."

Mr. S. Atkins (Salisbury) seconded the motion. He said the President told them yesterday of the difficulty that a metropolitan or West-end chemist had in keeping a special man, whom he called a "runner," to obtain special information, or the article itself, which might be prescribed by some distinguished London physician. If that were the position of a London dispensing chemist, what must be the unhappy position of the unfortunate country chemist who had not got a runner? Certainly he could wire to London, but the specialty did not come down from London by wire, but by parcels post. Not long since he happened to have four prescriptions handed to him by a lady who said she would call in an hour and a half for them. Unwisely he did not open them before promising they should be ready, but on opening them after she left he found they each contained a specialty which unfortunately he had not on the spot, and he had to confess his inability to execute the order within less than forty-eight hours. That was only one instance, but it bore on the question which Mr. Reynolds had raised. There were higher grounds, however, on which it could be put. They wanted accuracy, and they wanted also to set their faces against empiricisms. As an educating body the Pharmaceutical Society had been constantly teaching and preaching this doctrine, and he thought that practically this was a step in the right direction. This would be a kind of extra pharmacopœia. Country chemists were greatly indebted to the 'Extra Pharmacopœia,' but clearly that work, comprehensive as it was in its second edition, had not embraced the whole field of the difficulty. He should listen to the discussion with a great deal of interest; it was a practical question removed from debatable politics, which were wisely excluded from the discussions of the Conference, and he hoped the motion would receive a large amount of support.

Dr. Symes (Liverpool) supported the motion. He said those who had attended the meetings of the Conference, and had perused the 'Year-Book of Pharmacy,' would be aware that this was exactly the resolution which he moved some years ago, when there was no 'Extra Pharmacopœia,' and when they were certainly in a greater difficulty than they were in now with regard to this subject. He then mentioned the case of tincture of gelsemium, which was then largely prescribed, of which there was no official formula, saying that he made his 1 in 10, having no better indication; Mr. Umney said he made his 1 in 5, and various other persons mentioned various strengths, whilst others again said they bought it ready made, and did not know what the strength was. He did not think there could be any more forcible argument for the appointment of a committee to consider the matter, and why it remained for Mr. Reynolds to bring this forward he could not say, but he heartily supported the motion. One thing which he had in his mind especially now was strophanthus, which was very difficult to obtain, and if a pharmacist obtained the tincture he had no idea what strength it was. When that drug was obtainable he should like to know what strength they were to make the tincture until there was a new pharmacopœia. The dose ranged from 2 to 6 minims, and if a chemist depended on his own judgment of what strength to make it it was quite possible there would be far more difference in the strength, and far more serious results than ever existed from the fact that in the Edinburgh Pharmacopœia hydrocyanic acid was twice the strength of the London Pharmacopœia, though that was a thing which was harped on year after year as showing that there ought to be a British pharmacopœia instead of three separate ones. Those who had the means of communicating with medical men on this subject should do so. The British Medical Association of Brighton had recently formed a committee for considering therapeutically the value of new drugs, and he thought it very opportune that the Conference should on the present occasion form some kind of committee for considering the value of these, and should be in a position to work hand in hand with that Committee, and have the whole subject thoroughly threshed out. By such means the Conference would become better known to the medical profession, and it would help to impress on the Medical Council the necessity for members of the pharmaceutical body being on the Pharmacopœia Committee.

Mr. MARTINDALE cordially supported the motion. He said, seeing there were agencies at work scouring creation to get new drugs if they could, it was very important that there should be a means of getting uniform strength in these new preparations. They knew the results of his own efforts in this direction. He was placed in such a position that a great number of medical men called on him to know something about new drugs; having been brought so much in connection with them during his five years' hospital experience, he became looked upon somewhat as an authority. He found such a variety of strengths of preparations existed that it was necessary to compile a pharmacopœia of his own, an extra pharmacopœia, containing the strength of many preparations which were non-official at the time of its compilation. He was glad to say it had been fairly recognized by medical men, and by chemists also to a great extent. As Dr. Symes had said, this was one of the best means of pressing their claim on the Medical Council. It was in effect saying to them, if you will not give us the right to make the Pharmacopœia we will make one of our own. They knew how to make preparations to suit the public taste, and it was absurd to say that only such and such things should be used when pharmacists knew how to make them more palatable. To suppose that people would continue to take nasty drugs was an absurdity, if what was known as elegant pharmacy, or something more palatable, was obtainable. At Brighton reports were given from a Collective Investigation Committee of the section of Pharmacognosy and Therapeutics on two drugs this year. They were only preliminary reports, and the drugs were hamamelis and terebene. This Committee was undertaking a therapeutic investigation of the new drugs with the intention of seeing whether they could be admitted into the Pharmacopœia or not, and, as Dr. Symes had said, it was quite a proper movement for pharmacists to adopt some such suggestion as Mr. Reynolds had thrown out in making preparations suitable for trial and experiment. It was said at Brighton that some of the reports applied to nostrums as well as to more popular public formulæ. Some secret preparations even were recommended as having special virtue, but on the question of hamamelis the report was to the effect that all the preparations seemed to have medicinal virtues. There was one class of preparation, to which the President had referred particularly on the previous day, which caused the greatest trouble, such as the mist. magnesiæ cum bismutho, with all the Pharmacopœia comprised into a little dose. It was a great loss to a chemist to have to buy a half-a-guinea bottle in order to give out one dose.

Mr. SCHACHT said there were a great many things which were desirable which they had to do without. No doubt what Mr. Reynolds suggested was an extremely desirable thing to undertake, but he was not quite sure that he saw his way to the existing machinery by which it could be carried out by that Conference. When the American book came into his hands a few days ago, he thought the idea a most valuable one; but it also occurred to him immediately that the body from which such a book should emanate was rather the Pharmaceutical Society of Great Britain than the Pharmaceutical Conference, and for this reason, that he hardly saw the possibility of the Conference framing such machinery as would bring about such a result. A large amount of experimental work would have to be carried out, and he could appeal to no better person than to Mr. Martindale as to this fact. If so, where was the home where this work could be done? If Mr. Reynolds's suggestion was that a committee of private individuals be appointed who should work out different parts of it in their own private laboratories, he feared the work would lose a great deal of its value; he should hope that such a work would be produced by the joint labours of a specially qualified committee, working together, and seeing the results themselves. Such results could only be obtained by a body having a home of its own, and somebody to whom it was responsible. He was not opposing the motion, but he should like to know how it was to be carried out.

Mr. ROBINSON asked, if this suggestion were carried out, how it would affect the issue of the 'Year-Book of Pharmacy.' He thought that book was intended to qualify and bring to notice new preparations which had been discovered. Was it proposed to issue yearly an extra pharmacopœia with all the new remedies, stating what was their proper strength? Would the resolution pledge the Conference to the desirability of issuing a new Pharmacopœia, or did it refer the consideration of the question to a committee? It would be an excellent thing if pharmacists could have more information about new remedies, and they were much indebted to Mr. Martindale for the 'Extra Pharmacopœia,' but when gentlemen possessed special knowledge of a drug it was surely right they should have their reward in the special preparation and sale of it. It would be extremely kind if they placed that knowledge at the disposal of all, but it occurred to him that if they knew their special information was to be given away it might influence their communication to this Committee.

Mr. INCE very cordially supported the resolution. One objection had occurred to his mind as a difficulty in the case, but that had been entirely removed by Mr. Martindale. He had feared that he might raise some slight objection that this was rather taking out of his hands a work which he had done so extremely well; but as Mr. Martindale had supported the resolution any objection on that score was at an end, and he thought that they were bound publicly to compliment that gentleman on the generosity of his action. With regard to the method of bringing this about, of course that was not easily determined. The machinery was not cut and dried, but he was quite sure Mr. Reynolds, and those who might be associated with him, would in proper time devise new machinery for effecting this purpose. He would not ask him at that moment to give a full detailed account of the whole process, but he was decidedly of opinion that the Conference was the body which should undertake it. It was hopeless to look forward to such a proposal being brought forward and put in hand by the authorities who were entrusted with the compilation of the British Pharmacopœia, because from their very position they could not do that which was now suggested. They acted by authority; all their work as soon as published was by authority; every pharmacist was bound to obey it, and therefore they were compelled to take considerable care in what they did. That very care was one reason why their work must always be so long delayed, and so exceedingly guarded. But that objection was removed altogether if the work were undertaken by the British Pharmaceutical Conference. Its members had experience, knowledge, acquaintance with drugs, common sense, and very large facilities afforded for receiving information, and they could produce it at convenient periods at any dates which might be thought requisite, and they could do so with confidence because they were acting for the best. As British pharmacists they were supposed to know their subject, but every year they knew it better; they had facilities for obtaining this class of information, and were able to bring it before the world of pharmacy at short dates, without so much consideration or delay as must always be the case with the official publication. There was another reason why he should be glad for the Conference to undertake this task. All over England he heard remarks made constantly that they met together, and he hoped they long would, for social enjoyment. Of course they did; that in itself was a good thing; but there was an impression that that was the beginning and end of their association. This would be a proof, and a striking proof, which no man could get over, that at all events the Conference was not merely intended for social pleasures, but that it could come before the public and justify its existence by having done something.

Mr. MARTINDALE said he still saw a field for his 'Extra Pharmacopœia' as distinguished from the other publication. The one would correspond to what was known in France as 'Bouchardat's Formulaire Magistral.' He could quite see that the Unofficial Formulary would not interfere much with his work, though perhaps it would a little, but he should be very glad to allow the members of the Conference and the Society generally to have the advantage of anything they like to take from it. He was inclined to think with Mr. Ince and Mr. Reynolds that it would be better for the Pharmaceutical Conference to do the work. The Pharmaceutical Society had to come too much in contact with the Medical Council in certain ways. The Conference was not bound by the Medical Council in any way, and could take the matter in hand without asking any permission. There was a certain amount of pharmaceutical as well as analytical work to be done. That was a detail which could be regulated by the Committee.

Mr. ATKINS said he should be glad of a little more light on the question as to where the work was to be done. He was entirely in accord with previous speakers in preferring that it should be done by the Conference rather than by the Society, but he still wanted to know where the practical operations were to be conducted.

Mr. NAYLOR said he had no intention to offer the slightest opposition to this motion, but he did see a difficulty in the way. They would be understood to be doing this upon the ground of counteracting what they were pleased to call the evil effects of proprietary medicines; at any rate, those proprietary articles that come under the definition of non-official remedies, one or two instances of which had been referred to. It seemed to him that in so doing the members of the Conference would place themselves in a somewhat inconsistent position, unless they were, as a body, prepared to be perfectly frank and generous in this matter. There were a great many gentlemen present who remunerated themselves from non-official remedies. If these gentlemen were prepared to place their knowledge at the command of the Conference, or rather through the Conference at the command of the profession, then they were in a perfectly logical position; but he did think there would be a degree of distrust in selecting certain preparations to be put into this compilation whilst members of the Conference were still reaping the benefit of certain proprietary articles themselves. Then there was a question whether a corporate body would feel that it was in that sense responsible for the individual action of certain members. He did not want to say one word against proprietary articles. If some method could be devised by which a proper selection could be made, if they were to use a new remedy which was known to all, which had received the sanction of the medical profession, but of which there was no authoritative formula in the Pharmacopœia, then he was quite in accord with the motion, but it seemed to him that it covered rather too wide a ground.

Dr. SYMES said he should take exception altogether to Mr. Naylor's position, or, rather, to the Committee working as Mr. Naylor understood it was to do.

Mr. MARTIN said that Mr. Naylor had quite misunderstood the drift of the resolution. It was not to publish the formulæ of secret remedies, but to counteract want of uniformity in the preparation of new drugs. He might refer to the case of jaborandi. They were frequently called upon to dispense jaborandi, when they had either to prepare the tincture or buy it ready made. In neither case had they the slightest idea of the strength of spirit used or the strength of the preparation. As he understood the motion, the object was to publish authoritative formulæ for such preparations, but in no way to analyse mistura magnesiæ cum bismutho (Jones), and publish that formula. With regard to carrying out the resolution it occurred to him some difficulty would arise with regard to the expenses, but the Pharmaceutical Society was about to endow a research laboratory which would be open to members of the Society, and that would be available to members of the Committee who might be appointed, or to any delegate working under their direction, for the purpose of carrying out such experiments as might be rendered necessary in the progress of the work. On the whole he cordially supported the motion.

Mr. LASCELLES-SCOTT supported the general object of the motion, but suggested that as far as possible the Conference should try to confine itself to the general subject, without attempting, for several reasons, to decide how the result should be accomplished. The moment it was agreed that such an object was desirable an unanimous vote would be passed in its favour, but the subject would be so replete with difficulties on mere matters of detail—although they might be difficulties which would clear away after a time by the process of natural selection—that he thought it would be well to keep only one or two objects firmly in view, viz., that it was desirable that the general terms of the motion should be confirmed with as hearty and unanimous a voice as possible, and that a Committee should be formed to report upon the subject to next year's Conference. This Committee should not trouble itself at first with these minor details, since at present they were only rocks ahead, which, however, by-and-bye might become the firm bases of further action. It had been suggested that this was a subject which should be taken up by the Pharmaceutical Society, but with all due deference thereto he thought from all he heard that that Society would hardly do justice to the subject—not from want of means, or from want of genius amongst the Council, or the members, but because it was so tied down by hard and fast rules, and by unwritten laws, which were even more inconvenient, that they would find themselves at loggerheads with the Government, with the Medical Council, and with the trade within six months, if they attempted to do anything of this kind. In order to dissociate what they wanted and had a right to hope for from what they did not want it should go forth to the world in the most distinct terms that the Conference did not propose in any shape or form to interfere with proprietary medicines or with mixtures of any kind. They should deal with preparations pure and simple, such, for instance, as urethan, terebene, or any drug or alkaloid containing, so far as they knew, only one substance, and tinctures, etc., prepared from it; but when they came to the mingling of two distinct medicinal substances together, all such should be dissociated entirely from the motion.

Mr. GROVES thought it would be useless for the Conference to proceed unless it worked in accordance with the wishes and feeling of the medical profession. The difficulty was occasioned principally by doctors writing for proprietary articles, and attaching names, and unless they could be induced to discontinue that practice he did not see what benefit would result from having the suggested non-official formulary. He should prefer to adopt the suggestion of Mr. Scott, and defer the further consideration of the subject for a year, or else that the Conference should approach the Pharmaceutical Council on the subject. By doing that, first of all, it would get the use of a laboratory in which to conduct experiments, and having an official connection with the Pharmaceutical Society the Committee might perhaps approach the British Medical Association, and obtain some practical result.

Mr. SOUTHALL, as a country pharmacist, thought it would be a great advantage if something in the way of an official formulary for certain tinctures and remedies could be prepared. This would not at all interfere with anything Mr. Martindale might publish. He published a great deal more than this Committee were likely to do; the Committee would rather give an official standing to the preparations, to the processes, and to the dose. Pharmacists often had mixtures brought back which perhaps were not very different, but had been differently prepared by another pharmacist.

Mr. HAMPSON supported the motion, which he thought pointed to the kind of work which ought to be undertaken by the Conference. If the work were satisfactorily done, the formulæ introduced under the seal of the Conference would be in the course of a short time accepted, not only by pharmacists, but by medical men, and if the medical men of the country accepted these formulæ as something like safeguards in prescribing, that would do away with a certain cupboard into which they were in the habit of putting obsolete and useless preparations. He had described that cupboard as the "chamber of horrors," because it seemed to him that was the proper designation for it. As had been observed, frequently pharmacists had to buy expensive bottles of this class of preparations, perhaps for one prescription, and after having used small portions, they put them into this chamber from whence they never came out again. He hoped this chamber would speedily be abolished, and that there would be something like proper formulæ sanctioned by an authoritative body. One other remark he might perhaps be allowed to make. He and others were extremely desirous that pharmacists should be allowed to take their proper position with respect to the national Pharmacopœia, and it appeared to him if they showed they were able to prepare these formulæ, and these were accepted as standards for the various new medicines as they came out, they would have adopted the first practical step to show their ability in framing a national Pharmacopœia.

Mr. WILLMOTT said the same idea occurred to him as had been mentioned by Mr. Groves. They seemed to be altogether ignoring the British Pharmacopœia. He remembered that Professor Attfield endeavoured to show that the British Pharmacopœia was really the work of British pharmacists by referring to the different papers written on the preparations which were subsequently criticized in the Journal; nevertheless, they appeared to require an extra pharmacopœia. With regard to preparations such as terebene, and so forth, the work now in contemplation was already exceedingly well done, and he did not know that much improvement could be made, but it was these proprietary preparations which constituted the chief difficulty. When a medical man ordered a proprietary preparation he did so presumably because he had faith in that preparation, and if he should still order mist. bismuthi, Jones, or liquor pepsini, Robinson, could any other preparation be properly substituted? Unless that difficulty be met in some way he feared such a publication would become a dead letter.

Mr. REYNOLDS, in reply, said it was very gratifying to find that the *consensus* of approval of his resolution had been so great, and not the less gratifying that it was an intelligent approval, because questions were suggested, and gentlemen wished to see their way clearly before taking the responsible step of joining in such an action. Mr. Schacht asked how this could be carried out. In the motion affirming the principle very naturally no attempt had been made at furnishing details, but Mr. Williams would, he was sure, allow him to say a word or two on the subject on which he was to move a resolution, viz., that a Committee of ten representative pharmacists should be nominated. He believed those names would command confidence whatever subject was placed in their hands. Those gentlemen had been able in the past to do a great deal of work, and they did not require a central laboratory and official staff. He was inclined to think that the larger amount of work came from private individuals. He did not find many papers dated from 17, Bloomsbury Square; he wished there were more, but certainly it might encourage Bloomsbury Square to put its oar in when a crew were taking such a voyage as this. He thought it was feasible as far as work went, and Mr. Williams's motion would accord supremacy to the Executive Committee. There would be a request for a very few pounds in money to pay the necessary expenses. Mr. Robinson spoke of the 'Year-Book,' and inquired whether it would not be superseded. The 'Year-Book' brought to their notice the inconsistency of their present position, because it put side by side the various formulæ, and the various strengths for things which passed under the same name. If at the end of the 'Year-Book' they saw, as the Americans now had, the official formulæ, they would know what had weight, and that others had merely the individual authority of the gentlemen who first suggested them. An annual revision would certainly be desirable. The rapidity with which elegant pharmacy, making medicines as pleasant as they could be made, progressed would render that necessary. The Pharmacopœia did not do that, and other things were introduced as more pleasant substitutes. Mr. Groves spoke of its being necessary to induce doctors to give up prescribing proprietary articles, but the best way to do that was to put a good substitute before them. At present they said, "What can we do? We want to cure our patients. Smith and Jones declare their elixirs cure everything," and the doctors unfortunately fall in with it. The argument, which had evidently affected some speakers, that they were taking a most important step, thus exhibiting their fitness to a voice in the National Pharmacopœia was one of the strongest in favour of the present resolution, and he was quite sure, as a matter of policy, that it was a wise thing to do.

The PRESIDENT having read the motion, put it to the meeting, and it was carried *nem. con.*

Mr. WILLIAMS said Dr. Symes complained that when he brought this subject before the Conference some years ago and obtained a vote it went no further, but the Conference this year was taking a considerable step in advance of all former Conferences. In the President's Address the abstract was brought into the concrete, and they had really something of a tangible character to argue about. The Committee which he was about to propose would at any rate have a tangible existence, and he hoped would not come to the same conclusion or no conclusion which Dr. Symes complained of on the former occasion. Mr. Reynolds had so completely gone into the matter that it was quite unnecessary to say much upon the general question, but one point only he might allude to. The Pharmaceutical Society had been mentioned as being more properly fitted for carrying out investigations of this character, and for giving them an official position. He had strongly supported on a great many occasions the suggestion that the Pharmaceutical Society should carry on researches in pharmacy proper, and he hoped that it would shortly take up the matter in a more serious manner than hitherto, and perhaps obtain important results. He was sure the members of the Conference would not feel jealous of the Society, but would be very glad to obtain information from any source possible, but he was beginning to fear that the Society would not be able to carry out to any great extent this proposal. The truth was that the educational duties of the Society would, he feared, swamp the merely abstract research question, and he began to fear that the two were almost incompatible. The Conference was not in any way bound up with educational requirements, and was, therefore, more at liberty. If they could spend money enough, and could utilize the co-operation of gentlemen who would undertake the serious work before them, they might perhaps be able to carry out that which he was very anxious to see performed. The motion was as follows:—

> "That the following, with power to add to their number, be the Committee for preparing a Formulary of Non-Official Remedies to report to the Executive Committee, and that the sum of £25 be placed at their disposal for expenses, Messrs. Greenish, T. P. Groves, Martindale, Symes, Thresh, N. H. Martin, W. A. H. Naylor, Maben, A. C. Abraham, and R. Reynolds."

Mr. HAMPSON, in seconding the motion, said the Pharmaceutical Society could help very much in this matter. For instance, if it were found that £25 was not enough the Conference might very graciously apply

to the Society for a grant of £100, and he was quite sure the Society would do good work in helping on such a very important undertaking as that now initiated.

Dr. SYMES said Mr. Hampson must be aware that the Council would have no power to make a grant of money to the Conference for any special work. As he had not an opportunity of speaking just now in reply to Mr. Naylor, he wished to say he thoroughly agreed with Mr. Williams's motion, and should be happy to join the Committee, and do the best he could, but he should certainly not join it if he thought the object was to publish a little book which was to rob Mr. Martindale of the fruits of the labour he had expended in the production of his. Neither should he join it if he thought the object was to rob pharmacists of the labour they had expended on some particular preparation. The same principle applied in both interests. The object of the Committee was to do good, broad work, not to set about to imitate preparations, but to indicate formulæ by which well-known preparations could be well prepared, and to give a sort of semi-official character to them. Even referring to Mr. Martindale, or to the makers of any good special preparation, they should, by the official work in an independent and liberal manner, be doing them much less harm than private individuals who lived on other men's brains, by attempting to imitate their preparations. He thought there was plenty of room for the Committee to act without encroaching on any person's rights, either as a maker of preparations or a publisher of books.

Mr. BARRON (Cheltenham), as a country chemist, said he hoped it would be made clear what the Committee were going to do. Hosts of things were foisted on the profession as drugs which were, in fact, secret remedies, and he was afraid very often a great deal of the charm was in the mystery. It would be a great boon if a large number of these preparations could be analysed, and people could know something about them. A year or so ago a prescription with bromidia in it was brought to him. He was quite at sea, and all his brethren in the town were equally so. The medical man said he knew nothing about it, only that he had been told it was efficacious for a certain class of disease. He was unaware himself that it was a proprietary secret nostrum prepared by enterprising men, who were really destroying the chemists' business. He did not want to behave dishonourably in any way, and if syrup of hypophosphites (Fellowes) were prescribed no honest man would use other than what was ordered, but at the same time he thought if a formula was published showing the composition of Fellowes's syrup a great many medical men would order that instead of the proprietary article. Although some gentlemen had spoken strongly on the matter, to the trade at large it would be a great boon if everything that was prescribed by medical men could be supplied by every chemist.

Mr. SYMONS asked if the financial condition of the Conference would permit of an outlay of £25, and also if the vote would be binding on the Executive Committee.

The PRESIDENT said the resolution would unquestionably bind the Committee. It was to be hoped that the usefulness of the formulary as it progressed would induce a great many persons not now members to join the Conference, and thus add to its stability and financial means. The President then put the motion, which was carried *nem. con.*

The reading of papers was then resumed with one on—

NOTE ON THE PREPARATIONS OF NUX VOMICA IN THE BRITISH PHARMACOPŒIA.

BY N. H. MARTIN, F.L.S.

Following the results of the scientific investigation of nux vomica by Messrs. Dunstan and Short, a new departure has been taken with regard to its two galenical preparations in our Pharmacopœia, and these are for the first time ordered to be made of a definite alkaloidal strength, the extract to contain a total of 15 per cent. of the mixed alkaloids strychnine and brucine, and the tincture to contain 1 grain of alkaloid per ounce. As the latter is ordered to be prepared by dissolving the extract in a mixture of spirit and water, it is presumed the alteration in colour, rather than in any other quality of the new tincture, was the cause of the frequent remarks made by physicians and others who prescribed it. For some time this caused me no surprise, but when, so lately as early in June of the present year, more than nine months after the publication of the Pharmacopœia, inquiries were still addressed to my firm as to the reason why our tincture was different in colour from that of some other makers, presumably purchased about the same time, it occurred to me that it might not be uninteresting or altogether profitless to collect samples of the tincture from chemists in different parts of the country, and to ascertain by analysis, in the first place, to what extent the new Pharmacopœia processes are followed, and, in the second place, whether the object of standardization, viz., uniformity, had been attained by the method adopted for carrying it into effect. Twenty-five samples of the tincture were collected for me by means of prescriptions written for "Tinct. Nucis Vomic. ℥ij" in towns between Falmouth and Newcastle-upon-Tyne, and the result, so far as the tincture is concerned, may be considered to represent fairly the condition of the preparations as found in our pharmacies at the present time.

In the examination of the samples so obtained, the method of procedure was as follows:—First, the specific gravities of the tinctures were taken, then a portion was evaporated over a water-bath until it ceased to lose weight, in order to ascertain the percentage of extract, and, finally, the total alkaloids were estimated by the second process given by Messrs. Dunstan and Short in their report of tincture of nux vomica (*Pharm. Journ.*, [3], xiv., 292); that is to say, the tincture was evaporated, the residue treated with dilute sulphuric acid, and, after the addition of ammonium hydrate, the alkaloids extracted by chloroform. The results are given in the following tables. The first table includes eleven tinctures, which, from their colour, were evidently prepared direct from nux vomica seeds, and the second table fourteen samples, which equally bear evidence of having been prepared by the method directed in the Pharmacopœia.

Analyses of Tinctures of Nux Vomica of a pale yellow colour.

No.	Specific gravity at 60 F°.	Percentage of dry extract.	Percentage of total alkaloids.
1	0·8365	·84	·157
2	0·8378	·56	·137
3	0·8408	·80	·137
4	0·8422	1·04	·187
5	0·8433	·62	·119
6	0·8434	·62	·214
7	0·8474	1·27	·285
8	0·8516	1·18	·279
9	0·8552	·94	·242
10	0·8864	1·31	·288
11	0·8892	1·20	·212

Nine of the tinctures in the first table have a specific gravity ranging from ·8365 to ·8552, dry extract from ·56 to 1·31 per cent., and total alkaloids of ·119 to ·285 per cent. Messrs. Dunstan and Short, in the paper above quoted, found an analysis of twelve samples give specific gravity from ·8377 to ·8552, and total alkaloids from ·124 to ·360 per cent. The other tinctures, No. 10 and 11, were manifestly prepared with a diluted spirit of about the strength ordered in the new Pharmacopœia, but as the colour coincided with the old preparation I have put them in this table. The second table gives the results of the examination of the fourteen tinctures, which from their colour and specific gravity have evidently

been prepared in the manner directed in the Pharmacopœia, and we find a specific gravity ranging from ·8804 to ·8965, dry extract from ·96 to 1·34 per cent., and total alkaloids from ·196 to ·313 per cent. The variation in the strength of the alkaloids is not so great as in the first table, or in that of Messrs. Dunstan and Short; but it is worthy of a moment's reflection, that whereas in my first table seven out of eleven, and in Messrs. Dunstan and Short's table eight out of twelve samples are below the standard of the Pharmacopœia, in the second table which I give ten samples out of fourteen are stronger than the Pharmacopœia standard; and it is quite conceivable that in a couple of years the variation will be as large as under the old Pharmacopœia, and with the tendency to a greater potency, which in this particular drug will be attended with at least as great danger and inconvenience to the public health.

Analyses of Tinctures of Nux Vomica of a light brown colour.

No.	Specific gravity at 60° F.	Percentage of dry extract.	Percentage of total alkaloids.
1	0·8804	1·00	·281
2	0·8818	1·18	·274
3	0·8824	·96	·196
4	0·8836	1·13	·242
5	0·8866	1·29	·219
6	0·8866	1·08	·313
7	0·8872	·98	·214
8	0·8880	1·24	·276
9	0·8902	1·27	·285
10	0·8914	1·16	·278
11	0·8922	1·21	·196
12	0·8925	1·25	·256
13	0·8933	1·03	·242
14	0·8965	1·34	·231

It will be seen from the details I have given that more than one third of the tinctures in use are still prepared according to the old Pharmacopœia, and that with regard to the remainder, the important feature in a typical tincture of nux-vomica, uniformity in alkaloidal strength, has not been attained by the process suggested by Messrs. Dunstan and Short, and made official in the Pharmacopœia.

Turning to the other preparation of nux vomica, I regret the time at my disposal has not permitted me to collect and analyse a similar series of samples of the extract, but some experiments I have made, taken in conjunction with the second table of tinctures given above, and with the table in Messrs. Dunstan and Short's paper on "Extract of Nux Vomica" (*Pharm. Journ.*, [3], xiv., 443), lead to the conclusion that the process devised by them and adopted in the Pharmacopœia yields a preparation so unstable that to call it a standardized preparation is misleading. This instability, of course, depends upon the hygroscopic properties of the freshly evaporated extract.

In reproducing Messrs. Dunstan and Short's table I have added another column to give the percentage of dry extract and have altered the sequence of the numbers, so as to make the column of total alkaloids an ascending scale from the lowest to the highest percentage. Thus arranged it will be seen at a glance that although there is a difference between the highest and the lowest total alkaloids of 7·21 per cent., no such difference is seen in the column of dry extract; in fact the highest percentage of alkaloids is yielded by 2·3 per cent. less of dry extract than the lowest. The inference from this is perfectly clear that so far as published evidence shows, there exists no relation between the amount of extractive matter and the amount of total alkaloids existing in different samples of nux vomica. The consequence is that we may have a sample rich in extractive, but poor in alkaloids, like No. 4 (No. 1 is too poor to be possibly brought to the standard), and in order to bring this to the standard alkaloidal strength it must be evaporated to a condition in which it is exceedingly hygroscopic and will rapidly deteriorate in strength by absorption of moisture. No. 11 of the tinctures may have been made from such an extract. On the other hand we may have a sample rich in alkaloid but comparatively poor in extractive, and this would have so large a percentage of moisture left in the finished product that it would be almost sure to become stronger under the ordinary conditions of storage and use. The tincture No. 1 may have been prepared from an extract of this class. My own experiments upon the extract also confirm this view. Four samples have been obtained from different sources and assayed by the Pharmacopœia process. The first contained 16·3 per cent. of total alkaloids. This extract, evaporated over a water-bath until it ceased to lose weight, yielded 15·2 per cent. of moisture and on exposing the dried extract to the air it reabsorbed 16·2 per cent. of moisture. The second sample contained 15·0 per cent. of total alkaloids, yielded 8·9 per cent. of moisture and reabsorbed 12 per cent. of ditto. The third sample contained 16·6 per cent. of alkaloids, yielded 12·7 per cent. of moisture and reabsorbed 14 per cent. of ditto. The fourth contained 16·8 per cent. of alkaloids, yielded 10 per cent. of moisture and reabsorbed 16·8 per cent. of ditto.

Messrs. Dunstan and Short's Table of Analyses of Extracts of Nux Vomica, with column showing percentage of dry extract.

No.	Percentage of moisture.	Percentage of dry extract.	Percentage of total alkaloid.	Percentage of strychnine.	Percentage of brucine.
1	15·5	84·5	10·32	4·19	6·13
2	13·8	86·2	12·25	4·87	7·38
3	16·0	84·0	12·49	5·53	6·96
4	13·9	86·1	12·53	5·17	7·36
5	16·7	83·3	15·15	6·63	8·52
6	15·7	84·3	15·16	7·08	8·08
7	19·7	80·3	15·64	7·44	8·20
8	13·6	86·4	15·78	6·41	9·37
9	16·0	84·0	15·94	6·84	9·10
10	17·3	82·7	16·24	5·81	10·43
11	15·9	84·1	17·12	8·58	8·54
12	17·8	82 2	17·54	7·52	10·02

I wish I had had time to carry these experiments further, but they are sufficient to prove the instability I have before mentioned. It requires no stretch of the imagination to suppose a chemist to have assayed his extract in the morning, and on being called upon on the evening of the same day to dispense a prescription containing it, to be guilty of using a preparation of either greater or less potency than the Pharmacopœia standard.

I must not be understood to underrate in the least degree the value of the work done by Messrs. Dunstan and Short upon this subject. I only regret they did not include amongst the objects of their investigation an exhaustive pharmaceutical, as well as "chemical and botanical" analysis of a sufficient series of samples of nux vomica, seeing that the practical object of their research was "to devise processes for the production of standard galenical preparations whereby the therapeutic action of these preparations shall be rendered as far as possible definite" (*Pharm. Journ.*, [3], xv., 157). If they had done this I think they would have been more disposed to endorse Mr. Schacht's statement that "without a great deal more knowledge than I think anyone is at present possessed of, any attempts to standardize the medical potency of extract of nux vomica must be fallacious" (*Pharm. Journ.*, [3], xiv., 851).

The PRESIDENT having moved a vote of thanks to Mr. Martin,

Mr. SCHACHT said he was not aware that Mr. Martin was investigating this subject, but he was glad to find that he agreed with him as to the difficulties which surrounded it, and in highly estimating the work done by the two gentlemen who had laboured so hard to unravel the problem. He rather thought his chief objection to the arguments of Messrs. Dunstan and Short was that they had scarcely sufficient ground for declaring the alkaloidal strength to represent the real potency of nux vomica and its preparations, alkaloidal strength being understood to include the alkaloids strychnine and brucine, whereas as yet no therapeutic authority had declared what was the medical potentiality of brucine. The fact that different samples of nux vomica afforded very different proportions of these two alkaloids ought also to be considered, so that although the total alkaloidal strength of two samples might be nearly identical, their medical efficacy might be very different, because one might contain a larger percentage of the more powerful alkaloid than the other. Mr. Martin's experience seemed to have led him to the conclusion that there was another source of difficulty in this intricate subject, and he was very glad to find that he did not wish to throw cold water on the previous investigations, but rather to indicate the direction in which further knowledge was required.

Mr. CONROY fully appreciated the work done on nux vomica by Messrs. Dunstan and Short, but at the same time he considered it a mistake pharmaceutically to prepare the tincture from the extract. The extract being made by heat, the natural combination of the alkaloids and acid was injured. It would be far preferable to make the tincture direct from the seeds in the old way, and adjust it to the strength required. He could fully endorse what Mr. Martin had said about the strength. Working on large quantities he had found the product from one parcel form a stiff extract when of the right alkaloidal strength, whereas that from another would form a thin extract. Of course a thin extract under ordinary conditions would lose moisture, and become much more potent.

Mr. H. W. JONES (Coventry) said he had had several cases brought to his notice in which the colour of this tincture had varied from a pale greenish tint to a very dark brown, showing that it was prepared directly from the seed, which gave a pale tincture, or from very varying qualities of extract. In the extracts in the market the difference might partly be accounted for by the quantity operated upon. If the extract were made on a small scale a very light product was obtained, but if a large quantity was operated on, and the heating process in the distillation had to be continued a longer time, the product was a much darker extract. In dissolving up the extract in the spirit he had found it absolutely necessary to make a final analysis of the tincture in order to get the exact strength. He agreed with Mr. Conroy that it was preferable to work directly on the seed.

Mr. MACKENZIE asked if Mr. Martin was satisfied that from a therapeutic point of view the old tincture was better than the new.

Mr. ALCOCK agreed with Mr. Conroy that the best way to prepare the tincture would be directly from the seeds, but the seeds should be very carefully manipulated first of all. The composition of these seeds was supposed to be this—that the alkaloids strychnine and brucine were combined with igasuric acid; this was a very delicate acid, and if the solution were left for any length of time or were exposed to heat it might undergo a change; some thought it might form lactic acid; at any rate it was a delicate acid, and so much evaporating might probably alter it entirely. They knew that the alkaloid strychnine might be heated for a long time in conjunction with strong sulphuric acid, so that that would not be affected. Probably the variability in the colour of the extract which Mr. Jones had spoken of might arise from this delicate acid having undergone some change during the process of evaporation. Some time ago he had to assay an extract, and found that it contained a quantity of chlorophyll, or what seemed to be chlorophyll; it might have come from seed, though he was not quite sure, but he would suggest that that might account for the peculiar greenish tinge which some of these tinctures had.

Mr. MARTIN, in reply to the question whether he had formed any opinion as to the therapeutical value of the old tincture as compared with the new, said his researches were undertaken purely from a pharmaceutical point of view, and he had had no opportunity of judging of the therapeutical effect. In reply to Mr. Schacht he would say that he had carefully avoided the subject of standardization, and the question of whether it was wise to adopt the total alkaloidal strength or the total strychnine or brucine as the standard. That had been dealt with exhaustively in the paper read by Mr. Schacht soon after Messrs. Dunstan and Short's, and it lay outside the scope of his small note to go into the question, but he believed it had been stated by a recent authority that experimenting with pure brucine put into his hands by a chemist it proved wholly inert when given to rats. If this were so the question whether it was advisable to take the total alkaloids or strychnine only as the standard became very important. The whole scope of his paper was to show that the method adopted in the British Pharmacopœia for standardizing these preparations was fallacious.

The next paper read was a—

NOTE ON THE PRESERVATION OF ETHYL NITRITE.

BY JOHN WILLIAMS, F.C.S., F.I.C.

For some time past I have been trying various plans with the view of making a solution of nitrite of ethyl, which should be of definite strength, and which should be fairly permanent.

None of my previous experiments have yielded results quite satisfactory, and I have lately tried glycerine, and I think with promising results, although sufficient time has not yet elapsed for me to speak positively.

It may be remembered that glycerine is already known to possess preservative properties in some cases in a very high degree. Thus sulphuretted hydrogen condensed into pure water rapidly decomposes, but if about a third of the weight of glycerine be added to the water the HS_2 can be preserved for many months without sensible change.

So with hydrocyanic acid, it may be in the memory of some members of this Conference that I pointed out at a meeting some seven or eight years ago with what effect this agent could be used as a preservative of the acid, and the result of some years' experience has quite confirmed the views I then put forward. Thus a solution containing 25 per cent. glycerine and 25 per cent. acid was prepared. This has been kept under ordinary conditions in a stoppered bottle, exposed to diffused light; for some years it retained its strength unimpaired, and it was again examined a week or two back, when after so many years it was found not to have become in any way discoloured, and to contain even now 12 per cent. of real acid. This, I think, is as good a result as could fairly be expected.

With nitrite of ethyl I have adopted the following plan:—A mixture of 1 part pure glycerine, and 2 parts of pure absolute alcohol was made. A given quantity of this liquid being taken, pure dry gaseous nitrite of ethyl was condensed with it to any extent desired by weight, so that a 5 per cent. or 10 per cent., or stronger solution could easily be made, the increase in weight from the absorption of the gas being the ready mode of obtaining the percentage. It was found that this liquid alcoholic glycerine could not be made to take up more than between 15 and 16 per cent. of the gas, the excess passing through, but not increasing the weight in any perceptible degree; doubtless if condensation aided by great cold was tried more gas could readily be got into the liquid if it was considered desirable.

The following table shows the results obtained up to the present time: —

Strength of solution as originally estimated by the passage of the gas.	Specific gravity.	Amount of NO yielded (by the nitrometer) of 5 c.c. corrected for solubility in the brine.	Percentage by weight found by nitrometer.
5 per cent. .	·922	68·5	4·74
10 per cent. .	·920	141·5	9·81
16 per cent. .	·917	225·6	15·69

All these solutions when added to water give off some of the nitrite ethyl as a gas with effervescence. To test them it is therefore necessary to first dilute with a known bulk of spirit; in other words, to bring them all down to about 2½ per cent, which appears to be the strongest solution which can be mixed with water without loss. The aqueous solution of this glycero-alcoholic solution of nitrite has a very pleasant flavour, and reminds one of certain wines of the dry sherry type, such as Amontillado, or Vino de Pasto.

These solutions have only been made a few weeks, but have been tested several times, and appear to be as strong now as when first made, so I hope that we shall be able in future to make a solution which will at any rate keep for a reasonable time without deterioration or loss of strength.

At the close of the paper Mr. Williams showed the effect of adding water to solutions of different strengths. Effervescence caused by the escape of the gaseous nitrite was observable in all the solutions containing more than 2½ per cent., and in the case of the stronger solutions the effervescence was very brisk.

The PRESIDENT said the Conference had to thank Mr. Williams for this excellent paper, which was only one of a series, and he hoped they would have many more of the like kind from him.

Mr. A. H. ALLEN (Sheffield) said he was delighted to find that Mr. Williams had succeeded in devising a preparation which bid fair to keep with all reasonable accuracy and which would be probably of great advantage to pharmacists generally. He was much struck with the experiments Mr. Williams had shown, proving that the amount of gas which could be retained on dilution did not exceed 2½ per cent. It was quite possible that the attempts some had made to make a strong solution of ethyl nitrite, and so obtain what they thought a very good preparation, had rather tended to defeat their own object. It seemed that the 2½ per cent. contained in the B.P. preparation was amply strong enough, and if medical men could only be persuaded to prescribe so much of Mr. Williams's glycerine solution containing a certain amount of nitrous ether, as distinguished from so much spirit of nitrous ether, it would very much facilitate matters. In the first place the assay of it was easy; the pharmacist could easily satisfy himself it was correct. But Mr. Williams had now introduced a method by which even assay was unnecessary. He was also pleased to find that Mr. Williams had found that the means he (Mr. Allen) had suggested of assaying these preparations by means of the nitrometer was a useful one in practice. It was never pretended that it possessed great accuracy, but merely that it was a ready method of ascertaining with considerable approach to accuracy the strength of such preparations.

Mr. KEMP (Bombay) asked if the strong solution containing 16 per cent. was capable of easy dilution to the lower strength, because the more concentrated form would be more convenient for export.

Mr. WILLIAMS said the more concentrated preparation would travel better and keep better than the weaker; and it could be diluted with a mixture of glycerine and alcohol when required for use. The proportion would be about 6 parts of the mixture to 1 of the solution to bring it down to 2½ per cent.

Mr. MACEWAN remarked that this preparation had nothing to do with the medicinal preparation, spirit of nitrous ether, and it occurred to him that it might possibly be dangerous, that nitroglycerine might be formed by deposition of the nitrate.

Mr. WILLIAMS said he had no wish at all to recommend this as a substitute for spirit of nitre; it was simply a question of the solution of nitrite of ethyl in a medium which would keep it.

Mr. MARTINDALE remarked that the aldehyde and paraldehyde which were formed probably contributed to the active properties of the preparation known as spirit of nitrous ether.

Mr. W. LASCELLES-SCOTT thought it a great pity that it should go forth that there was the slightest probability that nitrite of ethyl preserved by this process could or would form nitroglycerine. There was no evidence of that whatever, and what little evidence there was was against it.

Mr. SCHACHT thought most pharmacists were in the habit of practising the very elegant method proposed by Mr. Allen for determining the strength of sweet spirit of nitre, but that test, excellent as it might be, and all other tests that he knew of, went mainly to show the quantity of the nitrous acid radicle in the specimen, and in no way determined whether that radicle was combined as an ether, or in any other form. He should like to ask if anyone knew of any process which would show absolutely the quantity of nitrite of ethyl in any mixed sample. He was speaking of this subject in his own neighbourhood the other day when giving a few instances of what he thought was a deficiency in their knowledge, and he was able to show the young men there assembled a little bottle of stuff which would answer all the B.P. tests—having exactly the right specific gravity, giving the right indication with litmus, precisely answered what was required with the ferrous sulphate test, and would give exactly the quantity of nitric oxide gas indicated by Mr. Allen's elegant process—and yet there was not a particle of ethyl nitrite in the preparation. This was a challenge to those young men to discover, if they could, a real chemical test for nitrite of ethyl, which as far as he knew had yet to be found.

Mr. ALLEN remarked, that as Mr. Williams had pointed out, any free nitrous acid was represented by the gas liberated before the sulphuric acid was added. Free acetic acid would have the same effect, for it would decompose the nitrite and produce free nitrous acid. What was got afterwards on adding sulphuric acid to the tube was the nitrous radicle existing in the form of nitrites, and it might fairly be assumed in any preparation which was not cooked for the purpose of puzzling a student, that it existed in the form of ethereal nitrite. If you put in nitrite of potassium there would be a solid residue left, which could be detected in various ways; but they were really not concerned with that in the actual examination of such preparations. On the other hand, if there were nitroglycerine present that was a nitrate, not a nitrite, and would not be decomposed with the given test in the nitrometer. On the other hand, nitrite of amyl would give off nitric oxide resulting from its decomposition in the nitrometer, in the same way as nitrite of ethyl.

Mr. ALCOCK said there were some eminent pharmacists who objected to calling glycerine a preservative, but here was a very good example showing that it was of service as such, though, of course, it might not be equally useful for all things. He was of opinion that it is a preservative, and was pleased to find it so powerful in this case. Glycerine undoubtedly acted in this way when added to fluid preparations of pepsine.

Mr. WILLIAMS said he thought the idea of nitroglycerine being formed was rather a scare, and it would be well to wait until it was proved that it could be formed

by such a process. With regard to Mr. Schacht's observations, it was quite true there was no test for nitrite of ethyl, but you must take things with their surroundings. You might make up a bogus preparation which would puzzle a student, but that was hardly a question within the scope of the Conference.

The Conference then adjourned until 2 o'clock.

Upon resuming at 2 o'clock a paper was read on—

The Belladonna Liniment of the British Pharmacopœia.

BY FRANCIS RANSOM.

Amongst the numerous criticisms which the additions and alterations of the new Pharmacopœia have evoked, occasional reference has been made to the change in the method of preparation of belladonna liniment.

The alteration has, as a rule, been regarded with favour, and the following experiments were commenced with the object of ascertaining whether such approval is deserved, and also whether the present process is the best that can be devised.

A liniment (a) was firstly prepared in exact accordance with the directions given in the 1885 Pharmacopœia, as follows :—

"Take of—

Belladonna root in 40 powder. . .	20 ounces
Camphor.	1 ounce.
Rectified spirit a sufficiency to make	30 fl. ounces.

Mix the belladonna with 20 fluid ounces of the spirit, and macerate in a closed vessel for three days, agitating occasionally; then transfer to a percolator, and when the liquor ceases to pass, continue the percolation with more of the spirit, allowing the liquor to drop into a receiver containing the camphor, until the product measures the quantity above stated."

The alkaloidal value of the product was then ascertained by the following process, which was used throughout the succeeding experiments.

Fifty c.c. of the liniment are evaporated nearly to dryness over a water-bath with a gentle heat. The extract thus obtained is dissolved as far as possible in about 5 c.c. of warm distilled water and filtered, the residue being washed with diluted hydrochloric acid until nothing further is removed or until a drop of a solution of iodine and iodide of potassium added to a few drops of the washings in a watch glass ceases to give any precipitate. The filtrate is then rendered alkaline with ammonia, poured into a stoppered glass separator, and agitated for a few minutes with chloroform, which removes the alkaloid and any camphor that had remained in solution. The alkaline liquid is again washed with chloroform until no further alkaloid is removed.

The mixed chloroformic solutions are twice agitated with diluted hydrochloric acid, which removes the alkaloid, but leaves camphor and other impurities in solution. After separation the acid liquid is rendered alkaline with excess of ammonia, and the alkaloid removed by agitation with two successive 5 c.c. of chloroform. The latter allowed to evaporate spontaneously in a weighed dish leaves a light crystalline residue, which, when dried over a water-bath until constant, represents the amount of atropine and hyoscyamine in the 50 c.c., or, if doubled, the percentage by volume in the liniment examined.

This method of estimation is almost identical with that proposed by Professor Dunstan and myself for the assay of the alkaloids in the alcoholic root extract of belladonna and used by us in our examination of commercial samples (*Pharmaceutical Journal*, March 13, 1886).

In the present case the liniment prepared in exact accordance with the official directions yielded an alkaloidal residue weighing ·137 grm. = ·274 per cent. In order to obtain the 30 fluid ounces of final product required by the Pharmacopœia 54 fluid ounces of rectified spirit had to be used in the process.

My attention was first directed to ascertain whether it be possible to prepare a liniment of equal strength with a less expenditure of time and alcohol than was here required. It is also desirable, if possible, that the official process for galenical preparations should be available for manufacturing purposes on a larger scale than indicated by the quantities given in the Pharmacopœia. It is generally found in processes involving percolation, that extreme fineness of the powder operated upon is a disadvantage in dealing with large quantities, although perfectly suitable when only one or two pounds of the substance are used. The heavier the weight of the column of material be, the more liable it is to get blocked at the bottom of the percolator, if the powder be in a very fine state of division.

With these considerations in view a liniment (a') was prepared in the proportions directed by the Pharmacopœia, but with the following alterations in the process. The root was not so finely powdered, being passed through a sieve having twenty instead of forty meshes to the linear inch. Instead of continuing the percolation until 30 fluid ounces of percolate had passed through, the marc was subjected to pressure (in a small tincture press) when 40 fluid ounces of spirit had been used, this being found by experiment to be about the amount necessary to obtain the final 30 ounces required. By this modification a saving of 14 fluid ounces of rectified spirit was thus effected and less labour was required in powdering the root. Fifty c.c. of this liniment were then estimated by the method already described, and the residue when dried weighed ·139 grm. = ·278 per cent.

Two other liniments were prepared from an inferior root with similar results, (b) being prepared in exact accordance with the Pharmacopœia and (b') with the modifications already described. The following table shows the comparative results :—

(a)	·137 grm.	= ·274	per cent by volume.
(a')	·139 grm.	= ·278	,, ,,
(b)	·0285 grm.	= ·057	,, ,,
(b')	·032 grm.	= ·064	,, ,,

From this it appears that a slightly better result is obtained by the modified process, and a considerable economy in alcohol is effected.

That pressure is of value in the alkaloidal extraction was further indicated by the fact, that a liniment prepared from fifty pounds of root in still coarser powder, and employing hydraulic pressure, was found to be slightly stronger than that prepared from the same root by the official process.

Some experiments were next directed to ascertain whether the foot-note in the new Pharmacopœia, stating that improved exhaustion requires the increased volume of spirit as compared with the 1867 Pharmacopœia (*i.e.*, 30 instead of 20 fluid ounces) is correct. Two liniments (a'') and (c'') were prepared according to the 1867 Pharmacopœia with results as indicated below (a) and (c) being liniments prepared from the same roots according to the 1885 instructions.

(a)	·137 grm. alkaloid	= ·274	per cent.
(a'')	·1285 grm. ,,	= ·257	,,
(c)	·0535 grm. ,,	= ·107	,,
(c'')	·059 grm. ,,	= ·118	,,

It will be seen by the above that in one case the new liniment contains the larger percentage of alkaloid, while in the latter that prepared according to the old form is slightly the stronger. Practically I think we may say that the two liniments are about the same strength, much, however, depending upon the manufacturer's idea as to the meaning of a coarse powder.

The more explicit directions in the new Pharmacopœia as to the degree of disintegration to which various drugs shall be reduced before exhaustion are undoubtedly an improvement, although it may be that in some cases a powder of unnecessary fineness is ordered.

The next point determined was the extent to which atropine and hyoscyamine are removed from the root by the present official process for the preparation of the lini-

ment. Two samples of root were estimated by the method proposed by Professor Dunstan and myself in a paper on "The Assay of Atropa Belladonna" (*Pharm. Journ.*, Feb. 9, 1884). The first specimen (*a*) consisted of small foreign roots selected from a bale of fair appearance. The second (*b*) was mostly large English roots, derived from plants of several years' growth. The results obtained were as follows :—

(*a*) ·58 per cent. alkaloid.
(*b*) ·255 „ „ „

Liniments prepared from these by the official process contained respectively ·274 and ·107 per cent. alkaloid. As, however, 30 fluid ounces of the final product represent only 20 ounces of the dried root, it was necessary to multiply these figures by 1½ to indicate the proportion of alkaloid removed from the root. We then arrive at the following results :—

(*a*) ·274 × 1·5 = ·411 per cent. = 71 per cent. of the total atropine and hyoscyamine in root.

(*b*) ·107 × 1·5 = ·161 per cent. = 63 per cent. of the total atropine and hyoscyamine in root.

The above indicates, as might be expected, that the exhaustion is far from complete, and also that the root containing the larger percentage of alkaloid is further exhausted than the weaker.

The great difference in the alkaloidal value of the roots used, and consequently of the respective liniments prepared therefrom, induced me to continue the investigation somewhat further than originally intended.

The fact that the young roots are much richer in atropine than those of older growth was first pointed out by Lefort in 1872 (*Journ. de Pharm.*, xv., pp. 265 and 337). The percentages recorded by him, and also by Dragendorff, some years later, vary from ·21 to ·6 per cent., and my own experience tends to corroborate the conclusion arrived at by the former chemist, that the proportion of atropine in the root of *Atropa Belladonna* is extremely variable.

Such being the case, some means should, if possible, be taken to ensure some degree of uniformity in the strength of a preparation of so much importance and in such constant use as belladonna liniment, for it has already been shown that it is liable to at least as much, and possibly more variation than the root itself.

It was suggested by Umney in 1875 (*Pharm. Journ.*, [3], v., 281) that the liniment should be prepared from a fixed amount of the alcoholic extract of the root.

From recent investigations (*Pharm. Journ.*, March 13, 1886) it has, however, been shown that this extract, as met with in commerce, is far from uniform in strength, the specimens examined containing from 1·65 to 4·45 per cent. of atropine and hyoscyamine.

In describing the root to be used for all official preparations, the Pharmacopœia states that it is "from one to two feet long, and from half an inch to two or more inches thick." The length here given probably refers to the fresh unbroken root, as when dried it is generally met with in much shorter pieces. By selecting belladonna of this description roots of almost any age would be included, excepting the smallest, which are generally the youngest, and, as has been shown, the richest in atropine. Probably the only way of ensuring an article at all constant in strength would be the introduction of a standardized preparation. If the extract were thus standardized, Umney's suggestion could be advantageously carried out, and a liniment prepared from a definite weight of extract would always contain a known percentage of atropine and hyoscyamine. A judicious selection of roots would then be necessary, and probably some of the rubbish now occasionally met with would have to be discarded. A process for the preparation of such an extract could easily be devised, and would be quite as workable and reliable as that already employed for the extract of nux vomica.

In order to ascertain the average strength of the present liniment as met with in commerce, I assayed the following samples obtained from various sources :—

(1) ·255 grm. atropine and hyoscyamine in 100 c.c. liniment.

(2) ·067 grm. atropine and hyoscyamine in 100 c.c. liniment.

(3) ·152 grm. atropine and hyoscyamine in 100 c.c. liniment.

(4) ·224 grm. atropine and hyoscyamine in 100 c.c. liniment.

(5) ·158 grm. atropine and hyoscyamine in 100 c.c. liniment.

(6) ·274 grm. atropine and hyoscyamine in 100 c.c. liniment.

Of these Nos. 1 and 4 were made with methylated spirit, and Nos. 5 and 6 were specimens already prepared by myself in strict accordance with the Pharmacopœia, and working upon 20 ounces of root, the amount therein stated.

From these results it appears that ·2 per cent. is about the average strength, but it might be well to examine more samples before fixing a strength for a standardized preparation.

The fluorescence due to chrysatropic acid was more or less evident in the alkaline solutions obtained during the estimations, and was especially noticeable in those preparations which proved to be richest in atropine and hyoscyamine.

The average strength of the alcoholic extract as indicated by the investigations already referred to is 2·9 per cent. If the strength of the extract could be relied on as constant, say 3 per cent., the formula for preparing the liniment would then be as simple as that already introduced for the preparation of tincture of nux vomica.

The time is probably not far distant when various official preparations will be directed to be standardized, besides those already so ordered.

Although the results recently published by W. F. Southall, on his examination of commercial liquid extract of cinchona are not encouraging, we may reasonably hope that the advantage of using preparations of known strength will soon become more fully recognized, and if insisted upon, the care and experience necessary on the part of chemists for their production will doubtless be forthcoming.

The PRESIDENT having moved a vote of thanks to Mr. Ransom,

Mr. MOSS said he could confirm Mr. Ransom's experiences with regard to percolation. When working on a small scale, No. 20 powder might be used with a satisfactory result, but if the bulk of the material were increased, so that the percolator contained a large quantity of the ground root, the powder must be somewhat coarser. There was all the more reason for this, because the intentions of the Pharmacopœia were not always perhaps strictly carried out by drug grinders. A No. 40 powder, as he understood it, would pass through a 40 sieve, but would not give much powder which would pass through a smaller sieve. In grinding these roots, an absolutely uniform powder could not be produced, and a 20 powder would contain some which would go through a finer sieve even than a 40, or perhaps a 60, and in percolating with large quantities, probably the finer particles in the upper part of the percolator got washed down into the lower part, and so choked it up. For that reason it was necessary to use a coarser powder when working with large quantities.

Mr. UMNEY said pharmacists had to thank Mr. Ransom and Mr. Dunstan for many experiments in the direction of standardizing drugs, and the time had now come when the alcoholic extract of belladonna root should be standardized, so as to get over some of the difficulties to which he had alluded. He found the extract variable; this no doubt arose in great measure from imperfect percolation on the one hand, and from variations in the

root on the other. The younger root, as he gathered, yielded more alkaloid than the older. He must say he had overlooked the experiments by a French chemist to which Mr. Ransom had referred. He could quite corroborate the statement that drug grinders had not quite followed the instructions of the Pharmacopœia as to the production of No. 20 or No. 40 powder. Some time ago, at Professor Redwood's request, he sent him a complete set of powders and had quite a smart controversy with him on the subject, but was obliged to give in at last, for the professor pointed to three or four words in the Pharmacopœia, which were unmistakable. When grinding a powder to pass a 40 mesh sieve, it was not intended that there should be a large quantity of smaller sized powder in it, but these powders were not very easy to prepare. In crushing roots like belladonna by millstones, a large quantity of very fine powder was produced. Professor Redwood said that such ought to be removed, but the question arose what was to be done with it if it could not be used up in some form or other.

Dr. SYMES pointed out that this differentiation of the size of powder, although very desirable in one view, might prove a source of error. It was well known that in taking either a root or stem a certain portion, either the medullary or cortical portion, would powder more freely and form a finer powder than the other; to sift out the finer powder might simply separate the starchy matter, and so increase the strength of the residue, or on the other hand the strength might be diminished. In the case of ipecacuanha, he should think the effect of rejecting the coarser portion would be to increase the strength considerably, because the active portion would grind the finest. In his view the indications of the Pharmacopœia should only be followed in minute detail when they commended themselves to common sense.

Mr. UMNEY remarked that this was the line of argument which he followed with Professor Redwood.

Mr. KEMP suggested that the difficuly arising from having a large quantity of powder in the percolator, might be got over by introducing a few layers of filtering paper, so as to prevent the finer portions of powder being carried down by the menstruum.

Mr. H. W. JONES thought it had been undoubtedly shown that it was not right to take the coarser portion of the powder only, but to grind up a definite amount of root, and take it as it was. On the manufacturing scale it was not always an advantage to proceed very quickly.

Mr. HOLMES said one point came out very clearly from this paper, viz., that the results obtained in working with small quantities were very different to those obtained on a large scale; it would be necessary, therefore, in compiling a future Pharmacopœia, in order that practical pharmacists engaged in wholesale as well as in retail business should be consulted.

The PRESIDENT remarked, that in using a mortar the cortical portion of ipecacuanha root was reduced to a powder with very little exertion, but to powder the medullary portion required very great labour. He could quite understand that if the medullary portion were rejected a much stronger preparation would be the result. This paper brought to the front two very important points, one regarding the sieves, and the other the percolation, and the question was whether the substance to be percolated should be in a fine powder, or rather coarse. There was much to be said on either side, but there was one point he should like to have explained by Mr. Ransom or Mr. Umney. He could not understand why, in making belladonna liniment, the root should be prescribed in the Pharmacopœia when it had been determined beyond question that the leaves contained a larger proportion of the alkaloid than the root.

Mr. RANSOM said he should imagine the alkaloid was almost as variable in the leaf as in the root; the liniment would be a very different preparation made from the leaf, and it would be rather awkward to alter it. With regard to standardizing preparations, there could be no doubt that greater uniformity should be obtained than was yet arrived at in many of these things and it seemed to him that preparations of belladonna might be more usefully and easily standardized than many others. There were two alkaloids, atropine and hyoscyamine; the atropine was always much in excess, and the atropine of commerce probably always contained hyoscyamine.

(*To be continued.*)

The British Association for the Advancement of Science.

FIFTY-FIFTH ANNUAL MEETING.

THE PRESIDENT'S ADDRESS.

(*Concluded from page* 244.)

At the present time the North Atlantic presents some very peculiar and in some respects exceptional features, which are most instructive with reference to its past history. The great internal plateau of the American continent is now dry land; the passage across Central America between the Atlantic and Pacific is blocked; the Atlantic opens very widely to the north; the high mass of Greenland towers in its northern part. The effects are that the great equatorial current running across from Africa and embayed in the Gulf of Mexico, is thrown northward and eastward in the Gulf Stream, acting as a hot water apparatus to heat up to an exceptional degree the western coast of Europe. On the other hand, the cold Arctic current from the polar seas is thrown to the westward, and runs down from Greenland past the American shore.* The pilot chart for June of this year shows vast fields of drift ice on the western side of the Atlantic as far south as the latitude of 40°. So far, therefore, the Glacial age in that part of the Atlantic still extends; this at a time when, on the eastern side of the ocean, the culture of cereals reaches in Norway beyond the Arctic Circle. Let us inquire into some of the details of these phenomena.

The warm water thrown into the North Atlantic not only increases the temperature of its whole waters, but gives an exceptionally mild climate to Western Europe. Still the countervailing influence of the Arctic currents and the Greenland ice is sufficient to permit icebergs which creep down to the mouth of the Strait of Belle Isle, in the latitude of the south of England, to remain unmelted till the snows of a succeeding winter fall upon them. Now let us suppose that a subsidence of land in tropical America were to allow the equatorial current to pass through into the Pacific. The effect would at once be to reduce the temperature of Norway and Britain to that of Greenland and Labrador at present, while the latter countries would themselves become colder. The northern ice, drifting down into the Atlantic, would not as now be melted rapidly by the warm water which it meets in the Gulf Stream. Much larger quantities of it would remain undissolved in summer, and thus an accumulation of permanent ice would take place along the American coast at first, but probably at length even on the European side. This would still further chill the atmosphere, glaciers would be established on all the mountains of temperate Europe and America,† the summer would be kept cold by melting ice and snow, and at length all Eastern America and Europe might become uninhabitable, except by arctic animals and plants, as far south as perhaps 40° of north latitude. This would be simply a return of the Glacial age. I have assumed only

* I may refer here to the admirable expositions of these effects by the late Dr. Carpenter, in his papers on the results of the explorations of the *Challenger*.

† According to Bonney the west coast of Wales is about 12° above the average for its latitude, and if reduced to 12° below the average its mountains would have large glaciers

one geographical change ; but other and more complete changes of subsidence and elevation might take place, with effects on climate still more decisive ; more especially would this be the case if there were a considerable submergence of the land in temperate latitudes.

We may suppose an opposite case. The high plateau of Greenland might subside or be reduced in height, and the openings to Baffin's Bay and the North Atlantic might be closed. At the same time the interior plain of America might be depressed, so that, as we know to have been the case in the Cretaceous period, the warm waters of the Mexican Gulf would circulate as far north as the basins of the present great American lakes. In these circumstances there would be an immense diminution of the sources of floating ice, and a correspondingly vast increase in the surface of warm water. The effects would be to enable a temperate flora to subsist in Greenland, and to bring all the present temperate regions of Europe and America into a condition of subtropical verdure.

It is only necessary to add that we know that vicissitudes not dissimilar from those above sketched have actually occurred in comparatively recent geological times, to enable us to perceive that we can dispense with all other causes of change of climate, though admitting that some of them may have occupied a secondary place.* This will give us, in dealing with the distribution of life, the great advantage of being tied up to definite astronomical cycles of glaciation, which may not always suit the geological facts, and of correlating elevation and subsidence of the land with changes of climate affecting living beings. It will, however, be necessary, as Wallace well insists, that we shall hold to that degree of fixity of the continents in their position, notwithstanding the submergences and emergences they have experienced, to which I have already adverted. Sir Charles Lyell, more than forty years ago, published in his 'Principles of Geology' two imaginary maps which illustrate the extreme effects of various distribution of land and water. In one all the continental masses are grouped around the equator. In the other they are all placed around the poles, leaving an open equatorial ocean. In the one case the whole of the land and its inhabitants would enjoy a perpetual summer, and scarcely any ice could exist in the sea. In the other the whole of the land would be subjected to an arctic climate, and it would give off immense quantities of ice to cool the ocean. But Lyell did not suppose that any such distribution as that represented in his maps had actually occurred, though this supposition has been sometimes attributed to him. He merely put what he regarded as an extreme case to illustrate what might occur under conditions less exaggerated. Sir Charles, like other thoughtful geologists, was well aware of the general fixity of the areas of the continents, though with great modifications in the matter of submergence and of land conditions. The union, indeed, of these two great principles of fixity and diversity of the continents lies at the foundation of theoretical geology.

We can now more precisely indicate this than was possible when Lyell produced his 'Principles,' and can reproduce the conditions of our continents in even the more ancient periods of their history. Some examples may be taken from the history of the American continent, which is more simple in its arrangements than the double continent of Europ-asia. We may select the early Devonian or Erian period, in which the magnificent flora of that age—the earliest certainly known to us—made its appearance. Imagine the whole interior plain of North America submerged, so that the continent is reduced to two strips on the east and west, connected with a belt of Laurentian land on the north. In the great mediterranean sea thus produced the tepid water of the equatorial current circulated, and it swarmed with corals, of which we know no less than one hundred and fifty species, and with other forms of life appropriate to warm seas. On the islands and coasts of this sea was introduced the Erian flora, appearing first in the north, and with that vitality and colonizing power of which, as Hooker as well shown, the Scandinavian flora is the best modern type, spreading itself to the south.* A very similar distribution of land and water in the Cretaceous age gave a warm and equable climate in those portions of North America not submerged, and coincided with the appearance of the multitude of broad-leaved trees of modern types introduced in the early and middle Cretaceous, and which prepared the way for the mammalian life of the Eocene. We may take a still later instance from the second continental period of the later Pleistocene or early Modern, when there would seem to have been a partial or entire closure of the North Atlantic against the Arctic ice, and wide extensions seaward of the European and American land, with possibly considerable tracts of land in the vicinity of the equator, while the Mediterranean and the Gulf of Mexico were deep inland lakes.† The effect of such conditions on the climates of the northern hemisphere must have been prodigious, and their investigation is rendered all the more interesting because it would seem that this continental period of the post-Glacial age was that in which man made his first acquaintance with the coasts of the Atlantic, and possibly made his way across its waters.

We have in America ancient periods of cold as well as of warmth. I have elsewhere referred to the boulder conglomerates of the Huronian, of the Cambrian and Ordovician, of the Millstone-grit period of the Carboniferous and of the early Permian ; bus would not venture to affirm that either of these periods was comparable in its cold with the later Glacial age, still less with that imaginary age of continental glaciation assumed by certain of the more extreme theorists.‡ These ancient conglomerates were probably produced by floating ice, and this at periods when in areas not very remote temperate floras and faunas could flourish. The Glacial periods of our old continent occurred in times when the surface of the submerged land was opened up to the northern currents, drifting over it mud and sand and stones, and rendering nugatory, in so far at least as the bottom of the sea was concerned, the effects of the superficial warm streams. Some of these beds are also peculiar to the eastern margin of the continent, and indicate ice-drift along the Atlantic coast in the same manner as at present, while conditions of greater warmth existed in the interior. Even in the more recent Glacial age, while the mountains were covered with snow and the lowlands submerged under a sea laden with ice, there were interior tracts in somewhat high latitudes of America in which hardy forest trees and herbaceous plants flourished abundantly ; and these were by no means exceptional "interglacial" periods. Thus we can show that while from the remote Huronian period to the Tertiary the American land occupied the same position as at present, and while its changes were merely changes of relative level as compared with the sea, these have so influenced the ocean currents as to cause great vicissitudes of climate.

Without entering on any detailed discussion of that last and greatest Glacial period which is best known to us, and is more immediately connected with the early history of man and the modern animals, it may be proper to make a few general statements bearing on the relative importance of sea-borne and land ice in producing those

* More especially the ingenious and elaborate arguments of Croll deserve consideration ; and, though I cannot agree with him in his main thesis, I gladly acknowledge the great utility of the work he has done.

* As I have elsewhere endeavoured to show ('Report on Silurian and Devonian Plants of Canada'), a warm climate in the Arctic region seems to have afforded the necessary conditions for the great colonizing floras of all geological periods. Gray had previously illustrated the same fact in the case of the more modern floras.

† Dawkins, *Popular Science Monthly*, 1873.

‡ 'Notes on Post-Pliocene of Canada.' Hicks, "Pre-Cambrian Glaciers," *Geol. Mag.*, 1880.

remarkable phenomena attributable to ice action in this period. In considering this question it must be borne in mind that the greater masses of floating ice are produced at the seaward extremities of land glaciers, and that the heavy field-ice of the Arctic regions is not so much a result of the direct freezing of the surface of the sea as of the accumulation of snow precipitated on the frozen surface. In reasoning on the extent of ice action, and especially of glaciers in the Pleistocene age, it is necessary to keep this fully in view. Now in the formation of glaciers at present—and it would seem also in any conceivable former state of the earth—it is necessary that extensive evaporation should conspire with great condensation of water in the solid form. Such conditions exist in mountainous regions sufficiently near to the sea, as in Greenland, Norway, the Alps, and the Himalayas; but they do not exist in low Arctic lands like Siberia or Grinnel-land nor in inland mountains. It follows that land glaciation has narrow limits, and that we cannot assume the possibility of great confluent or continental glaciers covering the interior of wide tracts of land. No imaginable increase of cold could render this possible, inasmuch as there could not be be a sufficient influx of vapour to produce the necessary condensation; and the greater the cold, the less would be the evaporation. On the other hand, any increase of heat would be felt more rapidly in the thawing and evaporation of land ice and snow than on the surface of the sea.

Applying these very simple geographical truths to the North Atlantic continents, it is easy to perceive that no amount of refrigeration could produce a continental glacier, because there could not be sufficient evaporation and precipitation to afford the necessary snow in the interior. The case of Greenland is often referred to, but this is the case of a high mass of cold land with sea, mostly open, on both sides of it, giving therefore, the conditions most favourable to precipitation of snow. If Greenland were less elevated, or if there were dry plains around it, the case would be quite different, as Nares has well shown by his observations on the summer verdure of Grinnel-land, which, in the immediate vicinity of North Greenland, presents very different conditions as to glaciation and climate.* If the plains were submerged, and the Arctic currents allowed free access to the interior of the continent of America, it is conceivable that the mountainous regions remaining out of water would be covered with snow and ice, and there is the best evidence that this actually occurred in the Glacial period; but with the plains out of water this would be impossible. We see evidence of this at the present day in the fact that in unusually cold winters the great precipitation of snow takes place south of Canada, leaving the north comparatively bare, while as the temperature becomes milder the area of snow deposit moves farther to the north. Thus a greater extension of the Atlantic, and especially of its cold ice-laden Arctic currents, becomes the most potent cause of a glacial age.

I have long maintained these conclusions on general geographical grounds, as well as on the evidence afforded by the Pleistocene deposits of Canada; and in an address the theme of which is the ocean I may be excused for continuing to regard the supposed terminal moraines of great continental glaciers as nothing but the southern limit of the ice-drift of a period of submergence. In such a period the southern margin of an ice-laden sea where its floe-ice and bergs grounded, or where its ice was rapidly melted by warmer water, and where consequently its burden of boulders and other *débris* was deposited, would necessarily present the aspect of a moraine, which by the long continuance of such conditions might assume gigantic dimensions. Let it be observed, however, that I fully admit the evidence of the great extension of local glaciers in the Pleistocene age, an especially in the times of partial submergence of the land.

I am quite aware that it has been held by many able American geologists* that in North America a continental glacier extended in temperate latitudes from sea to sea, or at least from the Atlantic to the Rocky Mountains, and that this glacier must, in many places, have exceeded a mile in thickness. The reasons above stated appear, however, sufficient to compel us to seek for some other explanation of the observed facts, however difficult this may at first sight appear. With a depression such as we know to have existed, admitting the Arctic currents along the St. Lawrence Valley, through gaps in the Laurentian watershed, and down the great plains between the Laurentian areas and the Rocky Mountains, we can easily understand the covering of the hills of Eastern Canada and New England with ice and snow, and a similar covering of the mountains of the west coast. The sea also in this case might be ice-laden and boulder-bearing as far south as 40°, while there might still be low islands far to the north on which vegetation and animals continued to exist. We should thus have the conditions necessary to explain all the anomalies of the glacial deposits. Even the glaciation of high mountains south of the St. Lawrence Valley would then become explicable by the grounding of floe-ice on the tops of these mountains when reefs in the sea. In like manner we can understand how on the isolated trappean hill of Beloeil, in the St. Lawrence Valley, Laurentian boulders far removed from their native seats to the north are perched at a height of about 1200 feet on a narrow peak where no glacier could possibly have left them. The so-called moraine, traceable from the great Missouri Coteau in the west, to the coasts of New Jersey, would thus become the mark of the western and southern limit of the subsidence, or the line along which the cold currents bearing ice were abruptly cut off by warm surface waters. I am glad to find that these considerations are beginning to have weight with European geologists in their explanation of the glacial drifts of the great plains of Northern Europe.

Whatever difficulties may attend such a supposition they are small compared with those attendant on the belief of a continental glacier, moving without the aid of gravity, and depending for its material on the precipitation taking place on the interior plains of a great continent.

I have elsewhere endeavoured to show on the evidence found in Canada that the occurrence of marine shells, land plants, and insects in the glacial deposits of that country indicates not so much the effect of general interglacial periods as the local existence of conditions like those of Grinnel-land and Greenland, in proximity to each other at one and the same period, and depending on the relative levels of land and the distribution of ocean currents and ice-drift.†

I am old enough to remember the sensation caused by the delightful revelations of Edward Forbes respecting the zones of animal life in the sea, and the vast insight which they gave into the significance of the work on minute organisms previously done by Ehrenberg, Lonsdale and Williamson, and into the meaning of fossil remains. A little later the soundings for the Atlantic cable revealed the chalky foraminiferal ooze of the abyssal ocean; still more recently the wealth of facts disclosed by the *Challenger* voyage, which naturalists have not yet had time to digest, have opened up to us new worlds of deep-sea life.

The bed of the deep Atlantic is covered for the most part by a mud or ooze largely made up of the *débris* of

* These views have been admirably illustrated by Von Wœickoff in the paper already to referred to and in previous geographical papers.

* Report of Mr. Carvill Lewis in 'Pennsylvania Geological Survey,' 1884; also Dana's 'Manual.'

† 'Notes on Post-Pliocene of Canada,' 1872. One well-marked interval only has been established in the glacial deposits of Canada.

foraminifera and other minute organisms mixed with fine clay. In the North Atlantic the Norwegian naturalists call this the Biloculina mud. Further south the *Challenger* naturalists speak of it as Globigerina ooze. In point of fact it contains different species of foraminiferal shells, Globigerina and Orbulina being in some localities dominant, and in others other species, and these changes are more apparent in the shallower portions of the ocean.

It is also to be observed that there are means for disseminating coarse material over the ocean-bed. There are in the line of the Arctic current on the American coast great sand-banks, and off the coast of Norway sand constitutes a considerable part of the bottom material. Soundings and dredgings off Great Britain, and also off the American coast, have shown that fragments of stone referable to Arctic lands are abuudantly strewn over the bottom along certain lines, and the Antarctic continent, otherwise almost unknown, makes its presence felt to the dredge by the abundant masses of crystalline rock drifted far from it to the north. These are altogether new discoveries. I had inferred many years ago, from stones taken up by the hooks of fishermen on the banks of Newfoundland, that rocky material from the north is dropped on these banks by the heavy ice which drifts over them every spring, that these stones are glaciated, and that after they fall to the bottom sand is drifted over them with sufficient velocity to polish the stones, and to erode the shelly coverings of Arctic animals attached to them.* If then the Atlantic basin were upheaved into land we should see beds of sand, gravel, and boulders with clay flats and layers of marl and limestone. According to the *Challenger* Reports, in the Antarctic seas S. of 64° there is blue mud with fragments of rock in depths of 1200 to 2000 fathoms. The stones, some of them glaciated, were granite, diorite, amphibolite, mica schist, gneiss and quartzite. This deposit ceases and gives place to Globigerina ooze and red clay at 46° to 47° S., but even further north there is sometimes as much as 49 per cent. of crystalline sand. In the Labrador current a block of syenite weighing 490 lbs. was taken up from 1340 fathoms, and in the Arctic current 100 miles from land was a stony deposit, some stones being glaciated. Among these were smoky quartz, quartzite, limestone, dolomite, mica schist and serpentine; also particles of monoclinic and triclinic feldspar, hornblende, augite, magnetite, mica and glauconite, the latter no doubt formed in the sea-bottom, the others drifted from Eozoic and Palæozoic formations to the north.†

A remarkable fact in this connection is that the great depths of the sea are as impassable to the majority of marine animals as the land itself. According to Murray, while twelve of the *Challenger's* dredgings taken in depths greater than 2000 fathoms gave 92 species, mostly new to science, a similar number of dredgings in shallower water near the land gave no less than 1000 species. Heuce arises another apparent paradox relating to the distribution of organic beings. While at first sight it might seem that the chances of wide distribution are exceptionally great for marine species, this is not so. Except in the case of those which enjoy a period of free locomotion when young, or are floating and pelagic, the deep ocean sets bounds to their migrations. On the other hand the spores of cryptogamic plants may be carried for vast distances by the wind, and the growth of volcanic islands may effect connections which, though only temporary, may afford opportunity for land animals and plants to pass over.

With reference to the transmission of living beings across the Atlantic, we have before us the remarkable fact that from the Cambrian age onwards there were on the two sides of the ocean many species of invertebrate animals which were either identical or so closely allied as to be possibly varietal forms.* In like manner the early plants of the Upper Silurian, Devonian and Carboniferous present many identical species; but this identity becomes less marked in the vegetation of the more modern times.

In so far as plants are concerned, it is to be observed that the early forests were largely composed of cryptogamous plants, and the spores of these in modern times have proved capable of transmission for great distances. In considering this we cannot fail to conclude that the union of simple cryptogamous fructification with arboreal stems of high complexity, so well illustrated by Dr. Williamson, had a direct relation to the necessity for a rapid and wide distribution of these ancient trees. It seems also certain that some spores, as, for example, those of the Rhizocarps,† a type of vegetation abundant in the Palæozoic, and certain kinds of seeds, as those named *Ætheotesta* and *Pachytheca*, were fitted for flotation. Further, the periods of Arctic warmth permitted the passage around the northern belt of many temperate species of plants, just as now happens with the Arctic flora; and when these were dispersed by colder periods they marched southward along both sides of the sea on the mountain chains.

The same remark applies to northern forms of marine invertebrates, which are much more widely distributed in longitude than those further south. The late Mr. Gwyn Jeffreys, in one of his latest communications to this Association, stated that 54 per cent. of the shallow-water mollusks of New England and Canada are also European, and of the deep-sea forms 30 out of 35; these last of course enjoying greater facilities for migration than those which have to travel slowly along the shallows of the coast in order to cross the ocean and settle themselves on both sides. Many of these animals, like the common mussel and sand clam, are old settlers which came over in the Pleistocene period, or even earlier. Others, like the common periwinkle, seem to have been slowly extending themselves in modern times, perhaps even by the agency of man. The older immigrants may possibly have taken advantage of lines of coast now submerged, or of warm periods, when they could creep around by the Arctic shores. Mr. Herbert Carpenter and other naturalists employed on the *Challenger* collections have made similar statements respecting other marine invertebrates, as, for instance, the Echinoderms, of which the deep-sea crinoids present many common species, and my own collections prove that many of the shallow-water forms are common. Dall and Whiteaves‡ have shown that some mollusks and Echinoderms are common even to the Atlantic and Pacific coasts of North America; a remarkable fact, testifying at once to the fixity of these species and to the manner in which they have been able to take advantage of geographical changes. Some of the species of whelks common to the Gulf of St. Lawrence and the Pacific are animals which have no special locomotive powers even when young, but they are northern forms not proceeding far south, so that they may have passed through the Arctic seas. In this connection it is well to remark that many species of animals have powers of locomotion in youth, which they lose when adult, and that others may have special means of transit. I once found at Gaspé a specimen of the Pacific species of Coronula, or whale-barnacle, the *C. reginæ* of Darwin, attached to a whale taken in the Gulf of St. Lawrence, and which had probably succeeded in making that

* 'Notes on Post-Pliocene of Canada,' 1872.
† 'General Report, *Challenger* Expedition.'

* See Davidson's 'Monographs on Brachiopods;' Etheridge, 'Address to Geological Society of London;' Woodward, 'Address to Geologists' Association;' also Barrande's 'Special Memoirs on the Brachiopods, Cephalopods, etc.;' and Hall, 'Palæontology of New York;' Billings, 'Reports on Canadian Fossils;' and Matthews, 'Cambrian of New Brunswick,' *Trans. R. S. C.*
† See paper by the author on Palæozoic Rhizocarps, *Chicago Trans.*, 1886.
‡ Dall, 'Report on Alaska'; Whiteaves, *Trans. R. S. C.*

passage around the north of America, which so many navigators have essayed in vain.

It is to be remarked here that while many plants and marine invertebrates are common to the two sides of the Atlantic, it is different with land animals, and especially vertebrates. I do not know that any fossil insects, or land snails or millipedes of Europe and America are specifically identical, and of the numerous species of batrachians of the Carboniferous and reptiles of the Mesozoic all seem to be distinct on the two sides. The same appears to be the case with the Tertiary mammals, until in the later stages of that great period we find such genera as the horse, the camel, and the elephant appearing on the two sides of the Atlantic; but even then the species seem different, except in the case of a few northern forms.

Some of the longer-lived mollusks of the Atlantic furnish suggestions which remarkably illustrate the biological aspect of these questions. Our familiar friend the oyster is one of these. The first known oysters appear in the Carboniferous in Belgium and in the United States of America. In the Carboniferous and Permian they are few and small, and they do not culminate till the Cretaceous, in which there are no less than ninety-one so-called species in America alone; but some of the largest known species are found in the Eocene. The oyster, though an inhabitant of shallow water, and very limitedly locomotive when young, has survived all the changes since the Carboniferous age, and has spread itself over the whole northern hemisphere.*

I have collected fossil oysters in the Cretaceous clays of the coulées of Western Canada, in the Lias shales of England, in the Eocene and Cretaceous beds of the Alps, of Egypt, of the Red Sea coast, of Judea, and the heights of Lebanon. Everywhere and in all formations they present forms which are so variable and yet so similar that one might suppose all the so-called species to be mere varieties. Did the oyster originate separately on the two sides of the Atlantic, or did it cross over so promptly that its appearance seems to be identical on the two sides? Are all the oysters of a common ancestry, or did the causes, whatever they were, which introduced the oyster in the Carboniferous act over again in later periods? Who can tell? This is one of the cases where causation and development—the two scientific factors which constitute the basis of what is vaguely called evolution—cannot easily be isolated. I would recommend to those biologists who discuss these questions to addict themselves to the oyster. This familiar mollusk has successfully pursued its course and has overcome all its enemies, from the flat-toothed selachians of the Carboniferous to the oyster-dredgers of the present day, has varied almost indefinitely, and yet has continued to be an oyster, unless indeed it may at certain portions of its career have temporarily assumed the disguise of a Gryphæa or an Exogyra. The history of such an animal deserves to be traced with care, and much curious information respecting it will be found in the report which I have cited.

But in these respects the oyster is merely an example of many forms. Similar considerations apply to all those Pliocene and Pleistocene mollusks which are found in the raised sea-bottoms of Norway and Scotland, on the top of Moel Tryfaen in Wales, and at similar great heights on the hills of America, many of which can be traced back to early Tertiary times, and can be found to have extended themselves over all the seas of the northern hemisphere. They apply in like manner to the ferns, the conifers, and the angiosperms, many of which we can now follow without even specific change to the Eocene and Cretaceous. They all show that the forms of living things are more stable than the lands and seas in which they live. If we were to adopt some of the modern ideas of evolution we might cut the Gordian knot by supposing that, as like causes can produce like effects, these types of life have originated more than once in geological time, and need not be genetically connected with each other. But while evolutionists repudiate such an application of their doctrine, however natural and rational, it would seem that nature still more strongly repudiates it, and will not allow us to assume more than one origin for one species. Thus the great question of geographical distribution remains in all its force, and, by still another of our geological paradoxes, mountains become ephemeral things in comparison with the delicate herbage which covers them, and seas are in their present extent but of yesterday when compared with the minute and feeble organisms that creep on their sands or swim in their waters.

The question remains, Has the Atlantic achieved its destiny and finished its course, or are there other changes in store for it in the future? The earth's crust is now thicker and stronger than ever before, and its great ribs of crushed and folded rock are more firm and rigid than in any previous period. The stupendous volcanic phenomena manifested in Mesozoic and early Tertiary times along the borders of the Atlantic have apparently died out. These facts are in so far guarantees of permanence. On the other hand, it is known that movements of elevation along with local depression are in progress in the Arctic regions, and a great weight of new sediment is being deposited along the borders of the Atlantic, especially on its western side, and this is not improbably connected with the earthquake shocks and slight movements of depression which have occurred in North America. It is possible that these slow and secular movements may go on uninterruptedly until considerable changes are produced; but it is quite as likely that they may be retarded or reversed.

It is possible, on the other hand, that after the long period of quiescence which has elapsed there may be a new settlement of the ocean-bed, accompanied with foldings of the crust, especially on the western side of the Atlantic, and possibly with renewed volcanic activity on its eastern margin. In either case a long time relatively to our limited human chronology may intervene before the occurrence of any marked change. On the whole the experience of the past would lead us to expect movements and eruptive discharges in the Pacific rather than in the Atlantic area. It is therefore not unlikely that the Atlantic may remain undisturbed, unless secondarily and indirectly, until after the Pacific area shall have attained to a greater degree of quiescence than at present. But this subject is one too much involved in uncertainty to warrant us in following it further.

In the meantime the Atlantic is to us a practically permanent ocean, varying only in its tides, its currents, and its winds, which science has already reduced to definite laws, so that we can use if we cannot regulate them. It is ours to take advantage of this precious time of quietude, and to extend the blessings of science and of our Christian civilization from shore to shore until there shall be no more sea, not in the sense of that final drying-up of old ocean to which some physicists look forward, but in the higher sense of its ceasing to be the emblem of unrest and disturbance, and the cause of isolation.

I must now close this address with a short statement of the general objects which I have had in view in directing your attention to the geological development of the Atlantic. We cannot, I think, consider the topics to which I have referred without perceiving that the history of ocean and continent is an example of progressive design, quite as much as that of living beings. Nor can we fail to see that, while in some important directions we have penetrated the great secret of Nature, in reference to the general plan and structure of the earth and its waters, and the changes through which they have passed, we have still very much to learn, and perhaps quite as much to unlearn, and that the future holds out to us and to our successors higher, grander, and clearer conceptions than those to which we have yet attained. The vastness

* White 'Report U. S. Geol. Survey, 1882-83.'

and the might of ocean and the manner in which it cherishes the feeblest and most fragile beings, alike speak to us of Him who holds it in the hollow of His hand, and gave to it of old its boundaries and its laws ; but its teaching ascends to a higher tone when we consider its origin and history, and the manner in which it has been made to build up continents and mountain-chains, and at the same time to nourish and sustain the teeming life of sea and land.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

The Unofficial Formulary Committee.

Sir,—I was unavoidably absent from the morning meeting of the Conference on September 1, when Mr. R. Reynolds proposed his resolution respecting a Formulary of Non-Official Remedies. Conversation with several who were at the meeting did not succeed in educing any clear and definite ideas as to the scope of the resolution, which, so far as my informants were concerned, appeared to be still in a nebulous condition. I have endeavoured by a scientific use of the imagination to ascertain what were the views of the author of the resolution and of those who took part in the discussion with the result that I, like others no doubt, have formed certain notions. They may be erroneous notions, but I believe them to be justified by the facts, and as only good can result from a discussion of the subject in your pages I venture to address you.

The Committee formed is a representative one, and may be relied upon to proceed with circumspection. What is the nature of the work to be done? In other words, what work is it desirable should be done? I cannot suppose that the President of a Conference "established for the encouragement of pharmaceutical research" would foster the idea that there is finality in pharmacy. He cannot mean that there shall be no more new preparations, simple or compound, suggested by individuals; indeed, there must be lying in his constructive mind some scheme or plan more or less definitely shaped by which the object of the Conference quoted above, is to be furthered.

Men work for either fame or profit, and the majority of them will agree that the latter is the more frequent and more powerful incentive. The Committee will not then strive too strenuously to deprive successful workers of the result of their labours by proposing formulas for liq. bismuthi (Schacht), liq. pancreaticus (Benger), or succus taraxaci (Greenish), or for preparations generally of which they may be regarded as types, seeing that the demand for them is due to a legitimate expenditure of brain force, of personal work in experiment and of material substance, which seeks a material reward. Nor will its energy be wasted in devising recipes for Holloway's Pills, *et hoc genus omne*, which are tinctured, not to say saturated, with quackery, and are advertized as panaceæ, not to the medical profession (which the Conference seeks more particularly to reach), but to the much enduring and all-believing public. The work of the Conference Committee is narrowed by the exclusion of these two classes of compounds and it may usefully be directed to deciding what is the best solvent of the active principle of a new drug, or a better means of exhibiting an old one, and it may do this without trespassing on the domain of the therapeutist. It must indeed follow and assist the latter.

For example, guarana is exhibited in powder, tincture and liquid extract. The powder presents no difficulty, but the tincture is made of varying strength, from two and a half to five ounces to the pint, and made with proof or rectified spirit according to the will of the dispenser or manufacturer. The Committee may be expected to suggest what shall be the strength and the vehicle in this case. The liquid extract following the convenient recognized practice is mostly made one in one, but the menstruum is again at the will of the individual maker, and the *modus operandi* equally uncertain. The Committee will speak with welcome authority as to these points, so that a certain degree of uniformity may be imported into the pharmacy of a remedy which (for want of it?) has not received the attention it deserves in this country, and which I cite because it is the first instance which comes to my mind.

As one speaker said during the discussion, formulas for new preparations are annually quoted in the 'Year-Book,' but they are culled from the current literature of pharmacy, and carry the authority of one author only. A formula for the same preparation may have been devised for his own use by each of half-a-dozen competent pharmacists and not published, and on the appearance of a published formula each naturally asks why he should change. His willingness to do so would be the greater, if the published formula resulted from the deliberations of such a representative and able Committee as that recently appointed.

Within the lines I have indicated, it is evident that much good work can be done, and I trust that within these lines the Committee will for the present confine its operations.

I am all the more wishful for the success of the work, and have all the more belief in it, because the appointment of the Committee corresponds closely with a suggestion made by myself in your number for July 25, 1885, p. 104, the principal difference being that I had in view a committee of the Pharmaceutical Society. On consideration, I have come to the conclusion that the Pharmaceutical Conference is the fitter body. It can act with the authority of a representative and competent organization, yet with the freedom of one which is not trammelled by a too strictly official position.

These, Mr. Editor are my notions; discussion will show if they are generally held.

15, *Laurence Pountney Lane, E.C.* John Moss.

Dentist.—(1.) There is nothing to prevent a person who is legally qualified as a pharmacist and as a dentist from practising both callings. (2) On the second point we are unable to advise you.

The Case of Squill Poisoning.—We have been reminded by a correspondent that as *Convallaria majalis* grows from a rhizome, and not from a bulb, the admixture suggested in the *British Medical Journal* is extremely improbable.

Sigma.—Glycerine Cream.—The following formula is from an American source:—Spermaceti, 60; White Wax, 30; Oil of Sweet Almond, 250; Rose Water, 10; Glycerine, 20 parts. To be prepared like cold cream, and perfumed with oil of rose and oil of bitter almonds.

F. M. is thanked for her communication.

Artificial Ivory.—Penrose asks for a recipe for making artificial ivory according to the Chinese method, in which rice flour is the principal ingredient.

G. C. Druce.—We have no knowledge respecting the action of papain upon the diphtheritic membrane beyond the statements that have appeared in the medical journals. As to the composition and action of papain see two papers in this Journal for July 11, 1885, p. 45, and August 8, 1885, p. 129.

Campanula.—Saponaria officinalis.

R.H.—We know of no recorded observations on the point, but it is one that can easily be determined by experiment.

Communications, Letters, etc., have been received from Messrs. Tilden, Armstrong, Sisson, Reynolds, Hillhouse, Umney, Naylor.

"THE MONTH."

Teleotherapeutics.

Some statements made in a paper read at the recent meeting of the French Association for the Advancement of Science at Grenoble, upon the effect of drugs upon hypnotized persons, seem to demand for their acceptance an amount of faith equal to that required by the most startling statements of metallotherapeutists. Messrs. Burot and Bourrie affirmed in their paper that sick persons when put into a state of hypnotism become very impressionable to the action of many substances, especially of medicines, so that these will produce their characteristic effects by only placing them in well-stoppered bottles within a certain distance of the patients. Their statements were confirmed by M. Luys, who said that he had produced nausea and vomiting by simply placing a sealed tube containing one or two grams of powdered ipecacuanha without any notice behind the neck of the hypnotized person. The effects produced, which include convulsions, paralysis, hallucinations, etc., are said not only to vary with the substance, but with the point of contact, so that certain substances will produce different emotional expressions according as they are placed on the right or the left side of the patient. M. Luys concludes that medical men have thus placed within their reach a new method of treatment in nervous disorders, and he states that in this way he has obtained a distinct diminution of convulsive attacks in two patients suffering from hystero-epileptic convulsions.

Iodoform Poisoning.

In an important paper by Dr. Cutler (*Bost. Med. and Surg. Journ.*, pp. 503, 108) a *résumé* is given of seventy-seven reported cases of poisoning consequent upon the use of iodoform in the treatment of wounds. The general symptoms were those of poisoning by iodine, namely, persistent taste and smell of the drug, impairing appetite and digestion, headache, sleeplessness and delirium, the latter usually of a melancholy character, in extreme cases passing into absolute apathy with involuntary dejections, rapid feeble pulse and progressive marasmus. Several cases are mentioned in which a most satisfactory progress of the wound was coincident with the passing of the patient into almost a typhoid condition. Dr. Cutler arrives at the conclusion that (1) Fresh wounds, or unhealthy or tuberculous surfaces, are the only cases fitted for the application of iodoform; (2) Only a thin layer or small amount of iodoform should be applied; (3) When granulations appear healthy iodoform should be omitted; and (4) At the first symptoms of poisoning, or even coincidently with the first use of iodoform, compounds of alkalies with organic acids, such as potassium acetate, should be given by the mouth at frequent intervals. If severe symptoms supervene, transfusion with a solution of common salt is recommended, and the wound, after being washed free from iodoform with pure water and a solution of an alkaline carbonate, should be dusted with magnesia.

Iodol.

An ointment of iodol (1 part to 5 of vaselin) and a solution (3 parts to 35 of alcohol and 62 of glycerine) have been used tentatively by Dr. Trousseau in affections of the eye (*Archives de Pharm.*, Sept., p. 411). It was found that the introduction of the solution into the eye caused pain, due to the alcohol, but the ointment caused none. In simple blepharitis the iodol proved inferior to red precipitate or zinc oxide, but it succeeded very well in ulcerous cases. It was also useful in cases of granular and chronic conjunctivitis, but for the acute form it was inferior to iodoform or nitrate of silver.

Antifebrin.

Last month it was mentioned (p. 161) that the compound hitherto known as phenylacetamide, or acetanilide, had been introduced into medicine as an antipyretic. As further experiments are said to have confirmed the statement that antifebrin in quarter gram doses is as effective as antipyrin in one gram doses, and therefore there is some possibility that it may come into demand, a few words about its chemical constitution will not be out of place. Aniline, as is known, is a well-characterized base that combines with acids to form salts, as, for instance, the hydrochlorate, represented by the formula $C_6H_5NH_2.HCl$. The hydrogen atoms in the NH_2 group present, however, a special reaction, and are capable of being replaced by alcohol or acid radicles, the resulting compounds being known as alcohol anilides and acid anilides respectively. Antifebrin, or acetanilide, is a compound in which one atom of hydrogen from this group is replaced by an acetyl residue.

$C_6H_5NH_2$ Aniline. $\qquad$ $C_6H_5NH(CH_3CO)$ Acetanilide.

According to a writer in the *Pharmaceutische Zeitung* (Sept. 4, p. 528) the preparation of acetanilide is very simple, and consists in boiling aniline with excess of glacial acetic acid during one or two days, in a vessel connected with a return condenser, then distilling off the acetanilide that has formed, and crystallizing it from benzol or boiling water. The pure compound is now said to boil at 295° C., to dissolve in 189 parts of water at 6° C., and to be more readily soluble in alcohol and in ether. It is announced that experiments on animals are now being made with the acetyl derivatives of toluidine and naphthylamine, with benzylanilide and salicylanilide and with other more complex compounds.

Urethan.

Similar experiments have been made with the compounds analogous to urethan, the recently introduced hypnotic, which, it will be remembered, is a combination of carbaminic acid with an ethyl residue (see vol. xvi., pp. 641, 920). Professor Riegel has used in his clinic at Giessen methylurethan, ethylideneurethan and chloralurethan, the last-mentioned being a product of the direct combination of chloral with ethylurethan. He reports (*Pharm. Zeit.*, Sept. 8, p. 351) that both methylurethan and ethylideneurethan are devoid of hypnotic properties, and that chloralurethan presents no advantages over the ordinary ethylurethan. It may be mentioned here, also, that in experimenting on animals M. Coze has found urethan to be an effective antidote to strychnine, not only suppressing the tetanic symptoms, but preserving the life of the animal after receiving many times more than a lethal dose. Whether urethan in such a case acts as an antispasmodic, and whether it could be used with advantage in tetanus, are points not yet decided.

Salicylated Plastermulls and Salvemulls.

The local application of strong salicylic acid "plastermulls" in the treatment of lupus is strongly recommended by Dr. Unna (*Lancet*, Sept. 25, p. 574). The name "plastermull" has been giving to a dressing consisting of a very thin sheet of guttapercha, coated on one side with an adhesive substance containing one or more medicinal compounds and backed on the other side with mull or undressed muslin. The name of "salvemull" also has been

given to a similar kind of dressing, in which the medicaments are of a more soothing character, consisting of ointments having a basis of suet and lard, spread upon mull. In experimenting with a strong salicylic acid plastermull to remove the cuticle and prepare lupoid tissue for other more destructive agents, Dr. Unna observed that salicylic acid itself exercises a most beneficial influence upon the new growth. The chief drawback is the great and lasting pain caused by salicylic acid when applied to a thin epidermis or raw surface. In order to obviate this various combinations were tried; but cocaine failed to give relief, while opium and cannabis indica required an hour or two to develop their anodyne effect. The best results were obtained when genuine beech-wood creasote was combined with salicylic acid in the proportion of two parts of creasote to one of acid. Even then there is a painful stage lasting from ten to fifteen minutes, but a previous application of cocaine is sufficiently lasting in its effect to cover this period. The plastermulls are prepared in strips one metre long and twenty centimetres wide, the superficial area equalling one-fifth of a square metre. The salicylic acid plastermulls used by Dr. Unna are of five different strengths, containing respectively, 10, 20, 30, 40, and 50 grams of salicylic acid, and 20, 40, 50, 40 and 50 grams of creasote to each strip.

Mollin.

Dr. Kirsten reports upon some dermatological experiments made with a series of preparations having for their basis a substance called "mollin," which appears to be soap containing excess of undecomposed fat, similar to that recommended twelve months since by Dr. Unna (*Pharm. Journ.*, [3], xvi., 328). Mollin is described (*Pharm. Post*, Sept. 18, p. 636) as a dull slightly yellowish-white substance, of a uniform soft consistence that is not essentially affected by influence of temperature or long keeping, neutral in reaction and containing 17 per cent. excess of fat. The saponification is said to be effected advantageously in the cold with potash liquor and some soda liquor, the product being subsequently carefully heated with 30 per cent. of glycerine. According to Dr. Kirsten, the "mollinum hydrargyri ciner.," which can be prepared of the strength of 1:1, the mercury being readily extinguished, has the advantage of being cleanly and extremely active, the absorption of the mercury being facilitated by the mollin. Dr. Kirsten also praises the combinations of mollin with styrax, pix liquida, salicylic, carbolic and tannic acids, white and red precipitates, chrysarobin, ichthyol, sulphur and thymol.

Extract of Pomegranate Root Bark.

The official preparation of pomegranate bark is open to objection on account of its nauseousness, and three years since Mr. Siebold, in order to obviate this, suggested a process for removing the astringent principles (*Pharm. Journ.*, [3], xiv., 396). With a similar object Dr. von Schroeder has recommended the use of an extract free from tannic acid, but containing all the alkaloid of the bark (*Pharm. Zeit.*, Sept. 18, p. 556). The extract is prepared by treating a decoction of the bark with milk of lime to remove the tannic acid, filtering, neutralizing the filtrate exactly with sulphuric acid, evaporating it on a water-bath almost to dryness, treating the residue with 70 per cent. alcohol, and then driving off the alcohol from the extract obtained. The product is described as nearly entirely crystalline, and soluble in water with a slight turbidity. The yield is about one gram of extract from twenty grams of bark. In order to retard as much as possible the absorption of the pelletierine, which is present in the extract as a sulphate, it is recommended to add to this quantity one or two grams of tannic acid to convert the alkaloid into the difficultly soluble tannate.

Pelletierine.

It has been stated occasionally that the administration of pelletierine to adults has been followed by symptoms of poisoning, though not very serious ones, and this has caused hesitation in administering it to children. Some recently reported cases appear, however, to indicate that the physiological action of this tænifuge is relatively less energetic in infants than in adults (*Archives de Pharm.*, Sept., p. 409). Dr. Méplain administered six centigrams of pelletierine to a child two and a half years old, and Dr. Bétencès the same quantity to a child five years old, without the least symptom of poisoning, but with the removal of the worm in both cases. In another case a dose of ten centigrams was successfully administered to a child ten years of age.

Santonin.

Santonin is generally considered to act as a poison upon ascarides, but according to Dr. von Schroeder (*Arch. f. exp. Path.*, xix., 290) this is not the case. He states that the santonin does not kill these worms, but its presence, being distasteful to them, causes them to leave their resting place and wander into the large intestine, from which they can then be removed by a purgative. This should determine the time for giving a purgative, and Dr. von Schroeder thinks it should either be given with the santonin, or else some hours after.

Thapsia Plaster.

Although thapsia plaster has been in use for some time in France it cannot be said to have come into use in this country. In the United States, however, experiments have been recently made with it. Dr. J. R. Crook considers it to be one of the most vigorous of counter-irritants, since it causes an active determination of blood from the deeper structures to the surface. There are, however, two objections to its use. These are the remarkable tendency of the eruption to spread and the occasional severe and painful character of its local action. A tolerance of its action appears, however, to be acquired after repeated use of the plaster.

Piperine in Ague.

Some cases of refractory intermittent fever, in which, after the failure of quinine, piperine has been administered with advantage, are reported by Dr. C. S. Taylor (*Brit. Med. Journ.*, Sept. 4, p. 449). In one case, immediately on the accession of an attack three grains of piperine were given every hour until eighteen grains had been taken, and on the following day, when the intermission was complete, the same dose was given every three hours. Dr. Taylor remarks also that piperine does not produce the unpleasant symptoms in the head that sometimes follow the use of quinine.

Oil of Sandal Wood.

According to Dr. Méhu (*Journ. Pharm.*, Sept. 1, p. 209) the internal administration of oil of sandal wood is followed by the appearance in the urine of a resin having the sandal wood odour, which is apparently kept in solution by sodic phosphate and plays the part of a weak acid. It can be separated by acidulating the urine with phosphoric or tartaric acid and shaking it

with ether. The ether on evaporation leaves a resinoid matter having a light brown tint and the odour of sandal wood, and which gives with concentrated sulphuric acid the same yellow, brown and red colorations as the oil. Dr. Méhu adds that pure oil of sandal wood, unsophisticated with oil of copaiba or oil of turpentine, does not impart the odour of violets to the urine.

Wistaria Bark.

From the bark of *Wistaria chinensis*, a leguminous climber frequently cultivated in this country as an ornamental plant, Mr. Ottow has separated a crystalline glucoside that he has named "wistarin" (*Nieuw Tijdschr.*, xix, p. 207), and which he found to act in large doses as a poison on frogs. The glucoside is described as being freely soluble in absolute and dilute alcohol, difficultly soluble in ether and cold water (1 in 2000), more soluble in warm water, and less soluble in chloroform than in ether. A solution in hot water becomes opalescent on cooling, froths when shaken and has a bitter and astringent taste. It dissolves in solutions of alkalies and alkaline carbonates with a yellow colour, and in concentrated sulphuric acid with a yellow colour that passes to a beautiful cherry-red. Ferric chloride produces with it a violet colour passing to green-brown. Neutral lead acetate produces a turbidity, and basic lead acetate a white precipitate in an alcoholic solution, and the basic acetate also renders an aqueous solution turbid. Wistarin gives a green precipitate with cupric sulphate, but none with tannin. It melts at 204° C., and contains no nitrogen. When boiled with dilute sulphuric acid it splits up to form glucose, a crystalline resinoid body, and an essential oil, having the odour of menyanthol, and which when warmed with potash is converted into a white substance smelling like coumarin. Besides wistarin a resin was separated that appeared to possess toxic properties.

Mandioca.

The numerous varieties of the mandioc or cassava plant (*Manihot spp.*) cultivated in Brazil, where, as is known, the roots are worked for the preparation of Brazilian arrowroot, or tapioca, forms the subject of a lengthy and exhaustive paper by Dr. Peckolt, the chemical section of which (*Pharm. Rundschau*, iv., 148, 174, 201) presents several points of interest. Dr. Peckolt says that the occurrence of hydrocyanic acid is not limited to the bitter mandioca, but extends to all varieties, though it is present in smaller quantity in the sweet kinds. Hydrocyanic does not, however, exist as such in the root while in the earth, but is first formed on contact with atmospheric air, and its formation can be entirely prevented by immersing the freshly dug root in alcohol. The capability of forming hydrocyanic acid proved to correspond with a popular belief as to the time when the bitter mandioca is most poisonous, being greatest at the time of flowering. As a general rule it was found that the richer in juice the roots of a variety are, either sweet or bitter, the more poisonous they are, some of the sweet varieties containing only traces of milky juice. But Dr. Peckolt confirms previous suspicions that the toxicity of mandioca is not due wholly to hydrocyanic acid, for there exists in the juice, already formed, another volatile poison, which he has provisionally named "manihotoxin," as 5 milligrams of it killed a full-grown pigeon in five minutes. This he obtained from ether in stellate crystals, volatilizing completely at 60° C. Another substance, which is non-poisonous and occurs in the expressed juice from both bitter and sweet roots, but in greater proportion in that from the sweet, has been named "sepsicolytin," or "fermentation hinderer," on account of its remarkable antiseptic properties. It was obtained as a thickish light-brown extract, having a peculiar odour and a bitter pungent taste. It is insoluble in absolute ether, chloroform, petroleum spirit, carbon bisulphide and essential oils; freely soluble in ether and alcohol; less soluble in cold water, and only partially soluble in boiling water. Two drops of sepsicolytin mixed with fresh albumen (quantity not stated) are said to preserve it for upwards of six months without deterioration of any kind. It would seem therefore that the antiseptic properties that have been attributed to "cassareep" and the "pepper pot" of the West Indies, both of them prepared from mandioca or cassava juice, have some foundation in fact (see *Pharm. Journ.*, [3], i., p. 274). Other compounds separated were "manihotin," a crystalline mannite-like substance, which is a decomposition product, since it does not exist already formed in the root, and Henry and Boutron's "manihotic acid," which has been ascertained to be a decomposition product of manihotin.

Anchietea salutaris.

The root of *Anchietea salutaris*, St. Hil., a Violaceous plant, having a popular reputation in Brazil as a remedy in skin diseases, has been recommended as useful in syphilis (*Chem. Zeit.*, p. 619). The dose is 0·1 to 0·35 gram of the powdered root daily, and the drug is also administrated in the form of a syrup prepared from a tincture of the root. The root is met with in pieces 0·3 to 2·0 centimetres thick, the outer bark being greyish-white, with flushes of brown, in which occur white points, whilst the inner bark is brown, and the wood light yellow, with large vessels. In consequence of the drug being used for syphilis and provoking a flow of saliva it shares with some other substances the name of "vegetable mercury." Some years since Dr. Peckolt called attention to the usefulness of the drug in skin affections. He administered the powdered root, commencing with 0·35 to 0·70 gram three times a day, and gradually increasing the dose. The first effects are drastic, but these pass off after a day or two. Dr. Peckolt isolated from the root bark an alkaloid, which he considered to be the active principle, and named "ancheitine."

Orthosiphon stamineus.

The leaves of *Orthosiphon stamineus*, Bent., a new remedy for gout and in renal disorders, form the subject of a communication from Dr. van Itallie (*Pharm. Zeit.*, Sept. 1, p. 516). The plant, which belongs to the Labiatæ, and was formerly known as *Ocimum grandiflorum*, Blume, grows in moist shady places in Java and throughout India, and in the Nicobar and Philippine islands. The dried leaves are pale green with the petiole and principal veins purple; the midrib dividing the leaf symmetrically and giving off lateral veins at an angle of 45°. Strongly developed oil glands occur on both surfaces of the leaf, but only a small quantity of essential oil could be separated, probably in consequence of the dried condition of the leaves operated upon. A small quantity of a non-nitrogenous crystalline glucoside, having a taste at first bitter and then sweet, has been separated and named by Dr. van Itallie "orthosiphonin." It is more soluble in hot than in

cold alcohol, very soluble in absolute alcohol, less soluble in chloroform and scarcely at all in anhydrous ether. It is not precipitated from solutions by tannin or lead acetate, but is thrown down by the subacetate. No alkaloid was present in the leaves.

Piper Betle Leaves.

According to Messrs. Gehe and Co. (*Handelsberichte*) a supply of the leaves of the *Piper Betle*, L., which are used in India for chewing with areca nut, has recently been imported for the first time into Germany. An essential oil obtained from the leaves by distillation at Samarang, by Herr Schmitz, has been credited by him with having given good results in the treatment of catarrhal disorders and as an antiseptic, and the claim has been confirmed in the experience of Dr. Kleinstück, of Jena. The oil, which seems to be of an aldehyd nature, is said to oxidize with extreme rapidity, losing at the same time its characteristic ethereal odour and therapeutic properties. Great care will therefore be required in the transit of the leaves, if the oil is to be distilled in Europe.

Liatris odoratissima.

Another frequent import into the port of Hamburg during the past year has consisted of the stalks and leaves of the *Liatris odoratissima* (deer's-tongue, or southern vanilla), which is said to be employed as a substitute for the more expensive tonka bean in the scenting of snuffs. Messrs. Gehe say that the quantity of coumarin in the drug is considerable, but it has never, in their experience, reached the amount mentioned by Wood, of two drachms to the pound.

Itshongwee.

According to the *Natal Mercury* a plant named "itshongwee," used by nearly all the Kaffir tribes for fevers and various other diseases, and also to make dogs keen in hunting, has been sent to Europe for experimentation. An alkaloid was discovered in the plant about eighteen months ago by Mr. Jocelyn Cooke, of Estcourt. It is said to be soluble in water, hydrochloric acid and liquor potassæ, but insoluble in ether. The hydrochlorate does not form a double salt with platinum chloride, and on heating an aqueous solution of it a precipitate is formed which is soluble in dilute alcohol.

Plantago major.

The leaves of *Plantago major* have been examined chemically by Dr. Rosenbaum, but the results obtained do not indicate any active principle. He found that petroleum benzin extracted 4 per cent. of wax and chlorophyll, the extract fusing at 83° C. Ether dissolved 4·4 per cent. of resin and chlorophyll. Alcohol extracted 10 per cent., of which 6 per cent. was soluble in water and contained a considerable amount of sugar; the remaining four parts were soluble in ammonia. Water took up 13 per cent., of which 7·2 per cent. was insoluble in 66 per cent. alcohol. Soda solution dissolved 6 per cent. and diluted acid 10 per cent., the latter containing a notable quantity of calcium oxalate. It may be noted here that Th. Koller in 1868 found citric acid and oxalic acid in the three species, *P. major*, *P. lanceolata*, and *P. media*, besides the ordinary plant constituents, chlorophyll, resin, wax, albumen and pectin. These constituents do not account for the reputation as a styptic and vulnerary in which the plant was held by ancient writers. The presence of sugar indicates the possibility of a glucoside being contained in the plant. The value of the seeds in diarrhœa and dysentery is no doubt due in some measure to the quantity of mucilage they give out (see *Pharm. Journ.*, [3], xv., p. 106). The number of seeds that may be produced by a single individual of *Plantago major* is very large. An observer who took the trouble to count the seeds found that a plant which sent up thirty-three spikes of flower in one season produced no less than 43,569 seeds (*Garden*, Sept. 18, p. 261).

Fireproof Tree.

A remarkable tree is mentioned in the *Gardeners' Chronicle* (Sept. 18, p. 360), which is said by Mr. W. T. Thiselton Dyer to be absolutely indestructible by fire, it surviving in large districts where the dry pastures and bush are burnt twice a year and everything except this tree is destroyed. It would be interesting to learn to what cause this immunity is due. The tree is a species of *Rhopala*, of a contorted appearance, and growing to about twenty feet in height.

Poisonous Fungi.

The circumstances under which edible species of fungi become poisonous seem to need careful investigation. Mr. W. G. Smith has lately directed attention to the fact that what is known as "blue buttons" (*Tricholoma personatus*) is, under certain circumstances, dangerous. How far the reported cases of poisoning from edible species may be really referable to mistakes in identification seems to be open to question. A case of poisoning by what was supposed to have been the above-named fungus is attributed by Mr. Rolfe (*Gard. Chron.*, Sept. 18, p. 371) to a very poisonous species, *Amanita phalloides*. A suggestion has been made by Mr. G. Massee, which may account for the cases in which harmless species have been proved to cause poisonous symptoms, viz., that harmless species may, by the absorbent character of their porous tissue, absorb poisonous matter from the soil when growing through matter actually in a state of putrefaction. In other cases idiosyncrasy may perhaps explain the effects produced. The frequency with which cases of poisoning occur suggests the advisability of always exhibiting at fungus meetings, as far as possible, the edible species and the dangerous ones that resemble them side by side, so that they may be more widely known and more easily recognized.

Growth of Rootlets.

Messrs. Van Tieghem and Doubot have recently shown that rootlets, in making their way out from the interior of the axis of main roots, secrete a fluid which destroys the cells in their immediate neighbourhood by converting them into jelly and then dissolving, perhaps absorbing them, somewhat in the same manner that the embryo metamorphoses the albumen surrounding it and then appropriates it as food.

Lathræa squamaria.

In a paper in the *Journal of Botany* by Mr. G. Massee, on the structure and functions of *Lathræa squamaria*, the author remarks that he considers the plant to be a saprophyte rather than a parasite, especially when old, since the discs upon which its parasitism depends are frequently very rare, their presence or absence depending upon the position in which the plant finds itself. A liquid of an acid character appears to be secreted by the stipulate glands of the scale-like leaves, and is found in the curious intercellular spaces of the leaves. By this or some other secretion the roots of other plants with which the scales of the *Lathræa* come into contact are softened to a pulp and evidently utilized as food by the plant. Mr. Massee attributes the darkening of the plant during drying to the combination of the

tannin present in the plant with iron which also exists in the plant in the ferrous state. That it is due in some degree to oxidation appears evident from the fact that if immersed in sulphurous acid the plant retains its white appearance. According to Mr. Massee if immersed in concentrated solution of ammonia it changes to a bright yellow.

Botanical Teaching.

While those who control the line of study for the medical profession exhibit a tendency to eliminate the teaching of botany, those who are interested in the future of agriculture are becoming more anxious that it should form a prominent feature in agricultural studies. Professor C. E. Bessey, in the 'Proceedings of the Society for the Promotion of Agricultural Science,' makes some very pertinent remarks on this subject (*Gard. Chron.*, Sept. 18, p. 362). He points out that botanical science should provide a classification and nomenclature of the plants in cultivation, in agriculture, and horticulture, so far as their numerous varieties are concerned, maintaining that modification through cultivation should be recognized equally with modification produced by natural causes. The physiology of the plants of the farm and garden, and all questions concerned with the taking of food by the plant and its method of using it, and the conditions most favourable to the nutrition and growth of each, should, he thinks, be included in a botanical course, as well as the subject of fertilization and reproduction and the laws of hybridization and the germination of seeds. The laws which cause the differences between a wild and cultivated plant, and the pathology of plants with regard to parasitic fungi and insects, should also form branches of the subject. These branches of botany have, perhaps, not received the attention they merit, not only as applied to ordinary farm and garden plants, but also to plants used in medicine.

Fletcher's Cold Zone.

A few weeks since was published (see before, p. 106) a paper in which Mr. T. Fletcher described the result of some experiments made with a view to overcome the loss of heating power caused by the incapability of flame to exist, under ordinary conditions, in actual contact with the bottom of a metal vessel containing water. Probably most readers were then surprised to learn that a piece of paper pasted on the bottom of a kettle containing water might be exposed continuously over a flame for weeks without becoming charred. But further experience has shown that this "cold zone" is impassable by a flame even when urged against the metal by an air blast having a pressure of 1¼ lb. to the square inch, and that the radiant heat from white-hot platinum held as close as possible without actual contact is equally ineffective, paper remaining uncharred even after the water inside the vessel is boiling. Mr. Fletcher emphasizes the important fact that this cold zone, though impassable by flame, and, to a certain extent, by radiant heat, is powerless to resist the carrying of heat through it by solid bodies, as a heated wire passing through chars the paper immediately upon touching it; this is the property, in fact, which Mr. Fletcher says he has utilized effectively by means of projecting metal studs. Mr. Fletcher was at first disposed to think that his observations clashed with all accepted theories as to heat, though in his latest communication (*Industries*, Sept. 21, p. 327) he is inclined to attribute the cold zone to the "curious non-conducting power" of a "strongly adherent film of air." But is not the phenomenon exactly the converse of "flameless combustion;" in the one case the already ignited gas being brought below the temperature of combustion by contact with the relatively cold plate, and in the other the gas becoming first sufficiently heated for combustion when it impinges on the red-hot metal? Further, is not the explanation of the result following the use of studs or wire to be found in the fact that by such means a large portion of the flame is kept at a greater distance from the cool layer of water, so that the intervening metal tones down, as it were, the sudden loss of heat that renders combustion impossible in practical contact with water, even at a boiling temperature? If so, it would seem then almost to follow that the thickness of the "cold zone" would vary inversely both as the thickness of the metal diaphragm between the flame and the water and the temperature of the water.

Action of Lead on Soft Water.

In a report on the action of drinking water on lead, presented by Messrs. Crookes, Odling and Tidy to the Chemical Section of the British Association, an opinion was expressed that it would be impracticable, even if it were advisable, to replace lead pipes by iron pipes, or even by coated lead pipes. As an alternative course it was recommended that such modifications should be made in filtering beds as would insure an efficient silication of the water. It was stated that it had been found in the examination of a large number of first-class soft waters that all those which took up lead in passing through the service pipes contained less than two-tenths of a grain of silica per gallon, while those that had half a grain per gallon did not take up any lead. This agreed also with results obtained with soft water to which dialysed silica had been added. The reporters therefore believed that artificial silication would minimize to the utmost, and practically prevent, the action of the water on lead pipes and thus effect a real hygienic improvement. The plan adopted in the Huddersfield works, difficulties in which gave rise to the inquiry, is to pass the water through tanks containing crushed flint, sand and limestone, the surface of these materials being equal to one foot for every 54 gallons of water passing through per hour. Examination shows that considerable solvent action is exercised upon the flints, whilst the undesired action of the water upon the lead service pipes has been stopped.

Soap Test.

It is pretty well understood that correct results in using the ordinary test for hardness in water are dependent upon adequate shaking of the mixture after the addition to the water of the alcoholic soap solution. In some experiments by Mr. G. E. R. Ellis (*Chem. News*, Aug. 27, p. 99), it was found that when the soap solution was added in small quantities (1 c.c.) at a time, and the sample shaken after each addition, about 10 or 12 per cent. less of soap solution was required to produce a permanent lather than when the bulk of the solution that would be required was run in before the first agitation. It was also found that the mechanical act of shaking was more effective in the case of waters containing calcium salts than in those containing magnesium salts, and that the harder the water, within certain limits, the greater seemed to be the percentage reduction in the quantity of soap solution required when the sample of water was vigorously shaken.

TWO NEW TESTS FOR SUGAR.*

The two reactions described in this note are common to cane-sugar, milk-sugar, glucose, levulose and maltose, and to the carbohydrates and glucosides capable of yielding glucose by the action of sulphuric acid. They do not, however, produce any result with inosite, mannite or quercite.

1. From ½ to 2 cubic centimetres of the suspected liquid are treated with two drops of a 15 or 20 per cent. alcoholic solution of alpha-naphthol, and the mixture is shaken. A slight turbidity results from the precipitation of a little naphthol; sulphuric acid is then added in quantity equal to or even double the volume of the fluid, and the whole is briskly shaken. In the presence of sugar a deep violet colour is developed, and dilution with water throws down a violet-blue precipitate, soluble in alcohol and ether with a yellow colour, or in caustic potash with a golden-yellow colour. In order that the reaction may occur as described, the test must be made exactly as stated.

This test will permit the detection of 0·00001 per cent. of sugar, and, with the exception of vanillin, anethol, methyl salicylate, and a few similar substances, gives no reaction when sugar is not present. These substances, however, either produce the colour with sulphuric acid alone, or the precipitate formed when the violet solution is diluted with water differs totally in character from that formed in saccharine liquids. The limit of sensibility of Fehling's test is 0·0008 per cent., and that of Trommer's test is 0·0025 per cent.

2. If, instead of the alpha-naphthol in the preceding test, an alcoholic solution of thymol of similar concentration be employed, the remaining manipulations being the same as before, a deep red varying from cinnabar to carmine is produced; dilution with water brings the colour to carmine, and after a time there separates a flocculent precipitate, which dissolves with a pale yellow colour in alcohol, ether and caustic potash, but with a bright yellow in ammonia.

The delicacy of this reaction is about the same as of that with alpha-naphthol.

After many experiments had shown the trustworthiness of the results given by these tests, it was interesting, on account of their exceeding delicacy, to apply them to the solution of the disputed question whether normal human urine does or does not contain sugar. The results of the first attempts were so decided that the urine examined appeared to be diabetic. The urine of a number of perfectly healthy individuals was therefore examined, but with precisely the same results. The tests were made with alcoholic solutions of alpha-naphthol and thymol, exactly as has been described, and the extraordinary delicacy of the reactions can be better understood by the statement that normal urine diluted to from one hundred to three hundred times its volume with water still gives a recognizable reaction. When the urine is diluted to four hundred times its volume the test shows no result.

In order that there might be no question as to sugar being the actual cause of the reaction, the following substances were examined and gave negative results with both alpha-naphthol and thymol: urea, creatine, xanthine, uric acid, allantoine, hippuric acid, succinic acid, phenol, pyrocatechin and indican.

These results fully confirm the opinion advanced by Brücke, and supported by many other observers, that normal urine constantly contains sugar.

These tests may be applied in two different manners in order to distinguish a normal from a diabetic urine.

1. A specimen of normal urine and of that to be tested are equally diluted with water to about one hundred times their volume; the same quantity of each is then tested just as has been described; if the suspected urine give a deeper violet than the normal specimen, it may be considered as diabetic.

2. The urine under examination is diluted with water to from four to six hundred times its volume. Even in this enormous dilution diabetic urine will sharply respond to the reactions of the tests described, while normal urine would give no result when diluted to four hundred times its volume.

After carefully studying the various tests for sugar in urine, F. Penzoldt came to the conclusion that the fermentation test is worthy of the greatest confidence in doubtful cases. All experiments, however, seem to show that the two new tests are decidedly more certain than the fermentation test. They leave but one thing to desire: they do not enable a distinction to be made between glucose and levulose, and although the sugar found in urine will, in nearly all cases, be glucose, yet various instances have occurred in which levulose was detected also.

* Communication to the Kaiserliche Akademie der Wissenschaften, Vienna. From *Amer. Journ. Pharm.*, Sept.

PERMANGANATE OF POTASH AS A REAGENT FOR ALKALOIDS.*

A short time ago E. Giesel demonstrated that concentrated solutions of pure cocaine hydrochlorate give a bright violet precipitate of cocaine permanganate on the addition of a solution of permanganate of potash. In diluted solutions the precipitation only becomes apparent after a short time, in the shape of crystals of a somewhat dark-violet colour. Considering the scarcity of characteristic reactions of cocaine, it was of some interest to determine whether the formation of violet cocaine permanganate is characteristic, or whether other alkaloid salts have the same effect on permanganate of potash.

Mr. H. Beckurts, of the Brunswick Technical High School, in conjunction with Mr. O. List, has tested the effect of permanganate of potash on a number of alkaloidal salts, diluting in each instance the cold saturated solutions of the alkaloidal hydrochlorates, drop by drop, with decinormal permanganate.

Under these circumstances immediate reduction of the permanganate, with separation of brown manganic oxide, was observed in the solutions of hydrochlorate of quinine, cinchonidine, cinchonamine, cinchonine, brucine, veratrine, colchicine, coniine, nicotine, aconitine, physostygmine, codeine and thebaine.

The solutions of hyoscyamine hydrochlorate, pilocarpine, berberine, piperine, strychnine and atropine were coloured red on the addition of permanganate of potash, the latter being only gradually reduced.

The reagent also causes a white crystalline precipitate of oxydimorphine from solutions of morphine hydrochlorate, which, after filtering and drying, may be recognized by its characteristic reactions.

A solution of apomorphine hydrochlorate immediately reduces a solution of permanganate of potash, and assumes an intensely green colour. Narceine, papaverine and narcotine show a characteristic action similar to cocaine.

By diluting a concentrated solution of narceine hydrochlorate with a few drops of permanganate solution a precipitate of a reddish tint is immediately formed, which is very stable in the absence of an excess of permanganate of potash, but is split up by an excess, or by heating, with separation of brown manganic oxide.

Solutions of papaverine hydrochlorate, or of narcotine, if diluted with hydrochloric acid, act exactly similar. Permanganate of papaverine and of narcotine are much less stable than narceine permanganate. The reddish precipitates soon discolour, and finally decompose with separation of oxide.

The alkaloids used in the experiments were pure, so far as could be ascertained, so that the reactions observed may be considered as pertaining especially to alkaloids. Consequently, among the better known alkaloids, only narceine, papaverine and narcotine gave coloured permanganate salts, difficultly soluble. The permanganate of cocaine is the most constant of all these.

* *Pharm. Zeitung*, from the *Druggists' Circular*.

The Pharmaceutical Journal.

SATURDAY, OCTOBER 2, 1886.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE MEETING OF "NATURFORSCHER UND AERZTE."

THE association of German scientific men which corresponds to the British Association has just held a meeting in Berlin for the second time during the sixty-four years that it has beeu in existence, and some evidence of the strength it has acquired meanwhile is afforded by the facts that while the attendance at the meeting in 1828 amounted to only 464, the number present at the recent meeting was upwards of 4000. At the meeting held in Strassburg last year a proposition was made, that in future an exhibition should be arranged in connection with the meetings of the Association, in order to illustrate the progress made during the previous year in scientific discovery and technical applications. This exhibition has formed a novel feature of the meeting in Berlin, and the official opening of it on the 16th ult. formed the first business on the programme. The German government rendered considerable assistance in the carrying out of this project, and the Royal Academy of Art was placed at the disposal of the Exhibition Committee as a convenient locality for the purpose. The number of the exhibits was so large that the space there available was insufficient and an extensive series of objects shown by the German Chemical Society had to be placed apart from the rest of the exhibits. On the following evening the ordinary proceedings of the meeting were commenced with the delivery of an address by the President, Professor VIRCHOW, in which he traced some of the circumstances which gave rise to the formation of such associations as the German Naturforscher-Versammlung. In the first place he referred to the indispensable necessity for co-operation in scientific research in order to give certainty and persistence to intellectual progress. Though some rare and highly gifted natures, superior to this want, were able to reconstruct alone entire departments of science, like COPERNICUS and NEWTON, LAVOISIER and VOLTA, SCHWANN and DARWIN, scientific heroes do not spring from the earth like mushrooms and their achievements are not so absolute and independent that each one has not predecessors who have prepared the way for their discoveries. For this preparatory work, as well as for the preservation and utilization of new discoveries, a multitude of workers is necessary, and as universities and academies became less sufficient for exerting their influence in this direction beyond limited areas, an attempt was made to supply the deficiency by the foundation of associations akin to the Naturforscher-Versammlung. The continuance and the prosperity of that association prove that it has supplied a real popular want, and so long as there is a demand for increasing rather than diminishing the number of its sections, there will be found in each section a recognizable condition that must proceed from some inherent necessity. Such a tendency makes itself apparent from time to time, as in surgery the specialities relating to the eye, the ear, the teeth, and the skin have branched off and formed separate departments of study and investigation. At the Naturforscher-Versammlung this year such an abundant programme has been provided in each of the several sections that it would be scarcely possible to ignore the fact, or to refuse them, for the time at least, a free field for their labours.

One of the sections of the Naturforscher-Versammlung is devoted to the subject of pharmacy and another to that of pharmacology. At the opening sitting of the former there were more than sixty members present and eventually the number rose to upwards of a hundred. Professor POLECK, of Breslau, brought forward some interesting communications from the pharmaceutical institute of that university, amongst others the investigation of *Polyporus officinalis* by SCHMIEDER, who has found that this fungus contains from four to six per cent. of a fat which is not a glyceride. He obtained from it a crystalline substance having a composition represented by the formula $C_{10}H_{16}O$, which he terms agaricol. The liquid portion of the fat yields no glycerin on saponification, but cetylalcohol and another alcohol together with two hydrocarbons, while the fat acid with which the alcohols are naturally combined appears to resemble ricinic acid. Another investigation of the dust obtained in dressing millet seed, by Dr. KASSNER, showed that it contains from 18 to 25 per cent. of a fat oil that also contains no glycerin. It deposits a crystalline substance, panicol, $C_{13}H_{20}O$, that is an alcohol apparently resembling agaricol and lactucerol in being allied to cholesterin. The investigation of the ethereal oil of *Allium ursinum* has shown that it is a vinyl derivative, and incidentally it was mentioned that vinyl compounds and probably also sulphur compounds are to be met with in commercial ether. Professor POLECK considers that the elimination of iodine that has been observed with some samples of ether may be due to this circumstance. In one sample of five litres he found a dark coloured deposit formed, from which gas was evolved, and as much as 400 cubic centimetres was collected which contained 75 per cent. of ethylene.

At the second sitting of the pharmacy section

Mr. Müller, of Breslau, read a paper on the analysis of urine and human milk, which gave rise to some discussion. Dr. Schacht, of Berlin, read a paper on the determination of iron in pharmaceutical preparations, recommending the volumetric method with permanganate as preferable to ignition for saccharated carbonate and the soluble saccharated oxide of the German Pharmacopœia. The presence of sugar was not found to interfere with the reaction. At the third sitting Professor Reichardt read a paper on the subject of practical hygiene as one suitable for the attention of pharmacists. Professor Hilger made a report on experiences in the practice of forensic chemistry, relating chiefly to the detection and separation of the ptomaines and showing that, in the form of oxalates, these bases could be separated from many other poisonous bases by treatment with ether, in which the former salts are soluble. A paper on morphia determination was read by Mr. Dieterich, in which he showed that the separation of morphine from a mixture of spirit, ether and ammonia is much facilitated by shaking the liquid. Mr. Schweissinger described a method of determining the strength of belladonna and hyoscyamus extracts and Dr. Beckurts read a paper on the colour reactions of alkaloids. The fourth sitting was chiefly occupied with the reading and discussion of papers by Dr. Tschirch on the secreting glands of umbelliferous plants and hemp and on the different kinds of "eichelcacao." A report of some observations on reactions of cubebin, resembling those of digitalin, morphine and other alkaloids was then read and discussed. Dr. Mankiewicz in a report on the detection of phosphorus showed that the luminosity of phosphorus vapour was counteracted by carbolic acid as well as by ether and other substances already known to have this effect. Professor Schmidt communicated the results of some investigations of alkaloids carried out at the pharmaceutical institute of Marburg. The hydrosulphate of berberine was shown to be analogous to the corresponding compounds of brucine and strychnine, being formed readily and crystallizing well. A compound of berberine and chloroform is easily formed and crystallizes well; it is not altered at 100° C. Hydrastine was found to be remarkable for its capability of crystallizing, especially from solution in acetic ether, while the salts of the base are very soluble in water, and not easily crystallizable. Oxyacanthine is regarded by Professor Schmidt as identical with a base recently obtained from *Berberis aquifolium*. Of the chelidonium bases it was stated that chelirethrine is not identical with sanguinarine as is often stated to be the case. It has before been suggested that "scopolein" is a mixture, and Professor Schimdt now states that the presence of atropine, hyoscyamine, and hyoscine can be detected in it. Tropine was also found in such relative amount that it may be really a normal constituent of the drug. In reference to the suggestion that choline, a very frequent constituent in plants and animals, may be converted into the poisonous substance neurine, Professor Schmidt has found that this cannot be effected in the way described by Grahm, though the change may take place under the influence of putrefaction and of micro-organisms. The last paper was by Mr. Thümmel, of Breslau, in which he recommended the use of mercuric chloride as preferable to caustic soda in testing sodic bicarbonate for ammonia salt.

The first evening meeting of the Pharmaceutical Society in the new session will be held on Wednesday next, the 6th inst., when the sessional prizes and certificates will be distributed and an address to the students in the School of Pharmacy will be delivered by Sir Henry W. Acland, K.C.B., M.D., F.R.S. As has been usual on similar occasions ladies are invited to be present.

* * *

In accordance with a recent resolution of the Council, a new course of Practical Pharmacy in the School of Pharmacy has been instituted for the forthcoming session, under the direction of Mr. Joseph Ince. The first lecture will be given on Thursday, October 7, at 5 o'clock p.m. The Demonstrations, which will be continued as usual, commence on Tuesday, October 5, at the same hour.

* * *

We understand that the Official Report of the proceedings at the Sixth International Congress, held in Brussels last year, is now ready, and that the copies intended for the English *adherents* will in the course of a few days be forwarded to Mr. Richard Bremridge, who has undertaken to distribute them. The report forms an octavo volume of nearly 1300 pages, and some extra copies will be available for a subscription of twelve francs each.

* * *

The Council of the Ontario College of Pharmacy had under consideration at its last meeting the position under the Ontario Pharmacy Act of medical men keeping branch drug stores. It was complained that although it was a straining of the law for a doctor to keep open a drug store other than that necessary for the supply of medicines to his patients, there were some cases in which medical men opened branch shops and placed these under the management of unqualified persons. It was finally decided to bring a test case before the law courts.

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An arrangement for the mutual recognition of diplomas of qualification between the Ontario College of Pharmacy and the Manitoba Pharmaceutical Association has been recently officially ratified.

* * *

Some of our readers who were indebted to Mr. Charles Thompson for kindly services rendered by him as Local Secretary to the British Pharmaceutical Conference, during the recent meeting in Birmingham, will be interested to learn that with the object of giving expression to the sense of obligation for his services, felt by the members of the Midland Chemists' Association and the Local Committee of the Conference, it is intended to make his marriage, which took place on the 17th ult., the occasion of offering him some tangible mark of appreciation.

Provincial Transactions.

LEICESTER AND LEICESTERSHIRE CHEMISTS' ASSOCIATION.

The annual dinner of this Society took place at the Bell Hotel, Leicester, on Thursday evening, Sept. 23, the company numbering about fifty. The chair was occupied by Mr. J. G. F. Richardson, President of the Association, Mr. J. Young acting as vice-chairman. After dinner, the health of "The Queen and Royal Family" having been drunk in a very hearty manner,

"The Medical Profession" was next proposed by the Chairman, who remarked that if it were not for that distinguished profession, their business as pharmacists would indeed be very small. He hoped that the greatest unanimity would continue to be felt between the two professions. He also alluded to the amount of gratuitous assistance medical men give to the poorer classes, endangering not only their own lives, but the lives of those near and dear to them. He was of opinion that the public generally were greatly indebted to those gentlemen for the manner in which their services were rendered. He had great pleasure in coupling with the toast the names of two very esteemed gentlemen—Dr. Crossley and Dr. Lankester.

Dr. Crossley, in responding, said that chemistry was a science he had been very much attached to, and he urged that it was desirable that the two professions should become thoroughly allied to each other. He was sure that they would be so, and hoped they would continue to work together in the utmost harmony.

Dr. Lankester also responded.

Mr. E. H. Butler proposed the health of "The Council of the Leicester and Leicestershire Chemists' Association." He was greatly pleased to see such an attendance there that evening, and thought it augured well for the future of the Association. He coupled with the toast the names of the President, the Vice-President, and Secretary of the Association.

Mr. J. J. Edwards (the Secretary) responded, and in the course of his remarks alluded to the old Chemists' Society which was now defunct. He explained that that was a society which merely looked after the education of assistants and apprentices, having nothing whatever to do with trade matters. A gentleman well known amongst them, Mr. W. B. Clark, had laboured to keep that society in working order, but through some cause or other it eventually went to the bad. Subsequently the present Association was formed, and had received great help from their worthy President. That Association was now in a good financial position, there being a balance of £32 in its favour. He urged upon the younger members of the Association the necessity of regularly attending the classes, which had been arranged to be held through the winter, and was sure if they followed that advice there would be no difficulty in passing their examinations.

"The Visitors" was proposed in eulogistic terms by Mr. J. Young, the toast being coupled with the name of the Rev. E. Atkins, B.Sc., who, in responding, wished the Association every success.

Mr. T. H. Lloyd proposed "The Pharmaceutical Society," which was ably responded to by Mr. W. B. Clark.

"The health of the Chairman" was next proposed by Dr. Crossley and received with musical honours.

Mr. Richardson, in responding, alluded to the great honour conferred upon him by electing him President of the Association. He assured the members that he would do all in his power to further the interests of that Association, and should always be pleased to set right any grievance which might exist. He was sure that the success of the Association had been brought about not altogether by any efforts of his own, but by the indefatigable exertions of their excellent Secretary.

British Pharmaceutical Conference.

TWENTY-THIRD ANNUAL MEETING.

(*Continued from page* 259.)

Wednesday, September 1.

The next paper read was on—

Salol: A New Antiseptic.

BY JOHN MOSS, F.I.C., F.C.S.

A few notes on a new antiseptic of promise will no doubt interest the members of the Conference.

Our information on salol is derived chiefly from *La Semaine Médicale*, April 14, 1886, which reports a meeting of the Medico-Pharmaceutical District Society of Berne, held in that city on the sixth of the same month. M. Sahli introduced salol as a new antirheumatic and antiseptic produced by Professor von Nencki, and as possessing certain very decided advantages over other bodies having allied therapeutic characters.

It is perhaps hardly correct to speak of salol as a new antiseptic. It is rather an association, a combination indeed, in which are concerned two well-known antiseptics, salicylic acid and phenol. It is somewhat startling to be told that phenol is an ether which is playing the *rôle* of a base, and that the compound is salicylate of phenol. We should be disposed to assume that M. Sahli's remarks on these points are misreported, and that salicylate of phenyl was intended, were it not that the word salol is evidently compounded of the initial and terminal letters of the former title.

Salol is a white crystalline coarse powder, rather like damp table salt. The odour is very marked, and is identical with that of oil of wintergreen, which is chiefly salicylate of methyl ($CH_3C_7H_5O_3$). When taken into the mouth, a fainter impression of the smell is received on the palate, and the taste of carbolic acid is just suggested. It is very sparingly, if at all soluble in water at 60° F. It dissolves in proof spirit, more readily in stronger spirit, and is precipitated on dilution, a permanent emulsion being formed. The solution has no effect whatever on litmus.

Salol melts at 106° to 108° F., forming at a slightly higher temperature a clear white liquid like carbolic acid. If it be melted under water and shaken till cool, the original condition of a coarse crystalline powder is restored.

It dissolves readily in caustic soda solution, and on addition of acid in excess the liquid becomes milky, oily looking drops are visible, and the smell of carbolic acid is noticeable. When the liquid is only slightly acid, the addition of a nearly neutral solution of ferric chloride produces the purple coloration indicative of salicylic acid.

The advantages which are claimed for salol over salicylate of soda, for which it is proposed as a substitute, are dependent first of all on its insolubility in water and the juices of the stomach, and secondly on the ease and completeness with which it is decomposed after passing the pylorus. Being insoluble in water it is free from the repellant and nauseating effects of salicylate of soda which some patients find so objectionable that even syncope has sometimes supervened on ingestion. Passing through the stomach unaltered it undergoes decomposition in the duodenum, where it comes into contact with the pancreatic juice and is broken up into salicylic acid and phenol. Professor von Nencki claims that this change is due to the pancreatic ferment, but a simple experiment suffices to show that so highly organic a secretion is not essential to produce the effect referred to. The pancreatic juice is alkaline in character and I find that the addition of a few drops of solution of soda brings about the decomposition, so that the further addition of ferric chloride is followed by the characteristic purple coloration. The action of the soda takes place very slowly in the cold, more quickly when gently warmed. The liquid must be neutral or slightly acid

for the colour to be produced, though much acid discharges it. The best effect is obtained by digesting salol in solution of soda at 100° F. for an hour, pouring off the clear liquid, adding slight excess of hydrochloric acid and diluting, then adding a dilute solution of ferric chloride. No coloration whatever results when salol is heated with an acid instead of alkali previous to the addition of ferric chloride.

Now the salivary secretion also is alkaline and if alkali is the only essential factor in the analysis of salol, it ought to happen that digestion with saliva should lead to the purple coloration with ferric chloride under the conditions already laid down, and this in fact is what occurs. The saliva is so slightly alkaline, however, that the amount of salol decomposed is correspondingly minute and the coloration very faint. The weak taste of salol is therefore accounted for.

Having passed the duodenum the salicylate and phenate of alkali, which are slowly produced as the gut is followed, are in condition to exercise their respective antiseptic powers, and to be absorbed into the circulation. They are voided as urate of salicyl and as sulphophenol.

So far as I know, the process of manufacture of salol has not been made public. I have tried to produce it by dissolving salicylic acid in excess of carbolic acid with the aid of a gentle heat, but have not succeeded in getting the whole of the salicylic acid so combined as not to give the purple coloration at once with ferric chloride. It seems not improbable that it should be formed by treating with hydrochloric acid at an earlier stage in the manufacture of salicylic acid. As you know, when the carbonic acid gas is brought into the presence of carbolate of sodium in the retort, a molecule of the former is absorbed with production of a molecule of salicylate of sodium, and a molecule of carbolic acid, which distils away. If the mixed salicylate of sodium and carbolic acid or, better, carbolate of sodium be treated with hydrochloric acid, the following equation would probably represent the decomposition :—

$$NaC_7H_5O_3 + NaC_6H_5O + 2HCl = C_6H_5C_7H_5O_3 + 2NaCl + H_2O.$$

Chemically speaking, salol is salicylate of phenyl. The possibility that it is phenylsalicylic acid, of which the formula would be $HC_7H_4(C_6H_5)O_3$, is contra-indicated by its indifference to litmus, though the latter view receives support from the slow rate at which the compound is decomposed by soda, as well as from the observation that after the decomposition is effected the addition of hydrochloric acid, under ordinary conditions, is not followed by the re-formation of the original compound. I am aware that the latter fact apparently disposes of the suggestion just made as to the manufacture of salol, but it must be borne in mind that the effects of high temperature and pressure on two bodies set free in presence of each other cannot be disregarded.

Salicylate of phenyl contains 36 per cent. of phenyl, corresponding to 44 per cent. of carbolic acid. Sahli says that salol contains not less than 38 per cent. of phenol ; but seeing that his account did not concern itself chiefly with the chemistry of this new compound, a little latitude of expression is admissible.

Sahli claims that more carbolic acid may be ingested as salol without unpleasant secondary effects than in any other way. The dosage of salol being 30 grains three or four times a day, 12 grains of phenol are exhibited in every dose, and the freedom from irritation and other unpleasant local effects may be attributed to the slow rate at which salol is decomposed under the action of the intestinal juices.

For the present it remains only to state what are the various ailments in which Sahli has used salol with good effects. He has used it in all rheumatic affections, in chronic urticaria, in sub-orbital neuralgia, as an antipyretic, in diabetes, in intestinal catarrh, in typhoid fever, in cholera, against intestinal parasites, in catarrh of the bladder, in ozœna, in otorrhœa, as a local application in gonorrhœa, and as a mouth wash.

Since the above was written I have learned from Messrs. Kühn and Co., who represent the manufacturers in this country, that the latter, Messrs. Durand and Huguenin, are not in a position to state how salol is made. The probability is that the process is entirely secret, and not the subject of a patent.

The PRESIDENT, in proposing a vote of thanks to Mr. Moss, remarked that this paper brought before the Conference a new substance which might by-and-bye be of importance in medicine. He recollected not many years ago when Mr. Daniel Hanbury in the same way brought under the notice of the members of the Conference, for the first time, chloral hydrate, which had since obtained a very extensive use.

Mr. LASCELLES-SCOTT said this very interesting paper required more time for discussion than could be afforded it. Mr. Moss had given the percentage of carbolic acid, or the carbol radicle present, but it might be interesting to state that, from some hasty experiments he had made with a small sample of salol on hay infusion and milk, he found that its antiseptic power in preventing decomposition and sterilizing bacteria was slightly in excess of that of carbolic acid itself.

Mr. NAYLOR said he did not gather that Mr. Moss had himself determined the percentage of carbolic acid which this salicylate of phenol was capable of yielding. He should like to know if he had tested it for salicylate of methyl, as it had distinctly that smell.

Professor ARMSTRONG said the most recent method employed in the manufacture of salicylic acid did not involve the production of any free phenol. The production of free phenol was due to an action which took place between the sodium salicylate which was first formed and the phenate whereby a basic salicylate was formed. Schmitt had shown that it was only necessary to saturate the dry sodium phenate with dry carbonic anhydride at the ordinary temperature and to heat under pressure to a temperature of 120° C. the phenyl sodium carbonate thus formed to effect its conversion into sodium salicylate. Commercial salicylic acid was now made under that patent he believed.

Mr. MOSS said, in reply to Mr. Naylor's question, that he did not pretend to have made any quantitative examination of this body. It was brought under his notice, and feeling extremely interested in it, he had referred to the original papers; in transcribing them for his own purposes it occurred to him that an account of it might be interesting to the Conference. He assumed that salol was a chemical compound, because he did not find either free salicylic acid or free carbolic acid in it. What he particularly wished to draw attention to was his observation that alkali would decompose salol. He was much obliged to Professor Armstrong for the information he had given as to the *rationale* of the decomposition in the process for making salicylic acid; he must at once admit that he was not previously aware of it, and of course any speculation based on erroneous knowledge fell to the ground.

The following papers were then read—

NOTE ON THE "PURE TEREBENES" OF COMMERCE.

BY W. LASCELLES-SCOTT, F.R.M.S.

The generality of pharmaceutical preparations are known and ordered by their technical or vernacular names, with or without the addition of a qualifying adjective, according to the particular uses for which they are required. In the case of the hydrocarbide to which, in its commercial forms, I desire to direct your attention to-day for a few minutes, this rule scarcely applies, since by way of avoiding confusion with a dark brown fluid of doubtful composition which has of late been put forward as a disinfectant under the title of "terebene,"

the term "pure terebene" seems to have been tacitly, if not officially adopted for it.

This is somewhat misleading, and, so far as my experiments go, the name is scarcely more appropriate than "pure cyanide" would be if this were taken as the term by which all the cake cyanide of potassium used in this country was known. However, the name, like many other things, good, bad and indifferent, seems inclined to stick, so we must accept it as it stands, at least until we know a little more about its integral constitution.

Terebene, to leave out, for once, its unwarranted prefix, is, as we all know, prepared by treating rectified oil of turpentine with various substances which cause it to undergo certain molecular changes without themselves suffering alteration. These substances are generally members of that class which possesses a great attraction for water, such, for instance, as concentrated sulphuric acid, chloride of zinc, fluoride of boron, glacial phosphoric acid, and even chloride of calcium in the form of a thick, syrupy solution. Of these the most effective are fluoride of boron, and sulphuric acid, and either of them will give satisfactory results provided that the oil of turpentine is itself pure, and that due time is allowed for the operation. The usual plan is to mix the oil with 5 per cent. of its weight of concentrated sulphuric acid, repeating this operation once or oftener until the distillate from such mixture no longer rotates a polarized ray of light either to the left or right, and becomes, in fact, optically inactive.

There is certainly no great difficulty in performing an operation of this extremely simple character, and it might fairly be imagined that the terebenes commonly sold would be to all intents and purposes of uniform quality and therapeutical value. Some cases published in the *Lancet* a little while back appeared to indicate, however, that the terebenes of commerce were not of uniform quality, and that they, or some of them, were liable to induce or aggravate various skin affections. In one instance which came under my notice, terebene had been given internally for some time with impunity, but an extremely irritable milliary eruption showed itself, until another brand was substituted. When the terebene was discontinued the eruption gradually died away, reappearing in forty-eight hours when the same terebene was again administered. It was then thought desirable to examine several of these preparations and endeavour to find out the reason why some produce skin diseases and others do not.

I may here record my opinion that it is not to really pure, freshly prepared terebene, that these effects were due; they were probably occasioned by one or other of the foreign bodies contained therein.

A number of samples of terebene were then examined, and the chief results are given in the following table. Peroxide of hydrogen was the ingredient respecting which my suspicions were chiefly excited, as I had been informed of two cases in which this preparation had been administered where it had occasioned very similar symptoms. With but few exceptions all the terebenes examined were impure, as shown by their leaving a resinous layer on evaporation, and by the fact of their whitening the corks of the bottles containing them. Some also contained much unchanged turpentine, and these samples were of course not "optically inactive" Iodide of potassium and starch, applied in the form of "Schonbein's ozone paper," is useful in detecting H_2O_2, and oxide of silver is very readily reduced by many of these "pure terebenes," the disengaged oxygen rising almost in effervescence from the fluid.

The great practical value of terebene for internal use in the ordinary way and as an inhalant renders it, in my opinion, the more regrettable that the majority of specimens seem to be impure, but the time is approaching when medical men will demand a much better and more definite preparation than is now, in most cases, available for them. It is therefore in the hope that the expression of some opinion hereon by this meeting of the Conference may tend a little towards a more carefully prepared article, that I have troubled you with these few observations.

The samples in question are as under, the amount of peroxide of hydrogen present being expressed as usual in volumes of oxygen liberated:—

	Resin per cent.	Vols. of O.	Remarks.
1* . .	—	1·13	
2 . .	—	—	Fairly good sample
3 . .	·08	·86	
4* . .	·71	1·72	Turpentine odour.
5* . .	·26	·37	
6 . .	—	—	Good sample.
7 . .	—	·39	
8* . .	·21	1·90	Turpentine odour.
9* . .	2·10	1·85	Caused continuous eruption when taken internally.
10 . .	trace	—	
11 . .	·64	·88	
12* . .	1·75	2·84	Very "turpentiney."
13 . .	1·04	—	
14 . .	·31	1·07	
15 . .	—	0·85	

Samples marked thus * exerted considerable influence upon the polarimeter, and hence were by no means "optically inactive."

I am convinced that it is impossible to prevent *all* tendency to the absorption of H_2O_2 by terebene, however carefully it may be made; but I may perhaps remark, in conclusion, that a very dry atmosphere, such as can be obtained by the use of a chloride of calcium tube, or a few lumps of caustic lime, will reduce this to a minimum. A little oxide of silver in a cambric bag suspended in the terebene, also enables it to be kept for a long time practically unchanged.

Short Note on the Impurity of "Pure Terebene," as indicated by the Polarimeter.

by John Hodgkin, F.L.S., F.I.C., F.C.S.

In view of the announcement of a note on the Pure Terebenes of Commerce, by Mr. W. Lascelles-Scott, the following statistics of the optical examination of various samples that have come under my notice may possibly prove of interest, and at the same time perhaps confirm to some slight extent the accuracy of Dr. Bond's deduction, in his letter on terebene (*Brit. Med. Journ.*, p. 617, March, 1886), "that it is very doubtful whether there is any such substance at all as 'pure terebene.'"

The samples examined consisted of seven British, representing six makers, C. and D. being different deliveries of the same manufacture; one of which the origin is doubtful, H. (probably foreign); and two foreign samples, I. and J. Before examining these statistics, it may be well to call to mind that pure terebene is stated to be optically inactive, and that the average polarimetric rotation of American turpentine (from which in all probability these were prepared, since the rotation of all is to the right) is +18° 6′. Of course it is not possible to give the rotation of the various parcels of turpentine employed in the manufacture of these terebenes, but taking the 18° 6′ as the standard, I have worked out the percentage of unaltered turpentine of this rotation, in order that the varying values may be seen at a glance. The range of unaltered, *i.e.*, active material still existing in the finished article is wide, from 3·2 per cent. to 61·0 per cent.

I may mention as a proof of the possibility of working commercially to a high standard, that eighteen batches of terebene made at our works at Stratford gave an average rotation of 0° 29′ or a percentage of 2·7 for unaltered material. Sample D. indicates that a pleasant smell is no indication of the purity of the tere-

bene. Whilst on the other hand H., smelling slightly of turpentine, has a good polarimetric test. The whitest samples were G. and J., which contain the largest amount of unaltered material.

All of these samples were labelled "Pure Terebene," but in face of the rotations here indicated and the optical inactivity of *really pure* terebene, it would in my opinion be rather difficult for any of them excepting H., and possibly A., to maintain their position as "*pure.*" The presence of so large quantities of unaltered material is referable to imperfect manufacture rather than to deliberate adulteration.

Pure terebene should according to these indications be almost, if not quite, colourless, of low rotation, and at the same time of agreeable odour. This latter may vary slightly according to the turpentine employed.

Origin.	Sample.	Colour.	Smell.	Rotation.	P.c. unaltered.
British.	A.	White.	Fairly pleasant.	1° 5′	5·9
,,	B.	Yellowish.	Strong odour.	2° 58′	16·3
,,	C.	Slightly coloured.	Fairly pleasant.	3° 42′	20·4
,,	D.	,, ,,	Pleasant.	5° 58′	32·9
,,	E.	Nearly white.	Pungent and unpleasant.	7° 6′	39·2
,,	F.	Slightly yellow.	Smells distinctly of turpentine.	10° 7′	55·3
,,	G.	White.	Trace of odour of turpentine.	11° 3′	61·0
Doubtful.	H.	Slight colour.	Slight smell of turpentine.	0° 35′	3 2
Foreign.	I.	Yellowish.	Artificially scented.	1° 44′	9·5
,,	J.	White.	Strong of turpentine.	10° 25′	55·8

A vote of thanks having being passed to the authors of these papers,

Mr. Moss said he was glad these papers had been contributed, for he felt that a Conference held in Birmingham would have been incomplete without some reference to terebene; seeing how they were indebted to two gentlemen now present, Professor Tilden and Dr. Armstrong, the former of whom was Chemistry Professor in that institution, for almost all their chemical knowledge of this substance. They had made a minute examination of terebene, and showed how pure terebene could be manufactured, and as a maker of it he felt bound to acknowledge his obligations to them. Like Mr. Hodgkin, he found the product varied somewhat, but whether the variation was caused by some unconscious difference in manipulation, or in the origin of the turpentine, he had not made out. He had always supposed that he was working on turpentine of the same character, but he noticed in the last lot he made, working on about 12 gals., that he obtained a considerable quantity—an ounce or two—of solid crystalline matter, which he carefully collected and put aside, which he supposed to be camphene, but had not yet been able to make any determinations.

Professor TILDEN said it was quite true, as Mr. Moss had said, that Dr. Armstrong and he had given a good deal of attention to terebene, but he was not aware that they had given the information Mr. Moss mentioned, for if one result came out more certainly than another it was that there was no such thing as terebene at all, and, therefore, any process for the production of pure terebene could hardly have resulted from their investigations. The point of their research was to establish the fact that the substance termed terebene by the French chemist Riban was a mixture of at least three or four distinct hydrocarbons, and, further, that the proportion of these hydrocarbons varied considerably, according to the manner in which the process of making terebene was carried out. He should like to hear from some manufacturer how he proceeded. In their experiments they employed almost exclusively strong sulphuric acid as the agent for effecting the molecular change, but in one respect their mode of procedure differed from that of M. Rlban, who, if he remembered rightly, treated the hydrocarbon with small successive doses of sulphuric acid, until on examining it with the polarimeter it was found to be optically inactive, and then in accordance with the process previously described by Deville, distilled the whole, sulphuric acid and all. Since their paper was read, some six or seven years ago, an article had appeared by M. Riban himself, in which he endeavoured to controvert their statements. At present they had not had an opportunity of going over the ground again, but the only difference apparently which M. Riban could point out was that he distilled the acid with the hydrocarbon after optical inactivity was established, and they did not. Anyhow, from the pharmaceutical point of view, the most important question to settle was to what did terebene owe its special therapeutical properties. Inasmuch as it was a mixture of things, the natural course would seem to be to take the several constituents which could be isolated, terpene, camphene, cymene, and other hydrocarbons known to be present, and examine their therapeutic effects separately. It was useless to talk about pure and impure terebene, until they know more about it. Probably its medicinal activity would depend very much on the proportions of the various hydrocarbons. Perhaps Mr. Moss would kindly say whether he separated the hydrocarbons from the acid before distillation, because that would no doubt seriously affect the result. Mr. Moss had referred to the production of a crystalline substance in the later stages of the distillation, and he had separated a similar substance, which he had examined and showed to be a variety of Borneo camphor, only differing from the natural substance in being optically inactive.

Mr. Moss said the pure terebene of which he spoke was not the pure terebene of the scientific chemist, but a form such as was introduced early in the year by a well-known therapeutist, which generally possessed the following characters. It boiled at about 155° to 160°, was colourless, had rather a pleasant fruity smell, and was optically inactive. That was what pharmacists called pure terebene, and which Professor Tilden and Dr. Armstrong had taught him to prepare. He had followed the process they described with very little alteration, and he rather took credit to himself for having picked out the process from their paper, because as Professor Tilden had already said one of the chief points they sought to determine was that there was no such thing as terebene. He took turpentine and added to it in five successive quantities the proportion they mentioned, 5 per cent. oil of vitriol, and allowed the mixture to cool down. He then let it stand two or three days, carefully poured off the hydrocarbon from the magma, the thick tarry stuff which fell to the bottom of the vessel, neutralized it with carbonate of soda, and then distilled with steam. That was a most important point. He got over as much as he could in that way, redistilled it, and treated it again in precisely the same way until he got an optically inactive preparation having the characters he had described.

Dr. SYMES thought the word *pure* terebene was intended to distinguish the article from a very impure terebene.

Before it was used internally it was known as the subject of a patent, and was a very impure substance. When it was introduced medicinally the question arose whether it could be used because it was covered by a patent, and in the result the information was given that it was not the impure disinfecting terebene, but *pure* terebene, which was to be used, and that was how the name became current. He found, after examining several samples, that the odour varied very considerably; that which came from Germany, for example, was frequently sweeter than that made in England. It had occurred to him whether or not the result of treating French turpentine, which was levogyrate, and American turpentine, which was dextogyrate, would be the same in regard to the molecular changes brought about.

Mr. MARTINDALE said he believed he was the first to call this substance *pure* terebene, and published in the 'Extra Pharmacopœia' some three years ago a short note upon it. He gave abstracts from the *British Medical Journal* in 1881–2, showing that in Germany it had been used medicinally as an expectorant. He applied the term to distinguish it from a substance known in English commerce, which was very impure. The preparation was clear and colourless, and was known as pure terebene, but of course it would vary according to the time the acid was allowed to act on the hydrocarbons.

Mr. PASSMORE asked if Dr. Symes had ever seen a copy of a specification of a patent covering the manufacture of terebene.

Dr. SYMES said he had not seen the specification, nor had he gone at all into the question of its validity; but it was stated to be a patented article.

Mr. PASSMORE said he spent some time in the search, but had failed to find anything beyond a specification in which a substance described as being known to chemists as terebene was mentioned as one of the ingredients in a disinfectant that was the subject of the patent.

Mr. UMNEY thought some of the differences noticed in the terebenes of commerce might be attributed to the final heat used in the distillation. He had proceeded somewhat in the way mentioned by Mr. Moss, but had not used steam, and did not know how it could be done, unless superheated steam were used, or the distillation were carried on in the vapour of water.

Mr. MOSS said that Mr. Umney's remarks were made under a misconception; the steam distillation of which he spoke consisted in passing live steam through the mixture itself, he did not mean merely heating the still by steam.

Mr. A. H. ALLEN (Sheffield) said there was one point on which he should like to hear Dr. Armstrong's opinion as an authority on American turpentine. Dr. Armstrong had shown that the optical activity of American turpentine varied from 16 down to 9; but it had been placed by the author of one of these papers at 18 and a fraction. If then it could vary from 18 to 9, it was quite clear that any estimation of the amount of the unaltered turpentine in a sample of terebene based on the optical activity would be liable to give an erroneous result, unless the activity of the turpentine used were first ascertained. With regard to the name terebene, it was first of all a name given to the product by the French chemist Riban—who believed it to be a chemical individual, but the researches of Professors Tilden and Armstrong had since shown it to be a mixture of several distinct substances. They were perfectly justified in speaking of it as terebene, and defining it as an inactive liquid produced by the action of strong sulphuric acid or a similar reagent on turpentine oil. As long as the product was optically inactive, and had the other characters associated with what had been termed terebene, it had a right to the name.

Dr. ARMSTRONG said it was quite true there were the differences in the optical properties of American turpentine Mr. Allen had mentioned, but the variations noticed were chiefly between samples shipped from the Savannah district on the one hand, and on the other from Wilmington; and inasmuch as the Savannah turpentine was a comparatively small quantity, the ordinary American turpentine of commerce might be said to be fairly uniform,—much more so than might be supposed from the figures referred to. If such a substance as pure terebene did not exist, the name remained for use as applied to the mixture which had been spoken of. On the other hand the danger arose, and it was a serious danger with regard to these preparations, that directly you used a homogeneous name of that kind, you began at once to think you were dealing with a uniform substance.

Dr. MEYMOTT TIDY said he had several times attempted to ascertain the action of pure terebene, and found no action at all; but the impure did seem to have a very definite action; so that medicinally it might be advisable to use the impure terebene, and not the pure one.

Mr. LASCELLES-SCOTT said he himself found some of the camphene which had been described; he handed a portion of the crystalline substance to a medical friend, who reported it as valueless, and he therefore took no further interest in it. He had cut out of his paper all reference to polarimetric results on seeing the title of Mr. Hodgkin's, but he might say that he had found all turpentines so variable in that respect that he could deduce nothing like a rule depending on this property.

The following papers were then read :—

NOTES ON THE ESTIMATION OF EMETINE.

BY HENRY WILLIAMS JONES, F.C.S.

In examining ipecacuanha we have the advantage of an excellent method recently suggested by Professor Flückiger; but with liquid preparations of the drug we have to work under less favourable circumstances. Emetine is generally regarded as easily suffering partial decomposition, as evidenced by the change in colour which occurs when it is exposed to light and air. Yet, for the purpose of examining preparations containing, like ipecacuanha wine, only a small amount of alkaloid, it is necessary to evaporate a considerable quantity of liquid—200 c.c. or more.

The following notes include a short description of experiments made with a view of determining how far alteration of the alkaloid takes place under certain conditions, and such as would be met with in the analysis of liquid preparations.

Since the publication of Professor Flückiger's process I have examined a number of samples of ipecacuanha by that method. It appears to give complete exhaustion of the root, and the alkaloid is obtained in an unaltered condition. In all samples I have examined, I have found the residue from the chloroformic solution imperfectly soluble in acidulated water; and in one case the total chloroformic residue from a commercial powder, in which oil may have been used in grinding, amounted to over 6 per cent. The process consists in exhausting the drug, in the state of a fine powder, in a Soxhlet's tube, or similar apparatus, with chloroform and a small amount of ammonia.

I prefer treating the residue from the chloroformic solution with water and dilute sulphuric acid; filtering through cotton-wool and recovering the alkaloid by means of chloroform and ammonia. It does not appear necessary to wash the acid solution with chloroform, as only a very small amount is removed. For example, an acid solution, equivalent to 10 grams of root, yielded, when treated in a separating funnel with chloroform, a dry residue weighing 5 milligrams, equivalent to 0·05 per cent. This shows, as will be more fully stated further on, that the chloroformic solution of the Flückiger process contains the alkaloid in a practically unaltered state.

Before the publication of the method just alluded to, I made, by means of the lime process, a considerable number of assays; and as a result of comparative ex-

periments found the best mode of procedure to consist in treating the finely powdered drug with one-fifth its weight of lime, and sufficient water to make the whole into a paste, allowing the same to dry spontaneously in a warm place. Then rubbing to a fine powder the dried mixture and exhausting it with rectified spirit; treating the residue of this, after evaporation, with water and dilute sulphuric acid, filtering from insoluble matter, and lastly, recovering the alkaloid by chloroform and ammonia and weighing the same.

Drying the mixture of ipecacuanha, lime and water over the water-bath, gives a horny mass, difficult to powder and still more difficult to exhaust either with spirit or chloroform. Instead of treating the drug with lime directly the powdered root may be macerated in water, acidulated with sulphuric acid, for twenty-four hours; and the solution so obtained treated with lime in excess, evaporated on the water-bath and the dry residue treated as previously described. I have found, however, that lower results are obtained by this modification. I have always found it better to exhaust the lime residue with strong spirit in preference to chloroform, for I have noticed on several occasions, when a trial with chloroform has been made, and the powder packed in a small tube percolator, that, after the chloroform had passed through it in a colourless condition, spirit would still remove a further amount of matter soluble in chloroform, even when the marc was originally in a state of a very fine powder.

Comparing the lime method as carried out by allowing the mixture of drug, lime and water to evaporate spontaneously I have obtained results practically identical with those obtained by Flückiger's process. The latter method is however much easier to carry out, and therefore to be recommended in preference to the other.

The volumetric estimation of emetine by Mayer's solution has received a large amount of attention. And, the standard solution has generally been added directly to the liquid obtained by macerating the root in water or alcohol, acidulated with sulphuric acid, the alcohol being driven off before titration. We have here two causes at work likely to affect the result. The one being, the presence in solution of substances other than emetine, and the other, the varying amount of alkaloid in the liquid. This latter point has been frequently disregarded, and beyond the statement that one part of the alkaloid should be contained in 250 to 500 parts, I am not aware that anything has been published. To note the difference observable in solutions of various strengths I prepared a pure specimen of emetine. This was obtained by precipitating, by sodic carbonate, a solution of hydrochlorate of the alkaloid, which before being dissolved appeared as a white solid, and in crystalline tufts. The air-dried alkaloid contained 6·71 per cent. of water.

The following table shows the results obtained by Mayer's reagent (1 c.c. = ·0189 gram emetine) during six experiments with the pure alkaloid :—

No.	Anhydrous emetine taken.	Volume of solution.	Amount of Mayer's solution required.	Emetine indicated.
1	0·1421 gram.	10 c.c.	6·2 c.c.	0·1171
2	0·1421 ,,	30 ,,	6·4 ,,	0·1209
3	0·1421 ,,	50 ,,	7·0 ,,	0·1323
4	0·0945 ,,	10 ,,	4·2 ,,	0·0793
5	0·0945 ,,	50 ,,	5·0 ,,	0·0945
6	0·0945 ,,	100 ,,	5·4 ,,	0·1020

All solutions contained the same proportion of free acid.

With faintly acid solutions, I found that pure emetine, prepared as described, required to be present in the proportion of 1 to 530 to give exact results. Although a certain degree of dilution is necessary to ensure the correct amount being found, the volumetric estimation of pure emetine in solution is not attended with such discrepancies as occur with some other alkaloids; and I believe that for practical purposes, and in cases where the solution has been freed from extraneous matter, as far as possible, it may be assumed that the error due to concentration or dilution increases or decreases in a regular order. Instead of disregarding the difference due to volume, or of diluting to a given quantity after making a trial to determine the approximate amount present, we may, I think, make use of a table of corrections, such as the following one, which is based on a number of actual determinations. The table gives a range from 1:50 to 1:500, and the nearer the solution approaches the latter in strength the better. In determining volumetrically the emetine in the dry chloroformic residue obtained by Flückiger's process, it will be found convenient to make the solution of such a strength that the alkaloid of 10 grams of root will be contained in 25 c.c., dissolving with the aid of a few drops of dilute sulphuric acid.

It is advisable in volumetric assays to exhaust more than 10 grams of drug, so as to get sufficient solution for several trials if necessary. With a very limited supply of drug it is obviously safer to weigh the emetine. To make a correction, first find the *apparent* ratio by dividing the volume taken by the amount of emetine found by Mayer's solution. A reference to the table will then give the factor (choosing the nearest number) by which the amount found has to be multiplied. Column I. shows the apparent ratios. Column II. gives the factors necessary for correction.

I.	II.	I.	II.	I.	II.	I.	II.
1 : 50	1:240	1:170	1·180	1:290	1·120	1:410	1·060
60	1·235	180	1·175	300	1·115	420	1·055
70	1·230	190	1·170	310	1·110	430	1·050
80	1·225	200	1·165	320	1·105	440	1·045
90	1·220	210	1·160	330	1·100	450	1·040
100	1·215	220	1·155	340	1·095	460	1·035
110	1·210	230	1·150	350	1·090	470	1·030
120	1·205	240	1·145	360	1·085	480	1·025
130	1·200	250	1·140	370	1·080	490	1·020
140	1·195	260	1·135	380	1·075	500	1·015
150	1·190	270	1·130	390	1·070	510	1·010
160	1·185	280	1·125	400	1·065	520	1·005

The following are examples of corrections applied to four determinations :—

Amount taken.	Found.	Observed ratio.	Corrected amount.
0·1421 gram	0·1171 gram	1 : 85	0·1434
0·1421 ,,	0·1209 ,,	1 : 248	0·1384
0·1421 ,,	0 1323 ,,	1 : 377	0·1423
0·0945 ,,	0·0793 ,,	1 : 126	0·0955

The various high results obtained by the volumetric method, appear to be principally due to the interference of foreign matter dissolved out of the root by the solvent employed. Thus, pecacuanha has been frequently reported as containing 3 or more per cent. of alkaloid, whilst the average amount of emetine in good samples does not greatly exceed 1 per cent. The following is quoted as an example showing the influence of bulk and extractive matter in a liquid prepared for titration in the manner usually recommended. To 60 grams of the powder prepared from the bark of the root, the woody portion being entirely rejected, 600 c.c. of 90 per cent. alcohol were added, and 60 drops of diluted sulphuric acid, and shaken occasionally during twenty-four hours. At the end of that time the liquid portion was filtered off, measured, and the alcohol removed by the heat of the water-bath. Evaporation was carried on until 25 c.c. of the liquor was equal to 10 grams of the drug.

Emetine indicated by Mayer's solution (1c.c.=·0189 gram).

I. 25 c.c. diluted to 100 c.c. = 2·17 per cent.
II. 25 c.c. not diluted . . . = 1·7 per cent.

The amount of emetine in the powder, as determined by the lime process, was 1·65 per cent. In the stronger solution the figures closely approach the correct percentage; as however the amount of emetine present, taken as pure alkaloid, would not give the full amount in the degree of concentration of this liquor, it serves to show the influence of the extractives on the result. To fully corroborate this view, and to prove that the whole amount of alkaloid could be obtained after the lime treatment, I made experiments with pure emetine in the manner employed for assaying the powdered drug. Strong spirit (sp. gr. ·838) was employed to exhaust the lime residue in the first instance, in accordance with statements previously made, and the alkaloid was finally recovered with chloroform and ammonia and weighed.

I. 0·1205 gram anhydrous emetine gave 0·1200 gram recovered.

II. 0·0945 gram anhydrous emetine gave 0·0950 gram recovered.

This shows that, whatever action is exerted by the lime on the alkaloid, with proper exhaustion the original weight may be recovered. As rather more was obtained than was anticipated,—no working loss, say 1 milligram, being apparent,—further small amounts of the same emetine were exposed to the heat of the water-bath for varying periods. It was found in each instance that a steady increase of weight took place on prolonged heating.

I. Pure emetine weighing 0·0670 gram lost on heating in a porcelain capsule on the water-bath water equivalent to 6·71 per cent. and weighed in the anhydrous condition 0·06250 gram. No further loss occurred up to one hour of further heating. At the end of two hours it still weighed 0·0625 gram, but regularly increased in weight after that time, until, after twelve hours' heating and exposure, its weight was 0·6525 gram.

II. A second portion weighing in the anhydrous condition 0·09375 gram after eight hours' exposure on the water-bath was found to weigh 0·0950 gram.

In both the experiments the emetine after drying to constancy was distributed in a thin layer over the di-h by means of alcohol, sufficient being added to dissolve the alkaloid.

III. Anhydrous emetine weighing 0 262 gram after fifteen hours' exposure weighed 0·2840 gram.

Alcohol was not added in this instance.

The emetine recovered after treatment with lime, as well as that subjected to heat alone, gave when dissolved in acidulated water highly coloured solutions; and experiment showed that a decided amount was removed by chloroform when shaken with the acid liquor. By this means I found it possible to determine to some extent the amount of change which had taken place. The following different amounts of emetine were contained in 10 c.c. of alcohol; and that amount was in each case measured off with a pipette, and evaporated in a small porcelain dish. The residue so obtained was dissolved in 50 c.c. of acidulated water (sulphuric acid) and washed three times with three successive 20 c.c. of chloroform. The united chloroform washings were evaporated to dryness, and either dried to a constant weight, or heated for a further period.

I. A residue from 10 c.c. of an alcoholic solution = 0·09375 gram dissolved and washed with chloroform as described yielded 0·0035 gram equivalent to 3·19 per cent. of the whole.

II. A residue from 10 c.c. as above, treated for ten hours on water-bath gave when washed 0·0115 gram, equivalent to 12·25 per cent.

III. A residue from a similar alcoholic solution of emetine, but weighing 0·200 gram, gave after heating for fourteen hours matter equivalent to 13·25 per cent.

IV. A residue from an alcoholic solution weighing 0·0950 gram, redissolved in 200 c.c. water acidulated with sulphuric acid, and treated with lime as in the lime process, gave when finally treated in acid solution with chloroform 16·8 per cent. of removed matter.

The dry residues from the chloroform washings when redissolved in acidulated water reacted with Mayer's solution. The residue of exp. I., however, gave only a slight opalescence, showing that the altered alkaloid, removed by chloroform in acid solution, carried with it a certain small amount of emetine.

In acetic solutions of emetine a similar alteration takes place, judging from the increase in colour which occurs on evaporation; and I have found that acetic solutions of the pure alkaloid give, after evaporation to dryness and re-solution too low results when titrated with Mayer's solution.

Ex.—Fifty c.c. of a nearly colourless acetic solution of emetine, with the addition of 200 c.c. of water, gave on evaporation to dryness and re-solution in 50 c.c. of the same mixture of acetic acid and water as originally taken, a sherry-coloured liquid. This required 4·6 c.c. of Mayer's solution to complete the reaction, indicating 0·08694 gram of alkaloid. A similar amount (50 c.c.) of the original solution before evaporation consumed 5·2 c.c. indicating 0·09828 gram of emetine.

Following the details given under the lime process we may, in my opinion, best estimate the emetine in wine and similar preparations by that method, filtering the liquid after driving off the alcohol on the water-bath, and after allowing it to cool. The weighed residue thus found would, in accordance with experiments quoted, include any alkaloid altered during the process of assay.

Vinum Ipecacuanhæ.

BY J. C. SHENSTONE.

Perhaps the best as well as the earliest papers upon the decomposition which takes place in this preparation are by Mr. Geo. Johnson, who at a pharmaceutical meeting, Nov. 7, 1861, recommended an acetum ipecac. in the place of the wine, and suggested the process for preparing the vinegar, now adopted in the Pharmacopœia for preparing the extract in making the wine.

At the Pharmaceutical Conference in Birmingham, 1865, he followed his previous paper by a report upon a more elaborate research. He made preparations from carefully selected wines from different countries, and found that in every case the deposit was formed, and further that the deposit was still formed, but less in quantity, from a mixture of spirit of wine, acid and water, and lastly that the deposit contained acid tartrate of potassium and emetine. He arrived at the conclusion that it was partly caused by the absorption of oxygen by the ipecacuanhic acid.

During later years contributions to the subject have been made by Mr. Brown,* Dr. Dyce Duckworth,† Mr. Barnes‡ (recommending the present process of the Pharmacopœia), Mr. Maben,§ Mr. Peter Boa,‖ and others, whose results fairly accord with those of Mr. Johnson, but it has been pointed out that the precipitation is much more rapid in a wine containing an appreciable amount of tannic acid, than from wines practically free from that constituent.

On account of the importance of the preparation, I decided that time would not be wasted by trying to find a method by which a really permanent liquid preparation of ipecacuanha could be produced, and it occurred to me that an interesting mode of attack would be to compare the behaviour of samples of the preparation made with natural wines, with various additions, and also with artificial substitutes of known composition, with a view of settling definitely the cause of the decomposition, and of finding how it could be prevented.

I considered that as sherry varies much in its com-

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* *Pharm. Journ.*, March, 1867.
† *Pharm. Journ.*, March, 1872.
‡ Pharm. Conference, Sept., 1880.
§ *Pharm. Journ.*, Jan., 1886.
‖ *Pharm. Journ.*, Jan., 1886.

position, the value of my experiments would be enhanced by the use of samples of wine, the principal constituents of which, at any rate, had been estimated. After examining several wines, I selected the two which in subsequent experiments I will call A. and B., as best suited to my purposes.

In examining the sample of wine I followed Thudichum and Dupré. A comparison of the table given below, which shows the result of my analyses, with the tables given by those authors will show that my wines were normal wines, containing rather a large percentage of acid tartrate of potassium, but as after immersing the wines for twenty-four hours in ice, no deposition of acid tartrate of potassium took place I did not think this of consequence. Nor did I consider the low percentage of ash in sample B. of consequence, a large portion of the ash in sherries being due to the process called plastering the wine.

	Character of sherry.	Percentage absolute alcohol.	Percentage total acidity as tartaric acid.	Percentage free fixed acid. as tartaric acid.	Percent. age volat. acid as acetic acid.	Percentage acid due to cream of tartar.	Tannic acid.	Percentage ash.	Sp. gr. minus alcohol at 17·5° C.	Sp. gr. of wine at 15° C.
A.	Very good pale light wine.	16·25	·3806	·3298	·0405	·0205	No perceptible amount.	·4685	101·64	99·23
B.	Brown sherry of fuller flavour.	15·79	·3964	·3166	·0638	·0291	No perceptible amount.	·3430	101·84	99 48

The percentage is in each case calculated as weight in volume.

Having selected the wines I next prepared the extract, using a sample of ipecacuanha with a well-developed unbroken cortical portion. It was coarsely powdered, macerated for twenty-four hours in acetic acid, and packed lightly in a cylindrical percolator, 1 lb. forming a column 8 inches deep. The first portion which passed was of a dark brown colour, but the percolate became straw coloured after 1 gallon had passed. A sample taken from the first gallon changed to a dark green colour upon the addition of a few drops of ferric chloride solution, but after $1\frac{3}{4}$ gallons had passed the percolate became colourless, left practically no residue on evaporation, and was unaffected by ferric chloride solution, I therefore discontinued the process, the percolation having taken two days.

The evaporation of the percolate took thirty-six hours, and upon dissolving a small portion of the extract in water and adding ferric chloride solution, no green coloration was produced, hence evidently the ipecacuanhic acid had undergone some change, and if Mr. Johnson's suspicion was correct, that the decomposition is partly due to the absorption of oxygen by the ipecacuanhic acid, this change during the evaporation might explain the superior keeping properties of the new preparation. I have examined several samples of extract prepared for wine, and in every case noted the same change.

I tested the extract qualitatively for emetine by the method given in the 'Pharmacographia,' and got an abundant precipitate, which turned yellow on the addition of solution of chlorinated lime.

The total weight of extract was 72 grains to each ounce of root used.

I may here mention that whilst all those samples prepared from natural wine when shaken produced moderate froth which quickly subsided, those prepared with artificial wine in every case produced copious froth which did not subside for many hours; from this it would appear that the so-called saponaceous principle contained in ipecacuanha root is not destroyed by the heating in the new process. I have confirmed the above by subsequent observations.

In examining the table it is at first difficult to come to any conclusion. Probably the apparent inconsistency of some of the results is due to there being (as was suggested by earlier workers) two agencies at work in the decomposition of ipecacuanha wine, *i.e.*, some constituent in the preparation itself, and the air. That the air plays an important part in the decomposition, I think I may say I have since proved by making a sample of ipecacuanha wine, putting half into a corked bottle, and half into a flask, which latter I sealed hermetically after expelling the air by boiling. The portion in the bottle had commenced to precipitate after seven days, in a few weeks the precipitate was fairly large; whilst there was no perceptible precipitate in the sealed flask after three months.

That the constituents of the wine play an important part would appear, first from the fact that none of the artificial wines (with the exception of that containing tannin) had commenced to precipitate after fourteen days, and with the same exception after six months they had all small precipitates; and further from the size of the insoluble residue, in the case of A 9 and B 9, and the different character of the precipitate, it would appear that the presence of 1 part of tannin in 1000 of wine caused the precipitate to commence even whilst maceration was progressing.

In sample C. 4, the artificial wine containing tannin, the precipitation does not appear to have gone so far during maceration as in the natural wine containing tannin, but later on that sample produced the largest precipitate out of the twenty-six. It must not be forgotten that the ordinary test for tannin does not prove the absence of the tannins derived from the grape, which may play an important part in the decomposition.

The fact that the only sample prepared with natural wine which showed no sign of a precipitate after fourteen days, was that containing glycerine, and one sample with sugar (those samples containing sugar being also in most cases better than the average, though the difference was not so marked as with glycerine), and that the only sample after six months which had no precipitate (having in its place a fungoid growth on its surface) also contained glycerine suggested that glycerine distinctly delayed the precipitation. I therefore made a preparation containing :—

Spt. vini rect.	23 parts.
Glycerine	10 parts.
Malic acid.	0·5 parts.
Water	67 parts.
Ext. rad. ipecac.	B.P. proportion.

This shows no signs of changing after three months, but still remains perfectly brilliant. How much longer it will continue bright I of course cannot say.

I think that these experiments, considered in connection with previous writings upon the subject, lead to the conclusion that if we are to have a thoroughly satisfactory liquid preparation of ipecacuanha, we must use a medium in which the portion of the extractive of grape wine which is partly the cause of the precipitation is absent, and also that there must be some body present which will protect the ipecacuanha from the action of the air. I do

not claim that the formula given above will answer every requirement, to get a perfect preparation it will no doubt be necessary to repeat the experiment several times under different circumstances, but I think it promises to lead to a satisfactory and permanent preparation, differing but slightly from ipecacuanha wine in appearance, whilst the addition of a little œnanthic ether would most likely make it very similar in flavour. It will further be necessary to get the medicinal efficiency of such a solution tested.

In the following table will be seen the formulæ according to which I prepared a series of samples of ipecacuanha wine, together with remarks upon their keeping properties and other particulars.

Sample of wine.	Composition.*	Weight of † insoluble residue after macerating 48 hours.	First showed signs of precipitation.	Appearance after 6 months.
A. 1.	Natural sherry.	10·3 grs.	Just perceptible after 7 days.	Considerable precipitate.
B. 1.	Natural sherry.	10·7 grs.	Perceptible after 14 days.	Considerable precipitate.
A. 2.	Nat. wine + 5 per cent. absolute alcohol.	10·11 grs.	Distinctly commenced after 7 days.	Moderate precipitate.
B. 2.	Nat. wine + 5 per cent. absolute alcohol.	11 grs.	Distinctly commenced after 7 days.	Moderate precipitate.
A. 3.	Nat. wine + 1 per cent. malic acid.	9·8 grs.	Distinctly commenced after 7 days.	Moderate precipitate.
B. 3.	Nat. wine + 1 per cent. malic acid.	10·2 grs.	Distinctly commenced after 7 days.	Moderate precipitate.
A. 4.	Nat. wine + 1 per cent. glacial acetic acid.	10 grs.	Distinctly commenced after 7 days.	Copious precipitate.
B. 4.	Nat. wine + 1 per cent. glacial acetic acid.	10·8 grs.	Distinctly commenced after 7 days.	Copious precipitate.
A. 5.	Nat. wine + 5 per cent. sugar.	10·7 grs.	Distinctly commenced after 7 days.	Comparatively small precipitate.
B. 5.	Nat. wine + 5 per cent. sugar.	10·7 grs.	Distinctly commenced after 7 days.	Comparatively small precipitate.
A. 6.	Nat. wine decolorized animal charcoal to decompose tannins nat. to wine.	10·4 grs.	Distinctly commenced after 7 days.	Moderate precipitate.
B. 6.	Nat. wine decolorized animal charcoal to decompose tannins nat. to wine.	10·7 grs.	Distinctly commenced after 7 days.	Moderate precipitate.
A. 7.	A. 6 wine + 5 per cent. sugar.	12·8 grs.	Scarcely perceptible after 7 days.	Moderate precipitate.
B. 7.	B. 6 wine + 5 per cent. sugar.	11·8 grs.	No precipitate after 14 days.	Moderate precipitate.
A. 8.	Nat. wine + 3 per cent. glycerine.	10·5 grs.	No precipitate after 14 days.	Copious precipitate.
B. 8.	Nat. wine + 3 per cent. glycerine.	11· grs.	No precipitate after 14 days.	Copious precipitate.
A. 9.	Nat. wine + ·1 per cent. tannin.	21·5 grs.	Copious precipitate after 7 days.	Large precipitate very light in colour.
B. 9.	Nat. wine + ·1 per cent. tannin.	20·5 grs.	Copious precipitate after 7 days.	Large precipitate very light in colour.
A. 10	Nat. wine + ·25 per cent. hydrochloric acid.	10 grs.	Perceptible after 7 days.	Small precipitate.
B. 10	Nat. wine + ·25 per cent. hydrochloric acid.	10·6 grs.	Perceptible after 7 days.	Small precipitate.
C. 1.	Absolute alcohol 20 parts + water 80 parts.	10 grs.	No signs until after 14 days.	Small precipitate.
C. 2.	C. 1 + ·5 per cent. malic acid.	9·8 grs.	No signs until after 14 days.	Small precipitate.
C. 3.	C. 1 + ·5 per cent. acetic acid.	11 grs.	No signs until after 14 days.	Small precipitate.
C. 4.	C. 2 + ·1 per cent. tannin.	13 grs.	Copious precipitate after 7 days.	Much the heaviest precipitate.
C. 5.	C. 2 + 5 per cent. sugar.	10 grs.	No signs until after 14 days.	Very slight precipitate and fungoid growth.
C. 6.	C. 2 + 3 per cent. glycerine.	11·1 grs.	No signs until after 14 days.	No precipitate—fungoid growth.

A vote of thanks having been passed to the authors of these papers,

Mr. MARTINDALE said he had made two lots of ipecac. wine by the B.P. process, and about ten months ago published his results. He found the difficulty of percolation was the great obstacle to overcome. About a month ago he had examined these and found that they had remained perfectly clear up to that time, so that as to keeping the preparation clear it answered admirably.

Mr. CONROY considered that in the B.P. process it was a great mistake to order the *powdered* root to be percolated with the menstruum. He found that if the root were taken whole, exhausted with an acetic menstruum and the extract evaporated to dryness, a much better result was obtained than by percolation with the root in a state of powder. He gathered that Mr. Shenstone would substitute a mixture of spirit and water with glycerine

* Percentage in all cases indicates weight in volume excepting in C. 1.

† The smaller differences in weight of insoluble residue are chiefly accounted for by my having used rather large filter papers to avoid undue exposure to air.

or sugar for sherry, but this was quite unnecessary. By following the B.P. process, only using the root whole, a preparation could be obtained which would keep bright a considerable time. A good result could also be obtained by simply macerating the *uncrushed* root in the sherry, provided the latter was of full alcoholic strength.

Mr. UMNEY asked if Mr. Conroy had estimated the emetine in the extract obtained by his method, and compared it with that obtained from the powdered root; unless he had done so they were a little in the dark as to the value of the two methods.

Mr. CONROY said he had estimated the emetine and had obtained satisfactory results. He believed the emetine resided entirely in the cortical portion of the root, and there was no difficulty in extracting it.

Mr. SHENSTONE asked if Mr. Martindale had noticed the condition of the wine after two months by shaking the bottle, or was it in a clear bottle so that he could see the bottom.

Mr. MARTINDALE said it was in a clear bottle and it had been there more than ten months. There was no deposit at all.

Mr. SHENSTONE said he had made inquiries at various places and always found that where the wine had been kept any length of time there was a deposit. In his own case by far the largest use that ipecac. wine was put to was to retail to families chiefly living in the country, to give to children liable to suffer from croup, it being thought it was the safest emetic they could use. That being so it was evident that the wine was often kept in very small bottles for an indefinite time, and it was desirable to have a preparation which would keep under those circumstances, and not merely for dispensing purposes, where six months would be sufficient.

The next paper read was on—

AMERICAN MUSK.

BY CHARLES SYMES, PH.D.

Some few years since several articles appeared in the Canadian and United States pharmaceutical journals, by Messrs. Christian and Gregory, these in turn were copied into European journals devoted to pharmacy; which created considerable interest in this substance. It was assumed that it would soon become an article of commerce and for many purposes replace the more expensive kind. With some little difficulty I obtained a supply, consisting of two thin flexible sheet-iron packages each containing half a pound of the pods or follicles, of a flattened oval shape, brown colour and smelling strongly of musk and rancid fat.

The animal yielding "American musk" has already been described; it is known as the musk rat (*Fiber Zibethicus*), related to the beaver, is amphibious and abounds on the margins of rivers and lakes in the United States and Canada; it is trapped for its fur, and in directing attention to its musk follicles Mr. Christian was attempting to utilize a waste product.

Accompanying the supply which I obtained were the following particulars as to its mode of use:—

"*For Toilet Soaps.*—Take one pound of the pods and bruise it with a portion of silex or glass, add four pints strong alcohol and 2 per cent. solution potash 6° B, and keep in a moderately warm place for three or four weeks. Such substances as civet, styrax, vanilla, benjamin; and such oils as cloves, caraway, serpolit and cassia are the usual additions to this musk in toilet soap, according to the kind wanted.

"*For Satchet Powder.*—Take one pound of the pods, place them in some convenient vessel with four pounds of powdered orris root (stirring occasionally) for two or three weeks when the pods can be sieved out and used for tincture as above. The musk orris root can enter into musk, violet, and heliotrope satchets.

"*For Perfuming and Flavouring.*—Take one pound of the pod and mix with four pints strong alcohol, adding 2 ounces slaked lime to this quantity and infuse about a month. For flavouring, the oils of rose, thyme, cloves, cinnamon and extract of vanilla are the usual accompaniments."

The sacs were found to be saturated with oil, and it became of interest to determine whether the odorous principle resided in this or the tissues. Some portions were cut up and macerated several days in almond oil with occasional agitation, and on filtering it was found that the menstruum had taken up very little, if any, of the musk odour, whilst the rancid fatty smell was distinctly perceptible.

Ether dissolved out the oil, but carried with it some colouring matter and a little of the musk odour. A further quantity of 250 grains was cut up, laid between folds of stout bibulous paper, and submitted to hydraulic pressure, when 25 per cent. of oil was readily separated; this, however, carried with it some brown extractive matter which possessed the musk odour, and it was evident that such a method could not be adopted in practice for separating the oil. It was subsequently found that bibulous paper with slight pressure possessed some advantages, and that this method was worth adoption.

Essence prepared with the use of calcium hydrate, as in the before-named formula, was partially freed from rancidity, but possessed a peculiar pungency of its own, which seemed undesirable, and it readily became turbid, requiring to be filtered over and over again. In another experiment a little liquid ammonia was substituted for calcium hydrate, and that with decided advantage.

The sample marked "Essence two years old" was so prepared. In another bottle this essence is mixed with an equal quantity of lavender water, so that an opinion may be formed as to how far it is possible to use it in perfumery. It was found that if a small quantity only of ether were poured on the pods and poured off almost immediately, little of the musk odour was removed, and the pods were more readily acted on by the spirit with which they were subsequently treated; and further, that weak spirit dissolved less of the oil than strong spirit, but when rendered alkaline it took up quite as much of the musk odour. Reasoning on these and other facts the following formula was deduced, and is, I believe, the most suitable for dealing with a somewhat unsatisfactory article.

Take 4 ounces of the pods, cut small and press gently between several folds of bibulous paper, wash lightly with about 2 ounces of methylated ether, pour off and allow the remaining ether to evaporate by a short exposure to the air; put into a wide-mouthed bottle with 15 ounces rectified spirit, 5 ounces distilled water, 20 minims liquid ammonia and ¼ oz. powdered animal charcoal; allow all to stand with occasional agitation for one month, and filter through magnesia. A sample of essence so prepared and a sample of soap perfumed with it are shown. The musk odour is there, but still a trace of the rancidity remains, and I am of opinion that the remedy is chiefly in the hands of the trappers of the animal or the collectors of the pods. The musk odour is, I believe, a distinct secretion, and when quite fresh much of the oil could be removed without materially impoverishing the perfume value of the follicles; thus more care could be expended on their preservation, so as to avoid this strong rancid greasy odour, for, until this is done, the American variety is not likely to make much way against genuine Tonquin musk.

A vote of thanks was passed to Dr. Symes for his paper.

Dr. THRESH then read a note on—

IODOFORM.

BY D. B. DOTT.

In a paper read to the Conference last year, I gave the results of some experiments on the volatility of iodoform. Dr. Vulpius* has called in question my statement that iodoform in certain circumstances loses 6·7 per cent.

* *Pharmaceutische Post*, February 27, 1886.

of its weight, per hour, when placed in a water-bath. Dr. Vulpius says "bei 100°," but as he afterwards in referring to his own experiments says "bei Wasserbadtemperatur," it is probable he means the latter in all cases. As is well known, the two things are by no means the same. I used a copper water-bath of ordinary construction, the internal space being something less than a cubic foot. When a beaker of water is placed on the shelf in the centre of this bath, the maximum temperature attained is 71° C., which would be approximately the temperature at which the iodoform was exposed. There are evidently many circumstances which must affect the volatility of a solid when placed in the water-bath, such as the state of division, the thickness of the layer, and the time of exposure. As the watch-glass and material take a finite time to attain the temperature of the bath, it is obvious that the result calculated from an exposure of five hours will be higher than that calculated from an exposure of half-an-hour. In short, the values obtained in any such experiments cannot be stated with scientific precision, though they may be very useful for all that. It has to be noted that Dr. Vulpius employed iodoform in fine powder, while I used the small commercial crystals. The state of division is not, however, of so much importance as the thickness of the layer. I have repeated my experiments, and get an average of 6·68 per cent. per hour as the loss of weight of iodoform in a water-bath, which number is remarkably near that formerly noted.

A vote of thanks was passed to Mr. Dott.

(*To be concluded.*)

Obituary.

Notice has been received of the death of the following:

On the 26th of August, Mr. Arthur Harry Masser, Chemist and Druggist, Foleshill. Aged 47.

On the 5th of September, Mr. Charles Muskett, Pharmaceutical Chemist, Diss. Aged 63. Mr. Muskett had been a Member of the Pharmaceutical Society since 1849.

On the 7th of September, Mr. Daniel White, Pharmaceutical Chemist, Regent's Park, London. Aged 85. Mr. White was one of the Founders of the Pharmaceutical Society.

On the 14th of September, Mr. William Robert Dearnley, Chemist and Druggist, Stanmore. Aged 29.

On the 15th of September, Mr. Benjamin Morris Edmonds, Chemist and Druggist, Lowestoft. Aged 74.

On the 17th of September, Mr. George Thomas Fortin Johnson, Chemist and Druggist, St. Leonards. Aged 81.

On the 19th of September, Mr. Wilmer Everard Heaton, Chemist and Druggist, Nelson. Aged 31.

On the 24th of September, Miss Elizabeth Leech, Chemist and Druggist, Wandsworth. Aged 56 years. Miss Leech had been a Member of the Pharmaceutical Society since 1880.

BOOKS RECEIVED.

THE EQUINE HOSPITAL PRESCRIBER. By JAMES B. and and ALBERT GRESSWELL. London: Baillière, Tindal and Cox, 1886. From the Publishers.

LABORATORY CALCULATIONS AND SPECIFIC GRAVITY TABLES. By JOHN S. ADRIANCA. New York: J. Wiley and Sons; London: Trubner, 1886. From the Publishers.

DISEASES AND THEIR COMMENCEMENT. By DONALD W. CHARLES HOOD, M.D. London: J. and A. Churchill, 1886. From the Publishers.

FORMULARIUM OF UNOFFICIAL PREPARATIONS OF THE PENNSYLVANIA PHARMACEUTICAL ASSOCIATION. From Dr. Hoffmann.

THE METHODS OF GLASS BLOWING. By W. A. SHENSTONE. London: Rivingtons, 1886. From the Publishers.

Correspondence.

THE PROPOSED UNOFFICIAL FORMULARY.

Sir,—You invite correspondence on the subject of Mr. Moss's letter, which appeared in your last issue. Mr. Moss's scientific use of the imagination appears to have obscured his view of the monthly price list issued by the firm of which he is a partner. In that I find chlorodyne, liq. opii sed., liq. santal. c. cubeba et buchu, mist. bismuthi co. c. pepsin., compound syrup of the hypophosphites, etc., offered at such prices as preclude the possibility of their being the original preparations so well known to pharmacists. But perhaps these belong to the "compounds the formulæ of which may be regarded as public property," spoken of by Messrs. Symes and Co. in the *Chemist and Druggist* of the 25th ult.; if so, probably lac bismuthi, and a host of others which will readily suggest themselves, may also be placed in the same class. There is just a little too much of the "don't do as I do" doctrine about Mr. Moss's letter to allow of its carrying much weight with the trade generally.

For a good many years dispensing chemists have been familiar with an acid glycerine of pepsine (Bullock); within the last two or three years a glycerole of pepsine (Greenish), which is described as being strictly acid, has made its appearance. No doubt Mr. Greenish will assist the Committee to the best of his ability in the making of a formula which will well represent this latter preparation.

For my own part, I see no good reason why a committee of practical pharmacists and able analysts should not collectively recommend the trade to do the thing which they themselves are doing individually.

It has appeared to me that the reason why the public prefer to buy Cockle's or Beecham's pills, Eno's fruit salt, or Kay's essence of linseed, and the medical profession to prescribe Fellow's compound syrup of the hypophosphites, Schacht's liq. bismuthi, and Bullock's glycerine of pepsine, is that they each believe that the proprietors of these articles are possessed of valuable secrets with regard to either the component ingredients or the methods of making the respective medicines. It is the duty of retail chemists to themselves, and to the public, to show that this belief is a fallacy, and that they are prepared to supply the same compounds at a much more reasonable price than extensive advertisers can afford to sell them at. I think it will be admitted that the public does not get fair value for the money spent in these articles, and I believe that in many cases an action might be sustained against proprietors of "patents" for obtaining money by false pretences.

One powerful reason why imitations of proprietary goods do not generally find favour with the public is that too frequently they do not at all resemble the preparations they are meant to imitate, and the imitations themselves differ from each other. Like many more retail chemists I for a time prepared an effervescent saline from sugar, bicarbonate of soda, tartaric acid, etc. I found, however, it in no way resembled the ideal preparation in physical properties; an analysis of the latter showed it to be made of acid tartrate of soda, bicarbonate of soda, with a little chlorate and nothing else. Since then my saline has been made from a formula based on that analysis; I find it sells well; people declare it equal to the original and come again for it; but strangers often tell me they have tried these imitations before and have found them wanting.

Formulæ representing the true composition of leading proprietary medicines which are in much favour with both the medical profession and the public would, I believe, be warmly welcomed by both, if published under the auspices of an influential and representative committee, and the information obtained from them would be of infinite value to the retail chemist from a business point of view, even if he did not prepare for sale an imitation of any one of them, and would do more to convince the medical profession and the public that the dispensing chemist is a master of the science and art of his profession than would the knowledge of the elementary composition of a thousand alkaloids.

The position of the retail chemist, when asked by a customer to explain the composition or therapeutical action of a particular patent, has always appeared to me most humiliating; whatever plan of persuasion he adopts in explaining that he does not know what the medicine is composed of, therefore cannot even guess the therapeutical action, far less recommend the medicine, the result is

the same, the customer concludes that the chemist is either ignorant or jealous, or both.

We cannot ignore patents and proprietaries, because they are part of our trade; we are compelled to keep and sell them. It is therefore just as essential that the chemist and druggist should know the composition, doses, action and antidotes of these, as of any other simple or compound substance in the whole materia medica. I am aware that chemists are not supposed to be therapeutists, but the public do ask questions which the business man must answer.

I observe a strong inclination in some quarters to discountenance the publication of formulæ for proprietary medicines on the ground that it would rob the owner of the reward of his labour and outlay in making the name and reputation of the article. Before this argument is allowed to have much weight it would be well to consider by what means, in the vast majority of cases, this reputation has been made. Has it not been by impudent advertisement arrogating superior knowledge to the proprietor, and by inference imputing ignorance to the medical and chemical professions alike—in other words, by gulling the public? Must the welfare of pharmacy be sacrificed to fill the pockets of such men?

Owners of proprietary medicinal compounds have the same protection from the law against imitators of their goods, and from patent and trade mark laws, as is thought sufficient for the protection of other arts, trades and industries. A compound which cannot claim the protection of the law may, I think, rightly be regarded as public property.

Blackpool. JOHN LAURIE.

Sir,—I am glad to see that the late meeting of the Pharmaceutical Conference is likely to benefit many of us who were unable to be present. For many years past, in common with most suburban chemists, I have been compelled to employ one of my errand boys as "a runner," who would by this time have been quite a familiar figure in the City and West-end, had not the duties of the post been of so uncertain and unsatisfactory a character that no one cares to retain it for any length of time. For not even the long-suffering British errand boy believes in scouring the West-end for a proprietary article when he knows the shop has closed; nor cares to return empty handed from an unavailing quest to find his only consolation in the serious look which gathers on his master's face when the cost of the trip is reckoned up.

If it is indeed necessary that preparations of a pseudo-patent character should be used in pharmacy, what an infinity of trouble would be saved if the prescriber would insert the agent's or maker's name and address; as for example in the 'Family Doctor' (in which advice is given at "store prices") a gentleman, who is prematurely old, is advised to take the "factory made" pills, prepared by a particular American firm, and the London address of the agent who supply them is also given.

I sincerely hope the Committee will not merely confine its labours to securing uniformity in preparations of such drugs as guarana, gelseminum or jaborandi, but will extend its researches much further, for the reason that several firms manufacture articles known by the same names, which nevertheless differ considerably in strength.

Only a few weeks ago this was brought to my notice in the case of a now popular preparation that is made by at least four English makers and by one German maker, and if by no American I should consider it as little less than a miracle. The proportions of the ingredients vary according to the fancy of the maker, though several of them are scheduled poisons, and the compound is not one to be played with. When, therefore, a prescription arrives simply ordering this preparation, and the unfortunate chemist is uncertain which make to use, what is to be done? Should he keep his customer waiting while he corresponds with the writer of the prescription, always in such cases far, far away? or should he obtain a sample from each maker, mix them and so strike an average? or dive into Mr. Hampson's "cupboard for sunken capital," place all the specimens of the preparation in question, decomposing there, in a row, and select the most aromatic?

I look upon this, Sir, as a typical case, and trust that when the Committee begins its work it will allow no squeamish feelings to deter it from making the formulæ of such articles known to everyone, even though it may have originated in brains as weighty as Cuvier's, or have cost the original maker as many sleepless nights and countless years of toil as the proprietor of Mother Bunkum's Syrup of Malate of Chloral assures us were necessary to the perfection of that great discovery.

116, *Denmark Hill, S.E.* THOS. H. POWELL.

Sir,—I was glad to hear the members of this Committee had already held a preliminary meeting, and the first instalment of their labours will be awaited with interest by the majority of pharmacists.

It is an indisputable fact that there is an increasing tendency with a large number of medical men to prescribe these semi-secret preparations, and too often their only experience of the therapeutic value of such has been derived from a sample bottle, and a puff in one of the medical journals.

Nobody, but those engaged actively in dispensing, knows the inconvenience that is sometimes caused thus. Half a dozen years ago, the chief of these advertised preparations could be counted on the fingers, and now they can be numbered by the score.

To make the work successful, it must be brought and kept before the notice of the medical profession, either by the medium of the medical journals, or otherwise. I would suggest such formulæ should be published every six months, in a distinct form, from the 'Year-Book.'

Several medical men who have mentioned the subject to me think the step a good one, and believe it will receive the support of the profession. They would sooner order a preparation they could rely on being a certain strength, and of which they knew the exact composition, than one concocted wholesale, the formula of which is not published.

As to the plea that the originators of such preparations should not be deprived of the fruits of the labour they had expended on them; that is absurd, as any intelligent pharmacist could prepare equally well nine out of ten of such preparations that are now in general use.

C. J. S. T.

FLOWERS FREQUENTED BY BEES.

Sir,—I think Mr. W. H. Brown (in the Journal of September 11) is right in saying that the sunflower ought not to be classed among bee-flowers, Some years ago I grew a lot, as they were named by writers in lists of bee-flowers, but I never saw but one honey bee on them. But indeed what is a bee-flower in one district would seem not to be a flower frequented by bees in another. Mr. Dobbie, of Norwich, does not find *Timnanthes douglassii* a favourite. I grow several rods of it and the bees cover the beds all day long. A writer in the *British Bee Journal* does not think fig-wort worth a fig. I know no better honey plant. Last year my globe artichoke blossoms were covered with bees; this year I see nothing but humble bees on them. Another writer praises *Melilotus alba*; with me it is not worth a cent.

Edingthorpe Rectory, North Walsham. J. LAWSON SISSON.

POISONING BY SQUILL.

Sir,—With regard to the squill poisoning case referred to in your editorial, a possible explanation of the mystery has presented itself to my mind, which does not appear to have received attention.

I know it was a custom some years since (and may be still), with some chemists, to make and keep a concentrated vinegar of squills to use in the preparation of oxymel, in order to avoid the greater part of the evaporation. Is it not possible that the wholesale house supplied this concentrated vinegar to Mr. Wakefield, and that it was used by him in the preparation of the syrup? I see the original report says the vinegar was darker in colour and much more bitter than usual, but no comparison of the amount of extractive contained in each appears to have been made.

130, *High Street, Notting Hill.* W. PICKARD.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Truman, Barclay, Dott, Tree.

INTRODUCTORY SESSIONAL ADDRESS

DELIVERED AT THE COMMENCEMENT OF THE FORTY-FIFTH SESSION OF THE SCHOOL OF PHARMACY,

October 6, 1886,

BY SIR HENRY W. ACLAND, K.C.B., M.D., F.R.S.,
Regius Professor of Medicine in the University of Oxford, and President of the General Medical Council.

Mr. President and Gentlemen,—Permit me first heartily to thank the President and the Council of your Society for the great favour you have conferred on me by desiring that I should on this day address your students and yourselves.

When I consider the national importance of the Institution in which we are assembled, the great and good work on which, for now forty-five years, you have been engaged, I cannot but account it one of the brightest days in the advanced years of a long working life, on which, connected as I am with the Medical Council, I am permitted thus honourably to meet you. Nor can I, on this occasion, forget that forty-five years ago there was bestowed on me the life-long benefit of studying dispensing and pharmacy in Oxford Street, under the guidance and with the friendship of the late Mr. Peter Squire, one of the chief promoters, friends, and ornaments of your Society. In the following year I had the great privilege of working in the laboratory of one of your members, Mr. Lloyd Bullock, translator of Fresenius, and favourite pupil of Liebig.

The science and the art of medicine, and the scientific and practical work which you here successfully administer and profess, are so intimately connected that any steps which draw them together confer substantial benefits on the country, and help to advance in special directions the interest of biological science by methods peculiar to modern times. That this is the case, and that it is not an exaggerated statement, is so well understood by yourselves that it were an impertinence to dwell on the fact in the presence of experts so distinguished as many that are present to-night. I would only, therefore, now say, first, that nothing seems to be more certain in the future of science than that the analytical and the synthetical chemistry will continue to extract new secrets from nature, and that these secrets will be revealed only to genuine experts in scientific chemistry; and secondly, that the action of the new chemical products thus discovered will throw fresh light on the changes which take place during the life history of living organisms, whether considered individually or as a correlated whole,—the latter secrets being revealed to the skilled Physiologist, to the precise Pathologist, and to all observant practical Physicians who have been both scientifically and clinically trained.

It need hardly be remarked that under these terms are included not only those students of nature who deal with the composition and heredity of Man, but those also whose vocation leads them to investigate the habits, the health, and the disorders of any portion of the animal or the vegetable world, whether for the advance of pure knowledge or for the utilitarian objects of commerce and art.

This being so, and considering the relation in which the Physician, the Physiologist, the Chemist, and the Pharmacist stand to each other, I shall venture to-day, first, to say very shortly, something more of this relation, for though indeed I cannot hope to offer anything that is new, yet familiar truths sometimes gain by new setting; and secondly, I shall make some suggestions, however trite, to those younger friends who, as students of Pharmacy, are assembled here for the first time at a period of unsurpassed opportunity, of unprecedented interest, and in their business relations, of increasing competition.

Now there are in this matter two fashions, which, when carried to an extreme, equally deserve the rebuke of serious minds. The one is an exaggerated praise of antiquity—an infirmity arising mainly from a one-sided estimate, or inadequate knowledge of history. The other arises from an excessive confidence in the superiority, in every particular, of the present over the past, when viewed as a whole. What probably is true, is, that our predecessors in certain points of character, were from various causes clearly superior to us, as we, in most material Arts, though not in all, are to them.

It has been well said that we are, in a certain sense, the real Ancients of the world, and that we ought to profit by the errors in the earlier days of its development. If in some things we of these later days have reason to envy the past we cannot certainly do so in all. Here is an instance. The College of Physicians of London published a new edition of their Pharmacopœia in 1651, "studiis ac symbolis ornatior." Among the official articles of the materia medica are the following:—Silkworms, toads, kittens, grasshoppers, ants, swallows and their young, earthworms, wagtails, green frogs, scorpions, moles, vipers, foxes.

And parts and excrements of the following:—Ducks, geese, eels, boars, herons, beavers, wild cats, horses, lions, wolves, snakes, rhinoceros horns, skulls of men who died a violent death, the exuviæ of snakes, frogs' livers, swallows' nests, and ants' eggs, partridge feathers, foxes' lungs, and many others too nauseous to be named.

William Harvey is among the Fellows whose names are attached to this volume. It is dedicated to King James, who is addressed as the King of Great Britain, France and Ireland, and as "Deus tutelaris" of the College.

It would be as tedious, as it is here unnecessary, to discuss at length, how, considered historically, so monstrous a list of medical agents could have been authoritatively issued, after Linacre had lived and taught in that great College which he founded, and which was destined to shed lustre on the

history and character of medicine. It was promulgated after literature and science had each begun to deliver their message to the later middle ages, through persons of so exceptional power and wisdom as Linacre and William Harvey. There is nothing akin to this in history, except in the grosser forms of superstition, which have been ever entangled among higher religious convictions, and which have stamped their dismal footprints on the sands of time.

It is not doubtful, to those who have investigated the subject, that notwithstanding the errors and fancies of the Eastern nations, medicine was studied long before our era in India, Egypt, Arabia and Greece, with an acumen and success which are truly astonishing. The modern researches of Brugsch and Ebers and others tend to show a serious attempt at medical and pharmaceutical research in the Thinite dynasty, some thousands of years before the Alexandrian period, when anatomical inquiry laid the foundation for ever of scientific medical knowledge and therapeutical practice. But, as was the case with more than one of the higher departments of human thought, this knowledge was darkened in the Middle Ages, and became for a time submerged in a way akin to the catastrophes of geological epochs, to rise anon in happier conditions and to thrive in purer air.

The whole history of the armoury of physic and of pharmacy brings a grave lesson to all who study the evolution of civilization. It is a lesson, however, which suggests a contingent danger. Are we quite sure that every modern scientific dogma and every new recorded experience will stand the test of time? Are we sure that the grave cautions of Hippocrates, ἡ πεῖρα σφαλερή ἡ κρίσις χαλεπή, are no longer needed by some?

In our new Pharmacopœia we retain one, musk, of the most disgusting remedies for nervous disorders, and we do so because the evidence of its value is still said to be adequate. But so also doubtless, according to their illogical notions of proof, was the evidence of the value of the parts of nearly one hundred and fifty animals for the purposes of medicine to the College of Physicians in 1651. The British Pharmacopœia has discarded all but eleven, though "syrup of foxes' lung" is still sold by chemists in the east of England as a remedy for cough. Will this number be increased or diminished? It would be idle to answer this precisely. We may be grateful to the animals, which by their amazing vital laboratories make bountifully for our medical armoury fats, sugars, wax, albumen, colouring matter, and blisters. Yet it is probable enough that their labours may be largely dispensed with. The modern chemistry now produces saccharine, dyes and flavours, irritants and ferments readily, and some in vast amounts, whereas a few years ago no organic substance had been made, or was expected to be made. It may of course be said that inasmuch as the animals we take for common food are to be reckoned, as far as we are concerned, convenient and cheap laboratories for converting vegetable into animal constituents for our comfort and support, it is reasonable that special parts may serve also for medicines. But it was quaintly remarked some years ago, by Sir James Simpson, that were a man ordered to take sulphur as an alterative medicinally in the homœopathic dose of the eighth dilution every second he would have had to go on for 30,000 years before he had taken a grain of this medicine. But I would add that had he eaten meanwhile a single egg daily for breakfast he would have consumed in the same period considerably over a ton of the alterative in his food.

Fantasies of this kind have their serious side, when we consider the probable value of many reputed remedies yearly increasing in numbers. They point to the supreme importance of combining the threefold modern researches of the Chemist, the Physiologist, and the Therapeutist according to the acknowledged methods belonging to them respectively. Quite lately the woorara poison was stated to be a specific against hydrophobia, and rattle-snake poison has been recommended for scarlet fever. To say whether they are or are not true remedies, can only be decided by careful investigation by competent persons with opportunities adequate to the occasion. How, or why they are remedies, if they are so, is a physiological question of still deeper importance. Even, then, their atomic constitution being known, it would remain in the womb of the future, whether kindred substances exist or can be made. In the case of the former body, the woorara, a physician has been reprimanded by the Home Office for taking the instant steps requisite to ascertain the purity and strength of the woorara, previous to the administration of it to a person severely bitten.

Now for this among other reasons, the value of a step about to be taken by the Pharmaceutical Society cannot be over estimated. It is decided, as I am informed, to establish a laboratory for the advancement of Pharmacology by research. It is to be available for the purposes of investigation and research in Chemistry and other branches of science relating to Pharmacology. To determine the exact constitution of new drugs and alleged remedies and the precise composition of alkaloids of acknowledged or hypothetical value, to discover by analysis or synthesis new remedial agents, and to obtain absolutely pure bodies of known constitution for experimental or therapeutical purposes, are all objects suited to and worthy of such a Laboratory.

This is not the occasion, nor am I entitled to speak in detail on the future of an institution of this kind. But it is clear that among the dangers of our time is the multiplication of tools of doubtful temper, and the flooding the already over-stocked armoury of medicine with useless weapons, to the distraction of students, to the injury of true physic, and the vexa-

tious overloading the stores and increasing the labour of the practical dispenser and druggist. To the many honourable manufacturers of chemicals to whom the medical profession as well as retail pharmacists throughout the country are greatly indebted for the purity, elegance and value of many of their preparations, such an institution will be a protection against the less cautious dealers in the common market.

I know no method by which the Medical Council might more usefully advance the progress of the Pharmacopœia, one of its most important duties, than by aiding research in this laboratory. It will also have a just claim on the large Government grant which is given annually to a committee, including among its members representatives of the Royal Society in every department of biological progress, as well as the Presidents of the Medical Council, and of the Colleges of Physicians and of Surgeons of England.

Before quitting this part of the subject it will be well to remember that the sagacious Sydenham, before the serious revision of the London Pharmacopœia, foresaw and stated in his 'Treatise on Dropsy' some of the dangers of exclusive reliance on chemistry for the purpose of therapeutics, a danger into which some even now might run, were it not for the advance of clinical observation combined with the modern physiology. He said—"Just as Hippocrates blamed those who, in their exceeding curiosity and officiousness, busied themselves more in speculations on the human frame than in practical observations upon the intentions of nature, so may a prudent physician of the present time blame those who believe that medicine is to be promoted by the new chemical inventions of our day, more than by any other process whatsoever. To hesitate in our acknowledgments to chemistry for more than one valuable medicine, and for more than one method of satisfying the indications of treatment, would be ungrateful. . . . . The art is a useful one, but most useful when limited to the Pharmacopœia. Blame —or, if not blame, at least error—lies at the doors of those who have so tortured and overheated their brains as to believe, that the chief weakness of medicine is its want of great and efficacious remedies, which nothing but chemical preparation will supply. Viewing the matter closely, we shall find it otherwise. The chief weakness of medicine is not our ignorance as to the ways and means by which certain indications may be satisfied, but our ignorance of the particular indications that thus want satisfying. How I can make a patient vomit, and how I can purge or sweat him, are matters which a druggist's shop-boy can tell me off-hand. He can tell me too how to cool a man when he is heated. When, however, I must use one sort of medicine in preference to another, requires an informant of a different kind —a man who has no little practice in the arena of his profession."

These general considerations lead on directly to the subject of the lists of the Materia Medica which are issued by authority. Now it is a common error to suppose that a national Pharmacopœia is synonymous with, or should be equivalent to the Materia Medica. This is very far from being the case, and the notion, though held by some persons whose opinion deserves full consideration, leads to much misconception and dissatisfaction. Formerly to a considerable extent it was so. The Pharmacopœia of 1651 for instance, just now referred to, contained a list of 150 animals to be used in medicine. The composition, therefore, of a scientific or modern Pharmacopœia begins with a policy of exclusion. This had been steadily and thoughtfully pursued by all the Colleges of London, Edinburgh and Dublin for more than a century. It professes to include only remedies of proved value, and then aims at saying authoritatively how these can best be prepared. The Physician lays down the remedies to be included. The Pharmacist states in what way they can best be made. But not wholly thus, because the physician, joining with the physiologist, has to point out how they can be most properly administered, in respect of method, of strength, and of physiological combination. The two last require the joint agreement of the physician and the pharmacist.

It may happen and has happened that these three powers are possessed by one person. But the rapid development of all three departments make this, as specializing continues with the increase of knowledge, a rarer gift. The possession of skilful art (or so-called practice) is in these respects as necessary a possession as that of abstract science, both for the Physician and for the Pharmacist.

Time forbids to enter into the interesting history of the successive issues of the English, Scotch, and Irish Pharmacopœias. Every edition of each had for many years striven to attain a higher standard of excellence. But the time was to come when a common standard was necessary for the nation.

In 1858 the Medical Council directed a carefully selected Committee, the late Sir Robert Christison being Chairman, to commence this work, with the aid of a distinguished member of the Pharmaceutical Society. In 1859 they presented their first report. In the second report of 1860 they announced that they had agreed on a complete list of all substances employed in the treatment of disease. Many remedies contained in the Pharmacopœias of the three Colleges of Physicians were removed and many new ones were adopted. The several Committees met more than four hundred times at this stage of the transaction alone.

Prior to the publication of this important volume a full account of the principles on which it was constructed was drawn up ('Medical Council Minutes,' vol. ii., p. 80). A perusal of this and of several subsequent reports will show the great difficulty and labour of the undertaking. It is not too much to say that this difficulty has been faithfully dealt

with by the members of the Medical Council and of the Pharmaceutical Society and by the other persons who now for more than twenty years have successively undertaken the task of meeting it.

And I feel that I shall be forgiven for naming especially the present Chairman of the Medical Council Pharmacopœia Committee, Dr. Quain, and the officers of the Pharmaceutical Society, Professors Redwood, Bentley, and Attfield, who have with skill and labour so fully recognized as to need no eulogy from me acted as our Editors.

The British Pharmacopœia was at first and in some respects a compromise arrived at by the distinguished champions of the traditions of each division of the kingdom; and therefore the first edition rapidly gave way to one constructed with no bias of a local kind. A national Pharmacopœia having been once adopted, it became the sole object to make it complete and exact on certain lines. Finality, however, in respect of completeness and of exactitude, is not, scientifically speaking, attainable in a modern Pharmacopœia. In respect of completeness opinions will, for a long time yet, differ as to the articles which should be included, and because critics would not agree as to the articles which should be cast off as not entitled to the stamp of national authority. On the one hand, unfair rejection of traditionally approved medicines might take place; on the other, too hasty recognition of drugs whose temporary popularity depends, not seldom, on a name, an appearance, or a person. Therefore the national Pharmacopœia must be inevitably open to the charge of being to some extent, as it is called, "behind the time," but it ought never to be justly charged with having on its list a single article of proved worthlessness. Again, completeness in all respects of the whole "Materia Medica" the Pharmacopœia does not attempt to possess. In the art, and indeed in the science of medicine, are many true remedies which are not and cannot be put upon the shelves of the pharmacists. Some of these are among the most powerful of all remedies in dealing with human infirmities. Direct action on the intellect and on the emotions of the sufferer, many of the remedies by light, or heat, or cold, by hygiene, and by climate are sometimes more potent for good than could be all the drugs of the world.

And in respect of exactitude, the Pharmacopœia must also be for a time defective. The progress of chemistry alone introduces new modes of combination and new ingredients to combine every year, while the physiologist discovers new and subtle actions to be controlled or aided in unexpected ways. The very existence of a formula will sometimes suggest its modification.

And therefore, there always will be in future, in some form, the admirable contrivance of the 'Extra Pharmacopœia.' It is of course open to discussion whether the Medical Council should maintain and issue a suggestive document of this nature. Opinions may differ as to how often it should issue authoritative appendices, and as to whether the decennial revision of the United States is or is not the best arrangement. I will only venture to say that Squire's 'Companion to the Pharmacopœia,' and the 'Extra Pharmacopœia,' are works that will always have, as they deserve, grateful acknowledgment from all interested in the progress of medicine and pharmacy, and that they seem to be valuable for the general growth of knowledge, in the same way that the large voluntary associations of modern times are serviceable to the state, though their conclusions by majorities are happily not law.

The United States Pharmacopœia as you are aware, prior to the last decennial revision, had adopted to some extent the principle of authoritatively distinguishing between first and second class medicinal agents. A secondary (*i.e.*, third) list is given in England in the private 'Extra Pharmacopœia.' The late Sir Thomas Watson, Mr. Simon and myself, at the Social Science Congress in the year 1861, endeavoured to draw attention to the importance of distinguishing between them, by proposing a list of "Standard Remedies," placing all which could not be so designated in a separate category. But we were compelled by circumstances to desist from the attempt.

These remarks are partly dictated by the conviction of the dangers in which we lie, of seriously and needlessly overloading the shelves of the practical druggist, as well as of trifling with the memories and the time of students both of medicine and of pharmacy.

In conclusion it may be said that by recent resolution of the Medical Council, steps have been taken which will practically insure the best methods of revision by either addition, subtraction, or alteration, and by annual report through competent advice on any subject bearing on the progress of any department of the Pharmacopœia. This constant watchfulness, without too frequent meddling and change, is certainly called for. It is sufficient to name such recently introduced remedial agents as nitro-glycerine, amyl nitrite, physostigmine and calabarine, salicylic acid, pilocarpine and antipyrin, with their delicate difference of action, and the whole class of antiseptics and hypodermic injections, to remind ourselves of the revolution which pharmacy and pharmacology are undergoing and have undergone in the last twenty-five years, a revolution of ideas as great as that which modern embryology has introduced into the conceptions of morphology, and into the study of evolution.

The labours of Fraser, Lauder Brunton, and other pharmacologists, when considered in relation to the precise knowledge obtained, and hereafter to be ob-

tained, through experimental physiology, comparative pathology, and comparative therapeutics, open a wide vista of potential usefulness for the prevention and treatment of disease in the animal and vegetable world. In the whole range of science (astronomy not excluded) there is nothing more marvellous nor more dazzling. The future possibilities of the carbon compounds through synthetical chemistry, taken into account with the traditional beliefs in vegetable agents throughout the various nations of the world, justify, I feel sure, this strong statement.

This short history, then, of the British Pharmacopœia suggests the duty of a brief allusion to the still larger question of an International Pharmacopœia. As the intercourse among nations becomes more constant, and as ideas and wants become more uniform among the family of man, such an undertaking would certainly appear to become more desirable and more easy of execution than at any previous period of history.

But is it yet desirable, and if so is it feasible? Under certain limitations the answer must be in the affirmative. What these limitations are was well shown in the discussions on the subject at the Pharmaceutical Congress in London in 1881. They practically resolved themselves into restricting the work to the mode of preparing medicines which are deemed by the best physicians and surgeons in all parts of the world to be the most important. The determination of what these are, would in itself be no small matter. It was to this that the proposal as to the "Standard Remedies" above referred to was directed. If formulas were agreed upon for one hundred such agents, to which more would be gradually added, it would be a clear advance in the pathology and therapeutics of the future.

This, however, is not the view of all persons. In France, especially, there seems to be a desire for a universal and authorized Codex of all received medicaments. I doubt if any true physician would aid in this, with a view to improving scientific treatment. Such a Cyclopœdia would doubtless be of great interest, but we know that it would contain hundreds of recipes comparatively useless for healing.

No one who has considered the matter from this point of view can think that such volumes as the elaborate 'Pharmacopée Universelle' of Jourdan, or the 'Universal Pharmacopœia of Europe and North America,' by Dr. Hirsch, now in progress, can advance the precise science of therapeutics, or have value beyond that of most convenient works of reference as to facts.

The real object of a Pharmacopœia is to help to heal by the best and quickest and pleasantest methods, excluding inferior, spurious, and worthless agents. A small volume which would lay down by international consent, the mode of obtaining with certainty the best remedies, made in the best manner, with rules of how to preserve them in all climates, and how readily to distinguish them, would be hailed with satisfaction by practitioners and by pharmacists in every part of the world, and especially in districts, of which there are many, which are in a markedly transitional condition.

Since the London Pharmaceutical Congress of 1881, steps have been taken to promote this object which most persons then agreed to be desirable if attainable. But at present there is not much real progress. Professor Redwood has favoured me with a copy of the 'Projet d'une Pharmacopée Internationale' by Mr. Anthony von Waldheim, dated 1885. This document, full of earnest labour, illustrates the real difficulty of the undertaking when carried on by a Committee of Delegates from eighteen States. The most hearty acknowledgments and appreciation of the labours of Mr. von Waldheim are unquestionably due to him.

It is certain that the Medical Council charged by the law of Great Britain to maintain the British Pharmacopœia will not fail to aid any step by which within the limits of its legal power it can promote the perfection of scientific pharmacy. There are great opportunities for this among the English-speaking race, of the old and of the new world alike, and co-operation in this matter with the active scientific pharmacists of the United States of America may be certainly relied upon. It cannot I think be doubted that there is much yet to be learnt by us from India, and from our cousins in the new world, as to the constitution of remedies originating in the hotter climates and specially adapted to them.

It is a source of regret that no steps have been taken to obtain representatives from India, the Dominion of Canada, and Australasia, to co-operate in England directly in future researches connected with the Pharmacopœia. This would seem more desirable and reasonable, as by a recent Act colonial and foreign practitioners are to be entered upon the Medical Register after the present year. It is a special privilege to be able to express this sentiment, in the presence, as I am informed, of two distinguished pharmacists of Australia.

The Medical Council is not likely to depart from the course it has adopted with so much success of allying itself with representative members of the Pharmaceutical Society. On this body by law devolves the responsibility of educating and qualifying the future pharmacists of Great Britain. It has always shown energy and administrative capacity in the development and fulfilment of this important and national obligation.

From these questions we should turn to those which specially concern the future education of pharmacists. Fear has been sometimes expressed that the highly educated pharmacist will interfere with the functions of the medical practitioners, many of whom must in rural districts dispense their own medicine. Experience and observation

show that this is a fallacy arising from a mistaken reading of the past. The uneducated and ignorant step in where better men will not interfere. The whole tendency is in this manner to subdivision of duties. Moreover it is not true to say the pharmacist has no concern with the action of the agents which he dispenses. Theoretically and professionally he has not. Practically he has. He dare not dispense that which he believes to be dangerous in the quantity written. Therefore he has to know the danger point of all dangerous substances that are in use. He may form his opinion of the uselessness of certain agents, but he cannot, as the telegraphist does, forward mechanically whatever is ordered. A dispenser of intelligence is an observant and thoughtful person, and brings a watchful and often a critical sense to bear on all that passes through his hands.

This rough outline of the present circumstances of the English student of pharmacy will have already been filled in with a thousand details by the older students. We are all students now-a-days, though of different ages. The younger, however, have more concern with the sketch than the old, because they have for years to come to fill up the pattern each for himself.

A fear has been expressed by even so great a master in pharmacy as Mr. Frazer, of Glasgow, that there is a tendency in the Pharmaceutical Society to over-educate. It would be a betrayal of their trust if the Council were to invite students to swell the ranks of pharmacy when they are unfit for the pharmacy of the future. The number of rejections at the examinations is no doubt deplorable. It will, however, soon be found what schools give the secondary education adequate to the just requirements of your standard.

You cannot have heard or read much even of the commonest journals without coming across unceasing discussions as to the method of modern education. I hope you do not read them. Educate yourselves. Your first, your livelong, your best education—may it have been so with all of you, began at your mother's knees. "The child is father to the man." The seed there planted will bear fruit, ripening till the day comes when the tree shall fall. Where the tree falls, there it shall lie.

The fundamental question that of late has perplexed educators has been whether education should be religious or secular, general or technical.

For you at all events it has to be neither of these alternatives. It must be all; but each in its proportion and at the proper time. You are come here to pursue the technical portion, to that you have now therefore to apply with all your might. But whatever you have made yourselves, by such opportunities that have been hitherto permitted to you, whether of religious discipline, or of secular training, that character you bring now to your technical work. If you are lovers of truth, of order, accuracy; if you do as you would be done by; if you are at once modest and yet manly and self-reliant; above all, if you think, as well as commit to memory,—then your work will daily prosper with you, and in it you will rejoice. There is no occupation in life in which personal character tells more than in the duties of a dispenser. They are replete with interest of the most varied kind. The details are to him, drudgery, or pleasure, as he makes them to be. Cleanliness, exactitude, order, punctuality, shrewdness, become a habit which is simple delight. If you have not these habits, and this delight, disorder and discomfort, dissatisfaction and dirt, will be your daily lot. If you have, the most practical among you will live on the borderland—I would rather say, within the boundaries—of science, and be in relation to the sufferings, and sorrows, and troubles of your fellow men, and become their friend. This is no ideal fancy. In a few masterly words, one, to whom you and all pharmacists are deeply indebted, the venerable Professor Redwood, pointed out not long since that whereas the business of the druggist in the last century was generally a paltry trade, the occupation of the skilled pharmacist is becoming one in which education and science are essential to gain the position which pharmacy deserves, and which it is obtaining in this country, as on the Continent of Europe. May you, my young friends, show this by using now the great opportunities this Institution lays open to you.

It would be a pleasant task to say something of pharmaceutical studies; this, however, will be more wisely said by your appointed teachers. You must work and think, as well as listen. The time is passed with all of you personally for considering whether preliminary examination should precede apprenticeship, and both be concluded before you come hither. I advert to this only because this Society has recommended for you the right course, the course, that is, which will lead to a just knowledge of your business and to your personal happiness. It is one based upon a sound general education in your boyhood prior to the study of the material world by the method called (it is becoming a cant word) science. Both are antecedent to practical application and method which will advance your daily and bread-winning work. But, again, educate yourselves. The opportunities of the present day enjoyed by those who study here surpass the dreams of the best of my student days the days when two of the most able of my teachers ridiculed the student who strove to master the stethoscope and to be skilled in microscopic observations. Teaching now marches generally on right lines; it will no doubt be carried on with various skill and divers aptitude. But books, laboratories and instruments are in their due proportion available to all. The worst part of our educational structure lies in the examination system, of which Professor Michael Foster some time since spoke here fully. For that you are not responsible. It is year by year being im-

proved, not in severity but in method. It is now felt to be cruel and unjust to examine youths in what they have not been taught to study, and to seek to extract from them what they therefore cannot know. Teaching and examining should be part of an organized interdependent whole. Like good builders, make each brick you lay in your building fill its proper place and see that each one on which you bestow your labour is worth the laying. Your work will then be good and each successive course will rest firm and true on a good foundation. Trust your teachers; mistrust the carping criticism of the present day. Have faithful, hearty love of Nature, but hearken not to the deadly whisper that man by only scanning the world of matter can read the whole lesson of the Infinite.

Contentment with your lot, whatever it be, is an element of true success as it is of happiness.

"It is not growing like a tree,
In bulk, doth make man better be;
Or standing long, an oak, three hundred year,
To fall a log at last, dry, bald, and sere.
A lily of a day
Is fairer far in May,
Although it fall and die that night;
It was the plant and flower of light.
In small proportions we just beauties see,
And in short measures life may perfect be."

Mr. President, thus briefly it has been my endeavour to draw a rude picture of pharmacy as it was, and of the temper in which it is now carried on. I have to express confident hope in its growth and progress for the future. How confident should be the hope in that future as well for the growth of knowledge, as for sober search after wisdom and the alleviating the necessities of man, is well known to you and your colleagues in the important branch of the healing art which you here both practically and scientifically cultivate.

NOTES ON GRASSE AND ITS CHIEF INDUSTRY.*

BY WM. SAUNDERS, F.L.S.

A few notes from this interesting old town, with some references to its chief industry, may possibly prove of interest to some of your readers. It is a land of flowers, where a large proportion of the perfumes of the world is made, and such an odd, out of the way corner of the country that but few visit it. Here odorous flowers are grown in immense quantities for the purpose of preparing the sweet scents in which civilized mankind and womankind delight, and it is from this district that perfumers everywhere obtain the chief ingredients from which by skilful combinations their celebrated perfumes are manufactured. On the main line from Paris to Rome, *viâ* Marseilles, about six hundred and sixty miles from Paris, lies the town of Cannes, on the Mediterranean shore, a noted health resort for invalids from Great Britain and other countries, the winter climate being remarkably mild and agreeable. Here a branch line of railway about twenty miles in length brings the traveller to Grasse. At Cannes the chain of mountains which for many miles on either side runs along the seashore retreats to some distance inland, and the route to Grssse lies up through narrow valleys and broader slopes of hill and dale. For the first few miles the general aspect of the country is rather desolate; vegetation seems parched and stunted; even the pine trees are dwarfed, and the wayside weeds lack vigour. But soon vegetable growth becomes more luxuriant, fertile belts are reached, and fields of roses, jasmine, mignonette, violets and other flowers are seen on every hand, while groves of olive trees clothe the hillsides, along with plantations of the vine and of the fig tree. As Grasse is approached the valley widens to about four or five miles, the mountain slopes are grey with olive trees, and nearly the whole valley is utilized for flower-growing.

The town, with a population of about 12,000, lies high up the mountain at the end of the valley, where the roads and narrow streets are so steep that the occupant of the ground floor of the back part of a house may often look out of the third story at the front of it, and where the quaint old houses tower up to six, seven, and even eight stories high at the front. The route leads through fields and gardens of roses, jasmine, jonquils, tuberoses, etc., up steep winding streets and alleys, where long flights of steps afford short cuts from one point to another in the town, and where buildings hoary with age greet the eye of the visitor at every turn. Mountain torrents stream down the hillsides here and there, affording water power for the ancient looking olive mills and means of irrigation during the hot weather for the flower growers. These streams also fill the public troughs with pellucid water, where crowds of women may be seen washing clothes from early morning until dark. It is said that this town was founded three hundred years before the Christian era; it is known to have been an important Roman station, and its excellent water privileges must have been a strong incentive to its early settlement. Nearly all the population excepting those engaged in mercantile business, and a few hundreds who are employed in the manufacture of olive oil, are engaged, either directly or indirectly, in the flower industry. The shop-keepers display their wares in the tiniest little shops, in which they have scarcely room to turn about; the hotels are antique country inns; but the air at this season is balmy and delightful, and the views from the upper part of the town charming.

There are about sixty firms or individuals in Grasse engaged in the manufacture of perfumes from flowers. Three or four of these are very large establishments, the others smaller. The harvest period here is a long one. It begins in February with the violet and the jonquil, which keep the perfume-makers busy until the end of March, when the mignonette comes in, which is followed in May and June by the orange flowers and roses, and in July by the jasmine, then with the rosemary and lavender, which are succeeded by the tuberose and cassia, which keep the trade busy until quite late in the autumn.

The rose bushes are grown in rows about three feet apart, with about eighteen inches of space between the plants. They are closely pruned in the spring, which induces a strong growth of young wood and an abundance of flowers. The jasmine and other flowers, where the individual plants occupy less space, are grown more closely together, the aim in each case being to have the ground as closely covered as is consistent with convenience of picking. The orange trees are about fifteen feet apart. It is the bitter orange which yields the most fragrant flowers; but the fruit of this variety is not eatable, so the trees are grown solely for the flowers they produce and for the oil obtained from the rind of the fruit.

In company with my genial travelling companion, Prof. J. P. Remington, I visited some of the principal establishments, where we were received with much kindness and courtesy; but to Mr. Warwick, of Warwick Frères, we were indebted for special attention. We found

* From the *Pharmaceutical Record*.

that while most of the larger manufacturers have flower plantations of their own, the bulk of the crop is grown by the peasants and small landholders, who during the season bring them daily to the factories. We rose early in the morning and drove into the country, hoping to see some of the flowers gathered, but the flower-growers were up before us, and had their fragrant crops collected and packed in sacks ready to take to the manufacturer before we reached the ground, Nothing is known here of the movement in favour of short hours for the working man.

It has long been known that fatty substances absorb odours very readily and retain them with much persistence. The perfumers of ancient Greece and Rome understood this well, and made use of such substances to steep flowers in for the purpose of extracting their odours. At Grasse fatty substances are largely used for the same object, and the pomades made there consist of fats strongly impregnated with the odours of flowers, which odours may be extracted from the pomades by exhaustion with alcohol and used as spirituous perfumes.

Pomades are made by two very different methods, the one by maceration, the other by what it is known as the process of *enfleurage*. Pomades of rose, violet, mignonette, cassia and orange flower are all made by macerating the flowers in fat warmed to 60° C. The fat is allowed to remain in contact with the flowers for several hours and occasionally stirred, after which it is put under a powerful hydraulic press, by which means the fat is expressed with but a trifling amount of waste. The same fat is thus treated daily with fresh flowers for from twenty to thirty days, during which time it becomes strongly charged with the odour of the flower.

The jasmine and tuberose pomades are always made by the other process. A large number of frames or "chassis" are prepared, each of which is fitted with one pane of glass about 18 × 24, set in a wooden frame, so that the wood may project on either side of the glass about ¾ inch, and each side of the glass is coated with a layer of fat about ¼ inch thick. The woodwork of these frames is so constructed that when laid the one on the other they fit very closely, so as to avoid any waste of odour. The freshly gathered flowers are strewed over the fat in each frame in a thin layer and the frames then piled one on the other to a convenient height, the upper and lower frames in each pile being coated with fat only on that side next the flowers. The odour emitted by the flowers is rapidly absorbed by the layers of fat above and below them, and after twenty-four hours of exposure they are practically exhausted. Every morning the trays are examined, the old flowers thrown away and fresh ones put in their place, the surface of the fat both above and below being broken every few days by a toothed spatula, and mixed so as to present a fresh surface. This process is continued for about thirty days, by which time the fat has become saturated with the odour, when it is scraped off the surface of the glass and packed in tin cans, the process being continued with fresh fat as long as the flower harvest lasts. Some of the larger factories have many thousands of these frames.

The buildings in which this work is carried on are built either of stone or brick, where the temperature is maintained as low as possible, so as to prevent the fat from becoming rancid. The fat is composed of a mixture of lard and mutton suet, melted together and carefully washed and treated until it is free from all trace of fatty odour. It is then slightly perfumed with orange flower, which is said to aid in preserviug it from change. The fat is usually prepared during the winter months and stored in cool cellars until wanted for use.

Roses are picked in the bud every morning just as the buds are about to open. They are picked with the green calyx attached, and this appendage is removed in the factories by the women employed there before the roses are treated.

Mignonette is picked before the seed pods are formed. The flowers of the violet, jonquil and tuberose are picked with the calyx attached, but the jasmine flowers are pulled free from their calyx in picking.

The following are about the average prices paid for the flowers as they are received at the factories :—

Roses, 8 to 10 cents per kilogram ; orange flowers, 17 cents per kilogram ; violets, 70 to 80 cents per kilogram ; jonquil, 60 cents per kilogram ; mignonette, 40 cents per kilogram ; jasmine, 50 cents per kilogram ; tuberose, 50 cents per kilogram ; cassia, 1 dollar per kilogram.

At these figures it is said the growers can make far more off their land by devoting it to flowers than they can from any other crop.

A large quantity of orange flowers are used for the preparation of oil of neroli and orange-flower water. To obtain these products the flowers are placed in large copper stills of water ; steam is introduced and the water made to boil, when the vapour arising is passed through coolers into suitable receivers. A small quantity of oil gradually accumulates on the surface of the water, which is removed from time to time. The water which collects in the receiver is the orange-flower water of commerce. The largest part of the rose crop is similarly treated, and rose water with a small proportion of otto of rose is the result.

Distilled perfumed waters when first made have a rank and rather unpleasant odour, which is softened and becomes quite fragrant after they have been kept a few months. While undergoing this mellowing process it is necessary that the jars in which these waters are contained should be uncorked. They are left either open or tied over with a piece of brown paper to exclude dust.

It is difficult to obtain reliable statistics of the quantities of flowers grown in this district, but the following may be taken as approximately correct. It is estimated that the sixty firms or individuals engaged in the manufacture of perfumes in Grasse consume annually about 3,000,000 pounds of roses, 4,000,000 pounds of orange flowers, 160,000 pounds of jasmine, 40,000 pounds of mignonette, 40,000 pounds of tuberose, 200,000 pounds of violet, and smaller quanties of jonquil and cassia. They also use large quantities of orange leaves for the preparation of oil of petit grain, and immense quantities of lavender, rosemary and thyme, from which the oils of these plants are distilled.

The aggregate value of the perfumes exported from Grasse is said to be about 3,000,000 dollars annually.

THE COLOURING OF METALS.*

According to the *Illustrirte Zeitung für Blechindustrie*, a greyish-black colouring on copper may be obtained by placing the object for treatment, after being well cleansed, in a weak solution of liver of sulphur. When a caustic effect has, after a short time, been produced, the object is rinsed, slightly heated, and brushed with a stiff brush. This coating is said to be very durable.

A blackish brown bronzing can be applied to vases, figures, busts, etc., cast from zinc, by the application of a solution of sulphate of copper. If the projecting portions are then well rubbed with a woollen rag, they assume a coppery red brilliancy, which increases the resemblance to genuine bronze. A solution of verdigris in vinegar also produces an effective bronzing.

Brass may be coloured black by repeatedly coating the cleansed metal with a moderately warm solution of nitrate of copper. Heating over a charcoal fire follows. Finally, the tone is heightened by rubbing with olive oil.

* From *Industries*, September 17.

The Pharmaceutical Journal.

SATURDAY, OCTOBER 9, 1886.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

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THE PROPOSED UNOFFICIAL FORMULARY.

IT might have been anticipated that the resolution brought forward by Mr. REYNOLDS at the Birmingham meeting of the Pharmaceutical Conference would have excited a far greater interest among dispensing pharmacists than has yet been manifested by the correspondence which has been received on this subject. But though we are still in the midst of the dull season, when the demands of business are not so pressing as to leave no time for such occupation, only two more letters on the proposed unofficial formulary have reached us in addition to those already published. The question mooted by the Conference resolution is, however, indisputably an interesting one in many respects, and it has such a direct practical relation to the most important part of a pharmacist's avocation that we looked for a much more thorough discussion of its various aspects than has yet been furnished. This is certainly desirable, if only for the purpose of defining more precisely the practice which can be reasonably objected to, and against which the influence of the Conference should be brought to bear. In the letters that have been published, there is a total absence of any just discrimination between nostrums and preparations which, though in fact proprietary, are not in any sense secret preparations, but appeal to the public and medical men for recognition on the simple ground of their inherent merits. We have endeavoured hitherto to avoid particularizing any preparations either of this kind or of a more questionable character; but, as our correspondents have mentioned some of both descriptions, further reticence on this point with regard to them may well be dispensed with, and Schacht's liquor bismuthi may be quoted as an instance of a preparation that is in no sense open to the reproach of being a nostrum. The history of this preparation is well known to most, and it is recorded in the pages of this Journal. At the time of its introduction it was essentially a novelty, and its production was based upon a new chemical observation affording a convenient means of administering bismuth in a state of solution. Its excellence and its suitability for the purpose were, moreover, signally endorsed by the introduction into the British Pharmacopœia of a formula for making it. But there is a further point of most essential importance in regard to this preparation, namely, its absolute freedom from arsenic and other impurities. The process by which it is made must be such as to ensure this absolute purity, and as we apprehend it is upon the ground that it is made by such a process that a proprietary claim can be sustained. A manufacturer who possesses the knowledge of a process by which a preparation can be made to answer this requirement is surely entitled to the benefit of his skill and labour in working it out; and when he has established his title to proprietary rights in this respect it is by no means to be wondered at that medical men recognizing that title should specify in their prescriptions the particular maker of the preparation they wish to have dispensed by reason of their well founded confidence in its merits. Bullock's glycerine of pepsine, also mentioned by Mr. LAURIE, is another preparation of a similar character. There is nothing secret about it but the mode of making, and its claim to special recognition is simply based upon its intrinsic merit, which anyone can put to the test of experiment.

Illustrations of another class of preparations might be given from among those referred to by Mr. LAURIE in the case of which there is no disclosure of their nature or composition, while the names applied to them are to a certain extent fancy names and sometimes even misleading. Others again are essentially nostrums, or what are commonly known as patent medicines, and it is the ordering of such preparations as come within this category in the prescriptions of medical men that may reasonably be condemned. The practice appears to have originated in America, and it has there grown to such an extent as to constitute a serious evil. At a recent meeting of the Louisiana Pharmaceutical Association this subject was under discussion, and it was resolved that steps should be taken to enable the pharmacist to cope successfully with the nostrum mongers by forming a committee with power to compile and publish certain formulæ which should supply the place of nostrums that are prescribed by medical men. In order to discourage physicians from prescribing those secret preparations it was decided that copies of the formulary should be supplied to every practising physician in the State, and that every member of the Association should use his influence with physicians to whom he is personally known to induce them to order the preparations contained in the formulary. The Pennsylvania Pharmaceutical Association is adopting a similar course.

That some good can be done in this way is shown by the letter from Messrs. BURROUGHS, WELLCOME and Co., which appears in the present number of this Journal. The mention by Dr. SYMES of tincture of strophanthus, as requiring a recognized formula to ensure uniformity in strength, has had the

effect of eliciting from the writers a statement of the process they have adopted at the recommendation of Professor FRASER of Edinburgh, and this shows that there is a need for some authoritative issue of formulæ in such cases, not only for the convenience of prescribers but also as a guide for manufacturers of such preparations. In like manner Mr. MARTINDALE'S reference to the preparation of *Hammamelis virginica*, known by the name of "hazeline," has elicited from the makers of this article a statement of the formula by which it has been made and by which any pharmacist will now be able to prepare it. By this publication of the formula the preparation has been removed from the class of nostrums, and whatever estimate may be formed of its medicinal virtues, it can now be made the subject of observation with an intelligent knowledge of what it is. The question whether the composition of proprietary articles is to be disclosed or kept secret is, after all, one that must be decided by their owners, their decision cannot be interfered with, whether it be to rely upon the real merits of their productions or to trust to meretricious puffing and human credulity; but as regards legitimate medical practice there should be no uncertain line of demarcation between the classes of preparations which appeal to one or other of these modes of appreciation.

The new college building erected by the Ontario College of Pharmacy has now been completed and was opened to students on the 1st inst. The Council at its last meeting adopted a scheme for the regulation and government of the teaching operations, according to which the teaching staff will be under the control of a Board of Education, consisting of the President for the time being, three other members of the Council and the principal of the teaching staff. The staff will consist of a principal and not less than two associates, to be appointed by the Council on the recommendation of the Board, and will receive in determined proportions all the fees for lectures up to the sum of three thousand dollars annually; any fees received in excess of that amount will be divided equally between the lecturers and the College. Some of the arrangements are temporary, but in the autumn of 1889 they will be modified so that there shall be a single term of five months every year, lasting from the beginning of October to the middle of March. It will include four courses of fifty lectures each on chemistry, pharmacy and dispensing, materia medica and botany, and practical chemistry and pharmaceutical manipulation. The fee for the full course is to be forty-eight dollars, with such additional charge as will cover the cost of apparatus used by the student in the practical work on chemistry and pharmacy.

* * *

It will perhaps interest some of our readers who may be visiting the Colonial and Indian Exhibition to mention that in the Educational Court of Ontario there is a large photograph of this new college, and we think our Canadian friends are to be sincerely congratulated on their success in building so handsome and commodious a structure. It may be mentioned also that in the Victoria Court there is a similar photograph of the new School of Pharmacy in Melbourne, a copy of which has just been presented to the Pharmaceutical Society of Great Britain. It will be remembered that this last-mentioned school has been subsidized by the Victorian Legislature to the extent of £1000, and from recent correspondence we learn that the pharmacists of Ontario are applying to the Canadian Government for an annual grant, which it is very probable they will receive, as the Legislature of Ontario is very liberal in its votes for the support of scientific and educational institutions. Evidence of this may be seen in the Educational Court of Ontario before referred to, which is well worthy of a visit to all interested in education and science. Apart from the large and varied collection of pupils' work from public and grammar schools, art schools, mechanics' institutes, etc., there is an excellent display of physical and chemical apparatus, botanical and geological charts, botanical models, specimens of plants illustrating systematic and economic botany, insects injurious and beneficial to vegetation, geological and mineralogical collections including rocks which chiefly compose the earth's crust, minerals which constitute the majority of rocks, animals which influence the formation of soils, etc., such as are used in Canadian schools and colleges. Altogether the exhibit is probably the best and largest display of general educational work and appliances ever exhibited by any one British colony.

* * *

In the Dominion of Canada, as in some parts of the United States, legislation relating to the sale of alcoholic liquors has placed pharmacists in an equivocal position. A Bill was therefore prepared that would have exempted from the operation of such legislation in Canada the purchase and sale by legally qualified medical men and chemists and druggists of (1) officinal preparations of authorized pharmacopœias, when made of full medicinal strength and sold for medicinal purposes; (2) physicians' prescriptions consisting of or containing spirituous liquors, if dispensed in quantities of not more than eight ounces; (3) any patent medicine, not capable of being used as a beverage; (4) articles of perfumery, bay rum, varnishes, and pharmaceutical preparations containing alcohol, but not intended for use as beverages; and (5) alcohol of 65° over proof, or methylated spirit, if sold for pharmaceutical, chemical or mechanical purposes only. The Bill passed the Senate, but failed to reach a second reading in the lower house before the close of the session.

* * *

During the past week a Congress of Italian pharmacists has been held in Turin. It commenced on Monday morning at 11 o'clock and was to conclude on Friday. Among the subjects set down for discussion were—(1) Scheme of a sanitary code in relation to the exercise of pharmacy; (2) Reorganization of the study of practical pharmacy; (3) Foundation of a national association; (4) Creation of a permanent committee for the compilation and revision of the Pharmacopœia; (5) Pharmaceutical tariff; (6) Definition of pharmaceutical products and commercial products; (7) The best means of raising the moral and material position of the pharmacist; and (8) The desirability of creating a new class of pharmacists who shall only practise in small towns and a class of assistants to correspond.

* * *

The *Scientific American* announces the completion

of a mammoth dynamo machine at the works of the Brush Electric Company, Cleveland, Ohio. The machine is 14 feet long, 5 feet 2 inches high, and 4 feet 2 inches wide, and weighs 22,000 pounds, or nearly 10 tons, the copper wire alone used in its construction weighing 6250 pounds. The normal speed at which it is driven is 430 revolutions per minute, and its electrical capacity is estimated at 300,000 watts, or the equivalent of 5000 incandescence lamps of 16 candle power each. The machine has been constructed for a smelting company for the work of reducing refractory ores.

* * *

The property possessed by sponge of swelling when immersed in water is well known, but it is not so well known, as pointed out by Dr. Porak, that it does not swell when immersed in ether. Dr. Porak says that a similar property is possessed by laminaria, but whilst this substance swells as readily in water after as before treatment with ether, sponge swells much more slowly in water after previous treatment with ether. It is suggested that this property might be utilized by keeping prepared sponge in an antiseptic ethereal solution of iodoform, from which it could be removed in an unswollen condition when intended for surgical use.

* * *

According to the return for 1885 from the department of the Chemical Examiner to the Government of Bengal it would appear that compounds of arsenic still remain the homicidal and cattle poison of India, notwithstanding the anticipations expressed that it would be ere now supplanted by vegetable poisons that "exist in every hedge and garden throughout the country." In 36 out of 234 human viscera received for examination arsenic was found, and in 143 out of 193 viscera of cattle. Out of 780 articles submitted for examination as being suspected to contain poison 394 justified the suspicion, and in 280 cases the poison was oxide or sulphide of arsenic. As many as 190 compounds suspected to be used as cattle poisons were also found to contain arsenic. The other poisons most frequently found were opium and aconite.

* * *

The *Druggists' Circular* says that the consumption of pills in the States has so enormously increased that several of the older and larger makers of pill-boxes have been overrun with orders. A recent introduction of "pill vials" with screw tops is spoken of as having been one of the greatest "hits" ever known in the trade.

* * *

A process for making a honey substitute by mixing dextrose, levulose and cane sugar in the proportions found in real honey, with the addition of certain essences to give the mixture the proper flavour, is the subject of a recent English patent. The proportions specified are dextrose 35 parts, levulose 40 parts and cane sugar q. s. until a 10 per cent. solution gives a reading of 1° on the scale of a Soleil-Veutzke polariscope.

* * *

The first meeting in a new session of the Chemists' Assistants' Association will be held at 103, Great Russell Street, on Wednesday evening next, when an Address will be delivered by the President, Mr. H. H. Millhouse. The chair will be taken at nine o'clock. We hope that this may prove the commencement of another prosperous session of this useful association.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, October 6, 1886.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT.

MR. THOMAS PRESTON GOSTLING, VICE-PRESIDENT.

Messrs. Allen, Atkins, Borland, Baildon, Bottle, Butt, Cross, Greenish, Hills, Radley, Richardson, Robbins, Savage, Schacht, Southall, Symes, Williams and Woolley.

The minutes of the previous meeting (August) were read and confirmed.

Leicester and Leicestershire Chemists' Association.

The President said a letter had been received from the Leicester and Leicestershire Chemists' Association, conveying a resolution of thanks for the grant of £25 recently made to that Association.

Retirement of Mr. Benger.

A letter had also been received from Mr. Benger, acknowledging the resolution passed by the Council in connection with his retirement from the Board of Examiners.

Elections.

ASSOCIATES IN BUSINESS.

The following, having passed the Minor examination, being in business on their own account, and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society:—

Garner, Edwd. James Francis...Manchester.
Norman, Valentine .....Godalming.
Rae, Robert Sanders .....Annan.
Southwell, Charles B.....Ramsgate.
Townsend, William Thomas ...Manningham.

ASSOCIATES.

The following, having passed the Minor examination and tendered (or paid as "Apprentices or Students") their subscriptions for the current year, were elected "Associates" of the Society:—

Auchinachie, Peter .....Keith.
Johnson, Frederick Edward ...Hull.
Scott, Robert Alexander.....Wishaw.
Shepperd, William John.....Newport (I.W.).

APPRENTICES OR STUDENTS.

The following, having passed the Preliminary examination, and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Aitcheson, John Tait .....Berwick-on-Tweed.
Bayliff, John Thompson .....Kirkby Lonsdale.
Beach, Thomas Edgar.....Bridport.
Blabey, John Robert .....Woolton.
Bott, Owen Herbert .....Leicester.
Brooke, Edward .....Barking.
Bruce, Harvey .....Edinburgh.
Buckley, John Davies.....Leominster.
Burrow, Edward John .....Wellington (Somerset).
Cameron, Alexander .....Montrose.
Cruickshank, Robert Watson...Aberdeen.
Drabble, Thomas Lambe.....Holbeach.
Fooks, Robert Spiller .....Bridport.
Gardiner, William Francis.....Scarborough.
Hanslow, Charles Edward .....Woodford.
Harrison, Richd. Casswell Clark. Birmingham.
Jones, John .....Rhyl.
Le Bosquet, Charles Henry ...Ramsgate.
Lengden, Alfred .....Cheltenham.
Marshallsay, Henry Reynold...Wareham.
Millar, James Herd.....Edinburgh.
Osmond, Henry Lincoln .....Totnes.

Reed, John William .....St. Helens.
Rowe, Frank.....Ilfracombe.
Stevenson, Andrew .....Kilmarnock.
Thomas, Joshua James .....Neath.
Tillman, Ernest Augustus .....Truro.
Tothill, Mortimer Aug. Legett..London.
Troughton, Reginald .....Edinburgh.
Wolfendale, Richard .....Farnworth.

Several persons were restored to their former status in the Society upon payment of the subscription for the current year and a fine.

Restorations to the Register.

The names of the following persons, who have severally made the required declarations and paid a fine of one guinea, were restored to the "Register of Chemists and Druggists":—
William Fletcher, 20, Lilac Terrace, Regent St., Leeds,
Abraham Dale Jones, 19, Neepsend Lane, Sheffield,
Charles Henry Tucker, 101, Stamford Street, Ashton-under-Lyne.

Addition to the Register.

The Registrar reported that—
Charles Forbes Wattie, Bellabeg, Strathdon, N.B., having made a statutory declaration that he was in business before the passing of the Pharmacy Act, 1868, and this declaration having been duly supported, his name had been placed on the Register.

Appointment of an Examiner.

The Council went into Committee to consider the appointment of a member of the Board of Examiners in the room of Mr. Baden Benger, resigned. A preliminary ballot having been taken the Council resumed, when it was resolved unanimously to appoint

Mr. Francis Ransom, of Hitchin.

Reports of Committees.

FINANCE.

The report and recommendations of this Committee were received and adopted on the motion of the President, and various accounts were ordered to be paid.

BENEVOLENT FUND.

The report of this Committee included a recommendation of the following grants :—

£15 to the widow (aged 38) of a pharmaceutical chemist, and member from 1867 to 1870, and a subscriber to the Fund for the same period. Applicant is a confirmed invalid and had a similar grant in 1885. (Surrey.)

£5 to the widow (aged 55) of a chemist and druggist, and member from 1870 to 1880, and subscriber for three years to the Fund. Is dependent on her children. (Yorks.)

£5 to the widow (aged 57) of a registered chemist and druggist, in ill-health, and dependent on her friends. She has had two previous grants of the same amount. (Essex.)

£10 to the widow (aged 33) of a chemist and druggist, member from 1874 to 1885, and a donor to the Fund. Applicant has five children, eldest thirteen, and no means of support. (Scotland.)

£5 to the widow (aged 63) of a registered chemist and druggist, in bad health. Applicant has had two previous grants of £10 each. (Middlesex.)

£10 to the widow (aged 59) of a registered chemist and druggist, who had a similar grant in 1885. (Warwickshire.)

£10 to the widow (aged 57) of a registered chemist and druggist, with two children who earn but very little, and who have recently been ill. Applicant had a similar grant in 1884. (Durham.)

£5 to a registered chemist and druggist (aged 52), formerly in business, and latterly in a situation, which he had to give up owing to failing sight. He had a similar grant in 1885. (Norfolk.)

£10 to a registered chemist and druggist (aged 65). Suffering from an incurable disease. He had a similar grant in 1885. (Surrey.)

£5 to a registered chemist and druggist (aged 58), who failed in business in 1865, and who is now unable to obtain employment. (Lancashire.)

One application the Committee declined to entertain.

A statement of the position of the Fund was appended to the report and it was recommended that six annuitants be elected in December next, the election to take place on December 3.

The Vice-President, in moving the adoption of the report, mentioned the particulars of some of the cases in which grants were recommended. Referring then to the regulation under which the Council had at its meeting in October to consider the expediency (financially) of electing pensioners in the following December, the Vice-President said that if the receipts were properly analysed it would appear that the actual income of the Fund had been so far rather larger this year than last, being £1986, as against £1957 last year. The Committee was very pleased to recommend that six annuitants be elected in December, though it was calculated that this would leave a very small balance at the end of the year. It was hoped, therefore, that the generosity of the subscribers would more than make up for the extra outlay. Having mentioned the circumstances of some of the persons whom it was intended to place on the list of approved candidates,

Mr. Symes said he hoped it would not be supposed that the Council supported any particular cases more than others.

The President said he was sure the Vice-President had no such wish. In fact it had always been the custom that members of the Council should not even allow their names to appear on the cards of any of the candidates.

Mr. Allen seconded the motion.

Mr. Bottle, in supporting the motion, expressed his satisfaction that six more annuitants were to be elected, which would bring the total up to a larger number than had ever been on the list before, and in fact a far larger number than their predecessors dreamed of. He could but regret to find that there were so many good cases to be placed on the list, and also that there were so many applications for casual relief. He found that six out of eleven of the cases in the present list were widows of chemists and druggists who had not been connected with the Society, and though it was matter of congratulation that the income was larger than formerly, owing to the better returns on the invested capital, he was sorry to see that the subscriptions had fallen off £60. If he appealed specially to any portion of the trade it would be to outside chemists and druggists, for though he knew that many of them found it hard to make both ends meet, still when they found that the majority of those who applied for relief were the widows of chemists and druggists who had never been associated with the Society, he thought a little effort should be made by that class of persons, and if they all sent in only a very small subscription, the present deficiency would be made up, and they would be in a satisfactory condition at the end of the year.

Mr. Richardson hoped the idea would not get abroad that the Benevolent Fund was in a good position financially, because he considered it was anything but that, and he regretted exceedingly that there was so much apathy amongst the trade generally with regard to the Fund. Appeals had been made over and over again to the trade, which had not met with the response that was expected; but he hoped that another year would show a better result. Most of these applications came from indigent persons who were not in any way connected with the Society, and who had not contributed a penny towards

the Fund, and if this went on he thought the Committee would really have to consider whether in justice to members of the Society it could continue to entertain claims from outsiders. He rejoiced to see that they were adding to the list of annuitants, for this was the most satisfactory portion of the work, providing for the declining years of unfortunate members of the trade, and alleviating the distress they would otherwise suffer. He hoped it would be possible to elect annuitants every year if suitable candidates came forward, but many of those who applied for temporary assistance were really bordering on the workhouse and must gravitate there before long. He rather questioned the wisdom of continuing these small donations, at any rate unless the Fund were better supported. He hoped next year the local secretaries would make another effort to induce every one connected with the trade to contribute something.

Mr. ATKINS remarked that it was quite true that the Committee was proposing to go to the limit of their resources, but he believed it was wise to do so. A special appeal would be made next year which he hoped would be responded to better than on previous occasions, and also that wealthy members when making their wills would not forget the Fund.

Mr. ALLEN protested against the term outsider being used with relation to the Benevolent Fund. That Fund was neutral ground, and must be kept so ; as had been remarked more than once it was a thoroughly catholic Fund, and as such he hoped it would always be regarded.

Mr. ROBBINS said it was very satisfactory to him to notice the progress which had been made by the Benevolent Fund. When he first proposed extending the scope of its operations there were 13 annuitants, and when it was proposed to add another he was deemed very bold in suggesting that three should be elected. It was very satisfactory to find that now there would be fifty-two annuitants, and that the capital had increased from £14,000 to over £20,000. The Committee had given away a larger amount than ever, and had more in hand, and if it had stuck to the old rule of only granting as many annuities as were provided for by the interest on the investments in Consols, nothing like the amount of good would have been done. He should, however, like to be able to offer a further inducement to subscribers by raising the annuities in such cases to £50, which could very easily be done. When he had made this proposition from time to time he was told that would be making it an insurance fund ; but that would not be so, because the greater part of those who contributed a guinea a year would never come upon the Fund at all. He felt certain that if such a change were made the Fund would increase in the same way as it had by means of the change which he initiated ten years ago.

Mr. SYMES said it was better to give fifty annuities of £30 a year than thirty of £50. He admired Mr. Robbins's tenacity, and he should be glad if the time came when it would be possible to give every annuitant £50 a year, but he saw no prospect of it at present, and he did not agree with making distinctions.

Mr. ROBBINS said the mistake was in supposing that there was a certain amount of money which had to be given away ; the money had to be got before it could be distributed, and his object was to induce more persons to contribute.

Mr. CROSS thought this discussion would do much to enlighten the minds of those not connected with the Society. His experience as a local secretary in canvassing for subscribers had shown him that a great many people knew very little about the Fund. Before he went round he sent a circular, but he found it was not read, and he could not get much beyond the answer, "Times are bad and money is scarce." He knew this was too true, but still he did not think there was a chemist in the country who could not afford to subscribe 2*s.* 6*d.* a year, and he thought it was the duty of all to do so. He hoped local ecretaries especially would take notice of the matter, and do what they could. It was his pride, when he remitted at the end of April every year, to send an increased sum for the Benevolent Fund, and although the chemists in his town were decreasing in numbers he still hoped to send a larger sum next year. He had not heard Mr. Robbins's arguments so often as other members, but he must say he did not follow them ; the main point seemed to be that people were to be persuaded to subscribe by promising them certain advantages in a contingency which was never likely to arise. The true policy was to go on granting as many annuities as possible, so that in years to come the Council might make the same boast as Mr. Robbins had made to-day that the list was larger than had ever been dreamed of.

Mr. RICHARDSON explained that he had not used the term outsider in any offensive sense. There were some people, he knew, who rather prided themselves on holding the position.

The PRESIDENT said the tendency of the discussion was to try and interest members of the trade who were not members of the Society, by pointing out that the Fund was distributed amongst all chemists and druggists, without distinction.

Mr. SOUTHALL said he was very much pleased with the way in which the Fund was distributed. One ground on which he thought the Council might reasonably appeal to the rich for subscriptions was that it often saved them the necessity of relieving local cases of distress out of their own pockets. All who had served on the Committee knew that every really deserving case was relieved.

The PRESIDENT remarked that one difficulty in dealing with the matter was that this Fund was always termed the Pharmaceutical Benevolent Fund, but it was really a benevolent fund for the whole trade—a Registered Chemists and Druggists' Fund ; though the Pharmaceutical Society did all the work of taking care of and distributing the Fund.

The motion was then put and carried unanimously, and another resolution was passed authorizing the election of six annuitants in December next.

GENERAL PURPOSES.

The report of this Committee included the ususl letter from the Solicitor, stating the progress made with cases placed in his hands. It reported that—

W. E. Pratt, Back Street, Nottingham,
had paid £9 0*s.* 8*d.* penalty and costs.

G. J. Copping, 28, Stockport Road, Manchester,
had paid a penalty and costs into Court.

T. Lightbown, Richmond Street, Accrington,
had admitted his liability for two penalties, payment of which would be made.

The Committee had considered twenty-three cases of alleged infringement of the Acts, and in nine of them recommended that proceedings against the offenders be commenced.

Communication from the Privy Council.

A letter had been received from the Privy Council enclosing a communication from the Coroner for the county of Kent, and asking the opinion of the Council with regard to the advisability of placing laudanum in the first part of the Schedule. The Committee recommended that the President should draw up a reply pointing out the undesirability of doing so.

The memorial from Scotland had been further considered, and the report had been deferred until the next meeting of the Committee.

The PRESIDENT moved that the report and recommendation of the Committee be received and adopted. With regard to the communication from the Privy Council, he might say that the Coroner's jury had formulated a resolution that it was desirable that laudanum should be placed in the first part of the Schedule of Poisons. The sale of laudanum in what appeared to be large quantities was

often brought to the notice of the public in the press, and coroners and juries often made remarks on the subject which showed they were not aware of the difficulties surrounding it. Laudanum was very largely used as a domestic medicine, and the same arguments for leaving it in Part II. held good now as prevailed at the time the Act of 1868 was passed. Quite apart from the question as it affected the chemist and druggist it would be impracticable as well as undesirable to place it Part I.; and if such were the law it would in all probability be constantly broken. The Committee had worked very carefully at the subject of the memorial from Scotland, and considerable progress had been made, but the question was complicated, and as the Committee consisted of the whole Council it was not possible to get a meeting oftener than once a month. There was every probability, however, that the report would be presented next month.

Mr. GREENISH asked if the President would favour the Council with the arguments he proposed to use in his letter to the Privy Council with regard to the sale of laudanum.

Mr. WILLIAMS, who seconded the motion for the adoption of the report, thought it would have been better if the reply had been referred to the Library Committee to prepare, but he presumed the object was to avoid delay. He was glad to find that the Scotch question had been again postponed, as it would, he hoped, give him an opportunity of expressing his views upon it in the Committee.

Mr. BORLAND disapproved of the statement being made that if laudanum were placed in Part I. the law would be constantly broken; at any rate he hoped this would not be stated as a reason for objecting to it.

Mr. ATKINS saw no necessity for the reply to the letter being referred to a Committee.

The PRESIDENT said he should have preferred not to give any reasons at all, but some members of the Committee thought it would be advisable to make a few preliminary remarks before stating their opinion. He proposed merely to write that the subject had been considered from time to time, and it was not considered desirable to place laudanum in Part I.

The motion was then put and carried unanimously.

EXAMINATION FAILURES.

Mr. SYMES brought forward the following motion, of which he had given notice :—

> "That candidates for the Preliminary examination who fail to pass may, on application to the Secretary, be informed of the position they attained in such examination."

He said this was a matter in which he felt some interest, and it had been largely discussed at different times. He had carefully avoided touching on the qualifying examination, because he felt that that was a matter for the examiners rather than for the Council, but it did not occur to him that this particular matter trenched at all on their province. It had, however, been suggested to him that it did, and with a view of meeting that objection he was willing to alter the motion so as to read—

> "In the opinion of this Council candidates should be informed," etc.

and that the matter be referred to the examiners; or, with the consent of Mr. Baildon, who had promised to second the motion, he should be quite content not to press it, if the President would undertake to bring the matter before the examiners.

The PRESIDENT thought this would be the best way. He did not know whether it was expedient to go into any details on the subject, but if Mr. Symes would like to write out any suggestions on the subject he should be glad to lay them before the Board. He believed, however, that Mr. Symes and others who thought that the Board was inconsiderate in this matter were under a misapprehension. The subject had often been before the Board, and without going into details he would just point out that it was extremely difficult to give an account in writing of the reasons for the failure of a candidate which would not convey a false impression. The Board used to try to do it, but it was given up. If a man obtained the requisite total pass number of marks, but failed completely in one subject, it was easy to say so; but if he obtained just the minimum pass number in each, and failed to reach the aggregate necessary to pass, which could you say he had failed in? It had been found by experience that if a man just barely passed, say in Latin and English grammar and failed in arithmetic, if he were informed of this, he came up next time, having worked up the arithmetic and neglected the other two subjects altogether, so that he failed in them.

Mr. SYMES remarked that if the question were to be discussed, he was quite prepared to do so, and he felt certain he should carry the Council with him.

The PRESIDENT said he thought this was really a matter for the Board of Examiners, but as Mr. Symes had read his motion, he merely wanted to say in justice to the Board of Examiners that the present regulations had been framed in the interest of the candidates.

Mr. SCHACHT thought the motion ought to be discussed. It was not right for the President to be the medium of conveying Mr. Symes's wishes to the examiners. If there was anything to convey, it should be the opinion of the Council, and that could only be arrived at after discussion. He thought eventually it would be desirable for the motion to be so modified as to refer the whole matter to the Board of Examiners, but the opinion of the Council should either be taken on the motion, or it should be withdrawn.

Mr. WILLIAMS said he did not wish to discuss the motion, but he would point out that there was no such thing, by law, as the Preliminary examination; what was so termed was really a part of the Minor. The question should be really whether it was desirable that candidates who failed in either the Minor or Major examinations should be informed of the subjects in which they failed.

The PRESIDENT suggested that the motion should run in this form :—"That the advisability of allowing candidates who failed to pass the Society's examinations, to be informed of the position they attained in such examinations, be referred to the Board of Examiners."

Mr. SYMES said he would accept that form willingly.

Mr. ATKINS asked if Mr. Symes desired to restrict himself to the Preliminary. There was just as much desire on the part of the candidates to know how they stood with regard to the Minor.

Mr. SYMES said the examiner could tell the candidate at the Minor examination if he failed in any particular subject, but there was no such opportunity in the Preliminary.

Mr. SCHACHT remarked that this only applied to those candidates who were rejected before going through the whole examination.

Mr. HILLS suggested that the matter should be deferred to next month, when Mr. Symes could give a fresh notice of motion, and the Council would know what it was discussing, which at present it did not. Already the terms of the motion had been changed more than once.

The PRESIDENT saw no necessity for discussing the subject further. It was simply necessary to ask the Board of Examiners for an opinion on the question.

Mr. SCHACHT thought it would be more discourteous to the examiners to discuss the question after they had given an opinion upon it, than before. Would it not be better to refer it first to a Committee to report?

Mr. SYMES said one part of the Minor examination was very largely in the hands of the examiners, but the other part was only nominally so; they never came in contact with the candidates in any way. That was why he thought the original motion did not in any way trench on the province of the examiners.

Mr. SCHACHT thought it was not entirely a question

for the examiners. It was quite right to consult them, but it did not rest with them to decide it.

Mr. BORLAND suggested that the motion be limited to the Preliminary examination.

The PRESIDENT thought it had better remain as it was, so that the examiners might deal with the whole question.

Mr. SYMES pointed out that the examiner might recommend that this information should be given in the case of the Preliminary, but not in the case of the Minor. The real difficulty was this, as was pointed out by Mr. Schacht, if the Board of Examiners vetoed the whole thing, it might seem discourteous to express a different opinion afterwards. He should prefer it being sent with a much stronger expression of opinion from the Council, and should have no objection to defer the matter a month for that purpose, for he had full confidence that the Council would accept the motion.

The PRESIDENT having expressed the opinion that it would be better not to defer the question, the motion was worded as follows :—

"That the Boards of Examiners be requested to consider the desirability of informing unsuccessful candidates for examination, on application, of the position which they attained in such examinations."

Mr. ATKINS seconded the motion in this form without pledging himself to anything further than a desire to know the opinion of the examiners.

Mr. HILLS said he was not prepared to vote at all, not having heard the question discussed. His only feeling was that the examiners, being experts, were the best judges in the matter.

Mr. BOTTLE said he should vote against it, as he had heard no reasons advanced for departing from the present practice.

Mr. BAILDON moved as an amendment :—

"That the Boards of Examiners be requested to consider the feasibility of informing, on application, the candidates for the Preliminary examination of the position they have attained in the examination."

Mr. BORLAND seconded the amendment.

On being put to the vote, the amendment was lost, and the motion as last amended was carried by eight votes to six, the other members present having abstained from voting.

EVENING MEETING.

Wednesday, October 6, 1886.

The first Evening Meeting of the session was held on Wednesday the 6th inst., the chair being taken by Mr. MICHAEL CARTEIGHE, the President, at half-past eight o'clock. The lecture theatre was crowded with students and friends of the Society, a fair sprinkling of ladies being present.

The first business was to receive the reports from the Professors.

REPORT ON THE BOTANY AND MATERIA MEDICA CLASS.

Professor BENTLEY first came forward to report on the Botany Class. He remarked that he had nothing to say different from what he had been saying for nearly forty years on previous occasions, that the conduct of the students entrusted to his care had been uniformly excellent and satisfactory in every respect. There had been three examinations, two for single course men, and one for sessional students. The examination at the end of February had been in every respect satisfactory, there being seventeen candidates, of whom five were entitled to honourable distinction. As the result of the sessional examination a silver medal each had been awarded to two competitors who came out equal, and he hoped the same thing would occur in future. Professor Bentley then mentioned the other prize winners, whose names will be found below.

The following is a list of the awards of medals and certificates to students of this class:—

FIVE MONTHS' COURSES.

FIRST COURSE.

Bronze Medal .....William Phillip Want.

Certificates of Merit ..... Edmund G. Baker. Joseph Grantley Tingle. Equal: Margaret E. Buchanan. Thomas Armistead Ward.

SECOND COURSE.

Bronze Medal ....James John Davies.
Certificate of Merit .....Richard Wilson.

SESSION. TEN MONTHS.

Silver Medal ..... Equal: Edmund Gilbert Baker. Lewis Walter Hawkins.

Certificates of Honour ..... William Phillip Want. James John Davies.

Certificates of Merit ..... Richard Wilson. Joseph Grantley Tingle. Margaret E. Buchanan. George William Hodder. John Birkett.

The following are the questions that were set for these examinations :—

FIRST COURSE.

BRONZE MEDAL AND CERTIFICATES OF MERIT.

Hours from 10.30 *a.m. to* 2 *p.m.*

1. Describe hyphal tissue, and mention the plants where it is found.
2. What are the characteristic peculiarities of structure between a root and a stem?
3. Define the following:—aleurone grains, crystalloids, rhizome, corm, bulb, tuber, tubercule, parasite.
4. Describe generally the structure of the seed, and the mode of germination.
5. Describe the characters of the official Chamomile flowers, and state how they may be distinguished from Feverfew flowers (*Crysanthemum Parthenium*) and those of Wild Chamomile (*Matricaria Chamomilla*).
6. What are the botanical and geographical sources of the official Jalap, and how may it be distinguished both physically and chemically from Tampico Jalap and Woody Jalap?
7. What are the botanical and geographical sources of Serpentary rhizome? Describe its characters and its principal constituents; and mention its official preparations.
8. What are the characters of fresh Colchicum Corm and of the dried official slices? At what time is the corm directed to be obtained; and what are its official preparations?

SECOND COURSE.

BRONZE MEDAL AND CERTIFICATES OF MERIT.

Hours from 10 *a.m. to* 1.30 *p.m.*

1. Describe the structure of the Bark in a Dicotyledonous stem; and that of the so-called bark of a Monocotyledonous plant.
2. Define the following terms as applied to roots and stems:—Tuberculated, conical, fusiform, spine, culm, fasciated, tendril, runner.
3. What do you understand by acropetal and cymose inflorescences? Define a spadix, locusta, panicle, capitulum, cyme, and glomerule.
4. How would you distinguish small fruits from seeds? What is a pseudocarp?
5. What are the botanical and geographical sources of the official Canella Bark? Describe its general and chemical characters, and show how it may be distinguished from true Winter's Bark.

6. What are the botanical and geographical sources of Senega Root? Describe its general and chemical characters, and mention its official preparations.

7. What are the botanical and geographical sources of Alexandrian and East Indian Sennas? Describe their general and chemical characters, adulterations, and means of dectecting them, and enumerate their official preparations.

8. What is Saffron? Mention its botanical source, describe its general characters, and enumerate its official preparations.

SESSION.

SILVER MEDAL AND CERTIFICATES OF HONOUR AND MERIT.

BOTANY.

Hours from 10 *a.m. to* 1.30 *p.m.*

1. Define the following:—Ectoplasm, endoplasm, tonoblast, primordial utricle, sieve-tubes, and vesicular vessels.

2. Define the following:—Fundamental tissue, meristem, xylem, phloëm, phelloderm, and phellogen.

3. Explain the meaning of the terms Respiration, Assimilation, and Metastasis or Metabolism, as applied to Plant-life.

4. What are simple, apocarpous, and syncarpous pistils? Describe the different kinds of placentation, and give plants as illustrations.

5. Distinguish between the circular and imbricated forms of æstivation, and define the following kinds:—Valvate, crumpled, twisted and vexillary.

6. Describe the specimen before you in technical language, and in the proper sequence of its parts and organs.

7. Give the essential characters of the following natural orders, and enumerate the official plants belonging to each:—Cruciferæ, Umbelliferæ, Scrophulariaceæ, Oleaceæ, Polygonaceæ, and Liliaceæ.

MATERIA MEDICA.

Hours from 2 *p.m. to* 5 *p.m.*

1. What are the botanical sources of the official Amylum? Describe the general characters and tests of Starch, and show how the different official varieties may be distinguished under the microscope.

2. What are the botanical and geographical sources of Coca? Describe its general and chemical characters, and enumerate its official preparations.

3. What are the botanical and geographical sources of Oleum Anisi, and in what official preparations is it contained? Give the characters of Star-anise Fruit.

4. What are the botanical and chemical characters of Cherry-Laurel Leaves? Enumerate the official plants of the *Rosaceæ*.

5. Describe the characters and tests of Asafœtida, and mention its official preparations. What are the botanical and geographical sources of Asafœtida?

6. What official drugs are derived from the *Lauraceæ*? Give the characters of Bebeeru Bark.

7. What is the official Ergot? Describe its characters, and enumerate its official preparations, and the dose of each.

REPORT ON THE PRACTICAL CHEMISTRY CLASS.

Professor ATTFIELD, in reporting on the Practical Chemistry Class, said that last year there were seventy students, as against sixty-seven in the previous session, the average period of work being nearly six months, each student working a little over three and a half hours a day. Of the seventy students, fifty entered during the month of October, which was rather a larger number than usual in the first month. The plan which had been adopted for some years of holding tutorial or professorial examinations from time to time had again been followed with most satisfactory results, the object being not only to satisfy the Professor that the students possessed the knowledge they should, but also that they had it in a logical and producible form. These examinations were held throughout the session, and the interest in them was maintained to the last. Thirteen pupils competed for the prizes at the end of the session, when out of a possible 100 marks Mr. Hawkins gained 92, Mr. Baker, 90, and Mr. Wilson, 89; whilst those who came next obtained 79, 72, 70 and 62 respectively. The conduct, attendance and diligence of the class was perfectly satisfactory. If he had any complaint to make of the students it was not with regard to their work in that building, but that they did not take sufficient interest in out-door recreation, and in the cricket and football clubs, over which the President and himself respectively presided. His experience was that those who took part in these games not only did better in the classes, but in the examinations also, than those who held aloof; that they learned better, and with greater ease to themselves, and passed their examinations with greater credit.

The following is a list of the awards of medals and certificates to students in this class:—

SESSION. TEN MONTHS.

Silver Medal	Lewis Walter Hawkins.
Bronze Medals	Edmund Gilbert Baker. Richard Wilson.
Certificate of Honour	Joseph Grantley Tingle.
Certificates of Merit	Charles Ernest Johnson. Peter Lugton. Edward Norton Grimwade.

The following are the questions that were set for this examination:—

Hours from 10 *a.m. to* 5 *p.m. each day.*

(*Books and Memoranda permitted.*)

Standard number of Marks, 100.

FIRST DAY.

1. Name the substances marked A, B, C, D.

2. Ascertain what alkaloid, if any, is present in the "Powder" handed to you.

3. How much real Sulphuric Acid is present in the "Diluted Sulphuric Acid" supplied to you?

SECOND DAY.

4. Examine the accompanying sample of "Nitric Acid" for ordinary impurities.

5. Analyse the sediment in the "Urine."

6. In the specimen of "Tincture" given to you how much alcohol is present?

NOTE.—*Manipulation as well as results will be scrutinized.*

REPORT ON THE CHEMISTRY AND CHEMICAL PHYSICS CLASS.

Professor DUNSTAN, in reporting on the Chemistry and Physics Class, said he had much pleasure in stating in this his first official report that the papers sent in showed a decided improvement on previous years. Mr. Tingle, to whom the silver medal was awarded, wrote one of the best papers he had ever read from a student in that institution. In fact the session was marked by the presence of more than one student of exceptional ability and he was glad to think that these men, who were so well qualified to go further in the application of chemistry to pharmacy, would before long have special encouragement from the Society to do so. It was well to be reminded of the intimate connection which should exist between advanced pharmaceutical education and original investigation. Any subject which de-

pended, as pharmacy did, upon a particular branch of science, should include in its system of education original investigation. This was the proper method of technical education; first teach the principles of the science, then show the student how to apply them. But the application could only be truly learned through original investigation, for by that means only did a man obtain sufficient grasp of his subject to enable him to promote its growth and development. This scheme of education the Council had wisely decided to complete, and he had no doubt the result would be the further advancement of scientific pharmacy by a well trained body of men who were also pharmacists. It must not be thought for a moment that he was dissatisfied with the students; on the contrary, what they did they did very creditably, and he agreed with Professor Attfield that if any error was made it was in working too hard. But however high the lecturer might place his aim, the standard of the average student, and too frequently of the more promising student, remained unaltered, that standard being the examinational one. This standard was very well as far as it went, but when it took complete possession of the student's mind he had no hesitation in saying that the result must be in the long run demoralizing. This was the danger to which the students were exposed and which he thought he was right in saying the Council had decided to do its best to avert. He concluded by reading the names of the successful candidates.

The following is a list of the awards of medals and certificates to students in this class :—

FIVE MONTHS' COURSES.

FIRST COURSE.

Bronze Medal .....Joseph Grantley Tingle.

Certificates of Merit.....William Phillip Want. Thomas Griffiths. Wilfred Francis Southall. Edmund G. Baker.

SECOND COURSE.

Bronze Medal .....Richard Wilson.

Certificates of Merit .....Leonard Wright Williamson. Albert Paul Ridley.

SESSION. TEN MONTHS' COURSE.

Silver Medal .....Joseph Grantley Tingle.

Certificates of Honour .....William Phillip Want. Edmund Gilbert Baker. Lewis Walter Hawkins. Richard Wilson.

Certificate of Merit .....John William Bostock.

The following are the questions that were set for these examinations:—

FIRST COURSE.

BRONZE MEDAL AND CERTIFICATES.

Hours from 11 *a.m. to* 3 *p.m.*

1. Show how oxygen may be prepared from water, carbon from carbon dioxide, sulphur from hydrogen sulphide.

2. Discuss the evidence for the statement that the molecules of hydrogen and chlorine contain two atoms respectively.

3. Explain the term "dissociation." Give examples.

4. Describe fully the electrical and chemical changes which occur in (i.) the voltaic cell, and (ii.) the electrolyte during electrolysis.

5. Describe the reactions of ethyl alcohol and contrast them with those of potassium hydrate.

6. How does nitric acid react with (i.) phosphorus; ii.) iodine; (iii.) tin?

7. What is the nature of "fluorescence?" Give an instance of a fluorescent liquid and solid.

SECOND COURSE.

BRONZE MEDAL AND CERTIFICATES.

Hours from 10 *a.m. to* 1 *p.m.*

1. Show how the properties of Nitrous Oxide differ from those of a mixture of nitrogen and oxygen in the same proportions.

2. Explain the meaning of the terms "oxidation" and "reduction." Illustrate by examples.

3. How may Ozone be prepared? What are its properties and constitution?

4. Compare the properties of ethyl alcohol with those of sodium hydrate and of phenol.

5. Describe precisely how you would determine the specific gravity of a specimen of finely powdered milk sugar.

6. What is the explanation of the "fluorescence" of an acid solution of quinine sulphate?

SESSION.

SILVER MEDAL AND CERTIFICATES OF HONOUR AND MERIT.

PART I.—CHEMISTRY.

Hours from 10 *a.m. to* 1 *p.m.*

1. The atomic weight of a metal is 52. It forms three oxides which contain respectively 76·47 per cent., 68·42 per cent. and 52 per cent. of metal. Calculate the formulæ of these oxides and identify the metal.

2. Explain the action of the test given in the British Pharmacopœia for impurity in *Hydrargyrum cum cretâ* and state the origin of the impurity.

3. Trace the similarities and dissimilarities between the reactions of alcohols and ethers on the one hand, and of metallic hydrates and oxides on the other.

4. Formulate the action of oxidizing agents and of ammonia on ethyl iodide, acetic aldehyde, chloral hydrate, benzoic aldehyde.

5. Explain fully the principal reactions which occur during the preparation of Spirit of Nitrous Ether. What is the composition of the liquid, and how is it tested?

PART II.—CHEMICAL PHYSICS.

Hours from 2 *p.m. to* 5 *p.m.*

1. Describe the principles involved in the liquefaction of the so-called permanent gases.

2. Enunciate the law of Dulong and Petit. The specific heat of a metal is ·114. Calculate the atomic weight.

3. Describe the construction of a polariscope and the mode of using it.

4. Discuss the statement that "the properties of the elements are periodic functions of their atomic weights."

5. Describe the construction and chemical action of Grove's voltaic cell. Upon what does the strength of the current depend, and how may it be measured?

The PRESIDENT then presented the prizes and certificates awarded in the above classes to those of the successful students who were present; and also copies of 'Pharmacographia' and the 'Science Papers' of the late Daniel Hanbury, the gift of Mr. Thomas Hanbury, to the winners of the Silver Medals.

THE HERBARIUM PRIZE.

Professor BENTLEY next reported on the Practical Botany or Herbarium Prize competition, complimenting the winner of the silver medal especially on the excellence of his work, which showed him to have a thoroughly practical appreciation of the difficulties of botany. He had often noticed that those who obtained these prizes afterwards came forward as the winners of further honours, and he had no doubt it would be so in the present case.

Silver Medal .....Cuthbert Henry Jones Lockyer.

Bronze Medal .....Charles Gartside.

Sessional Prizes.

The President having stated the nature of the Pereira and Council Medals, and referred to the prize of books added by Mr. Thomas Hyde Hills,

Mr. Gale briefly reported on the examination which he had conducted with Mr. Corder, there being eleven candidates.

These prizes had been awarded as follows:—

PEREIRA MEDAL (SILVER); and Books value £5 presented by Mr. T. H. Hills.

Edmund Gilbert Baker.

PHARMACEUTICAL SOCIETY'S MEDAL (SILVER); and Books value £3, presented by Mr. T. H. Hills.

Edward Ernest Morrall.

PHARMACEUTICAL SOCIETY'S MEDAL (BRONZE); and Books value £2, presented by Mr. T. H. Hills.

Alan Douglas Markham.

The following are the questions that were set for this examination:—

BOTANY AND MATERIA MEDICA.

Time: 10 *a.m. to* 1 *p.m.*

In framing Answers, Candidates should not enlarge upon the Questions, but should confine themselves to giving, as briefly and clearly as they can, the information required.

MATERIA MEDICA.

1. What is Cocaine? Give an account of its mode of preparation.
2. Write a short account of Barbadoes Aloes and its mode of preparation.
3. What is the chemical difference between Oak Bark and Elm Bark?
4. From what source are Eserine, Terebene, Thymol and Menthol obtained?

BOTANY.

1. What is Phylotaxis? and give some examples.
2. What is development in plants and how is is to be distinguished from improvement?
3. What are so-called insectivorous plants and by what means is it supposed that they digest animal food?
4. Some plants, such as Mimosa, are sensitive; what is the cause and what vessels take part in the action?

CHEMISTRY.

Time: 2 *p.m. to* 5 *p.m.*

Decompositions should be expressed by means of Equations, as well as by a concise Summary of the leading results of the changes.

1. What is Fermentation? Describe the principal forms with which you are acquainted.
2. Explain the phenomena of Endosmose and Exosmose as applied to Liquids and Gases.
3. Give a short account of the following:—
   Hydroquinone.
   Iodol.
   Paraldehyde.
   Resorcine.
   Saccharine.
   Urethane.
4. How are Succinic, Malic and Tartaric Acids prepared? What relation do they bear to each other and in what do they differ?
5. Give a sketch of Victor Meyer's methods for the determination of vapour density.
6. How would you examine a specimen of Copper Pyrites, so as to determine its composition?

Jacob Bell Scholarships.

Mr. Bowen then reported on the examination conducted by Mr. Blunt and himself for the Jacob Bell Memorial Scholarships. He congratulated the Council on the number of candidates who came forward last year, thirty-two, the largest ever known, and this year thirty, which showed that these valuable prizes were appreciated, and a large amount of good work must have been done in preparing for them. The papers of the successful men were of a very high order, whilst many of the unsuccessful ones did extremely good work, and were well deserving of scholarships, if they had had them to bestow. This led him to express the hope that the day might not be far distant when more scholarships would be offered for competition, and he thought it would not be very long before there was one founded in honour of a man who had done so much for the advancement of pharmaceutical education, Professor Redwood. The successful competitors were—

Edmund White.
Arthur Smith.

The following are the questions that were set for this examination:—

Hours 11 *to* 2.

In awarding marks the neatness and legibility of the writing will be taken into account.

In framing Answers, Candidates should not enlarge upon the Questions, but should confine themselves to giving, as briefly and clearly as they can, the information required.

LATIN.

* 1. Translate into English:—

Haud tamen audaci Turno fiducia cessit
Litora præcipere, et venientes pellere terra.
Ultro animos tollit dictis atque increpat ultro;
"Quod votis optastis adest, perfringere dextra.
In manibus Mars ipse viris. Nunc conjugis esto
Quisque suæ tectique memor; nunc magna referto
Facta, patrum laudes. Ultro occurramus ad undam.
Dum trepidi, egressique labant vestigia prima,
Audentes Fortuna juvat"
Hæc ait, et secum versat quos ducere contra,
Vel quibus obsessos possit concredere muros.

* 2. Give present, perfect, infinitive, and supine of *cessit, pellere, tollit, referto, egressi, obessos.*

3. Translate into Latin:—
   "To be rubbed into the right knee every night."
   "The plaster, to be placed on the left hip."
4. Write in unabbreviated Latin:—

R. Oxymel. Scil.	℥ss.
Tr. Camph. Co.	℥iii.
Vin. Ipecac.	♏.lxxii.
Aq. Destillat. ad	℥jss.

M. ft. Linct. s^{t} coch. i. min. ter. 4 terve in die, tuss. urgent.

And translate the directions.

ENGLISH.

Write a short essay on "Coal," or "The Art of Printing."

ARITHMETIC.

1. How many cubic inches are there in 5·5 metres cube (a metre is 39·37 inches).
2. Simplify $\frac{3}{5}\frac{4}{9}\frac{0}{6}\frac{6}{5} \times \frac{4}{6}\frac{5}{7}$ divided by $6_1\frac{5}{4}\frac{}{3} \times \frac{9}{1}\frac{}{3}$ and express the result when obtained as a decimal to the fourth place.
3. Represent 9·3649 as a vulgar fraction.
4. What is the value of 8 tons 2 cwt. 1 qr. 7 lbs. at £8 3*s.* 4*d.* per ton.

FRENCH.

Translate into English:—

Dans cette chambre, à peine eclairée par la faible lueur d'une lampe vacillante, on n'entendit plus de bruit que

* As these two questions did not come within the conditions of the examination no marks were awarded in respect to them.

celui de la respiration irrégulière du mourant, la prière monotone du prêtre, et le vent des Alpes qui murmurait entre les barreaux de la fenêtre.

Deux fois seulement le son d'une voix humaine sembla s'y meler. C'était le *qui vive* d'une sentinelle, lorsque Ludovic passa et repassa près de la poterne, se rendant à son logis, puis revenant a la chambre du malade.

Une demi-heure à peine s'etait écoulée quand son vieux compagnon de veillée le vit reparaitre, tenant à la main un pot rempli d'une liquide fumante. . . .

Et en parlant aussi il transvasait une partie du liquide dans une tasse, la balancait et soufflait dessus pour en tempérer la chaleur ; et quand il crut la potion à son point, il la fit prendre presque de force à Charney, tandis que le prêtre lui soutenait la tête.

GERMAN.

Translate into German :—

London is a very large town. I have bought a beautiful garden for my children. We have had clear days but dark nights. We cannot see all the numberless stars. Henry was to-day more industrious than yesterday ; he will be the most industrious to-morrow. They went away from here at four o'clock. He often visited us formerly. They entered (in) the wood and soon perceived the habitations of men. I do not know the man whom you are speaking of. The first battle (which) they fought was with the Saracens. I did not know who it was.

Hours (3 to 5).

CHEMISTRY AND PHARMACY.

1. Under the characters of Glycerine, B.P., it is stated that "its solution is not affected by (1) Nitrate of Silver ; (2) Sulphydrate of Ammonium ; (3) Oxalate of Ammonium ; (4) Shaken with an equal volume of Sulphuric Acid no coloration, or only a very slight straw coloration, should result." State to what four substances the above tests refer.

2. Describe the method of making Tartaric Acid, B.P., giving equations illustrating the same.

3. Give the formulæ for the following Salts :—Iodide of Sodium, Red Iodide of Mercury, Calomel, White Precipitate, Bicarbonate and Bichromate of Potash.

4. How would you prepare the solid and fluid Extracts of Taraxacum, B.P. ?

5. Define briefly Percolation, Maceration, and Decoction, and state what you understand by the term—"No. 20 Sieve."

BOTANY.

1. Define Monœcious, Dicœcious, Gynandrous, Monadelphous, and Syngenesious.

2. Describe the following inflorescences :—Capitulum, Cyme, Raceme, Panicle, and Scape, giving familiar examples.

THE PETER SQUIRE PRIZE.

The PRESIDENT, having presented the books given by Mr. Hills to the winners of the Bell Scholarships, stated the result of the examination for the Peter Squire prize, which had been conducted by Mr. Corder, who was unfortunately not able to be present. There were ten papers received from London and four from Edinburgh, and Mr. Corder stated that he had never had the pleasure of examining a better paper than that of the successful candidate,

Edmund Gilbert Baker.

The following are the questions that were set for this examination :—

Three hours allowed for this paper.

In framing Answers, Candidates should not enlarge upon the Questions, but should confine themselves to giving, as briefly and clearly as they can, the information required.

1. What functions does cellular tissue perform ?

2. How are roots produced ?

3. What parts of the plants secrete (1) Gum, (2) Resin, (3) Essential Oil.

4. What affinity has the flower with the branch ?

5. Describe the specimen before you in technical language, giving the genus and natural order.

6. Give the genus and natural order of the six plants, 1 to 6.

7. Most fruits which are acid when immature, become sweet when ripe. Account for the change.

8. What are Hybrids and how are they produced.

9. Mention the chief food of plants, and the sources from which they are obtained.

10. What is (1) Xylem, (2) Phloëm, and in what parts of the plant are they found ?

THE INAUGURAL ADDRESS.

Sir HENRY W. ACLAND, K.C.B., etc., then delivered the Inaugural Address, which will be found at p. 285.

At the conclusion of the Address,

The PRESIDENT said he would ask Mr. Bosisto, a former student and member of the Society, past President of the Pharmaceutical Society of Victoria, and member for Melbourne in the Victoria Legislature, to propose a vote of thanks to Sir Henry Acland.

Mr. BOSISTO said it was not often the lot of anyone, after forty years' absence from his native land, to have the honour of proposing a vote of thanks for such an address as they had just listened to, and it was to him one of the greatest pleasures he had had since visiting England after so many years' absence. It was very gratifying to hear gentlemen of mature age come before a Society like that, to tell young men how best they might pursue their studies in science, and how to avoid the dangers which lay before them. It was well for young men to bear in mind that older men, like the distinguished author of the able, thoughtful and instructive address they had just heard, possessed a knowledge which should be listened to, and he trusted the young men he saw around him would diligently study this address, and follow its teachings, in order that they might become proficient in all those branches of knowledge which, as they had heard, were essential to the progress of scientific pharmacy and medicine. He was very proud to be present that evening to see and hear what was being done for the benefit of the rising generation, but it was also very satisfactory for him to be able to say that there were also men in distant climes, though under the British flag, who were pursuing the same course. In Australia pharmacy was coming to the front, and young men were to be found earnest and diligent in work, and also as fond of fun and frolic as young men ought to be. Athletic sports were encouraged there the same as in England, and with the same object, that the young men might lay up such a store of health and energy as would enable them to become in riper years, industrious, hard-working men of business and of science. The race of life was as keen in Australia as at home, and it was only the diligent, sober, attentive and industrious who came to the front, and were able to obtain a dignified position. If he never again had the opportunity of addressing young men in the Pharmaceutical Society, he would say to them, being now over sixty years of age, that he was once a student in that Society, and whatever knowledge he had attained

since, he owed in a great measure to the Society. He hoped it would continue to send forth young men to Australia and the Colonies who would do their work in time to come in as efficient a manner as those who were his fellow students forty years ago. He proposed a most cordial vote of thanks to Sir Henry Acland.

Professor Burdon Sanderson had much pleasure in seconding the motion. Although he had often heard his friend, Sir Henry Acland, address various audiences on subjects connected with the object he had so much at heart, and for which, during his long life, he had accomplished so much—subjects connected with the advance of medicine—he had never heard him deal with the difficult questions connected with the progress of pharmacy and the progress of medicine in a more able and interesting manner than on the present occasion. With reference to the progress of pharmacy they all felt what an extremely difficult matter it was; in the midst of the daily obligations they had to acquire practical technical knowledge, and at the same time to work in such a way as to advance the subject in which they were interested. Doctors and pharmacists were all working in the same direction, they all looked forward to the same result, and they had to work by the same scientific methods. They must all be, as Sir Henry Acland had taught them, not only naturalists, but also physiologists, and acquainted with chemistry, and the resources of all those sciences must be brought to one centre, the advancement of knowledge of the means by which they could further their great object, the relief of human suffering. He could not help congratulating the Society on the admirable address which they had heard, and most cordially seconded the motion.

The resolution having been carried by acclamation,

Sir Henry Acland in acknowledging the vote of thanks said he had only two remarks to make. He was deeply sensible of the honour conferred upon him by Mr. Bosisto, and by his distinguished friend and adviser, Professor Burdon Sanderson, but, above all, he thanked the young men present for the sympathy and kindness with which they had received his remarks, which in the outset at all events must have been somewhat tiresome. He thanked them especially for that which was most precious to the old—and happy the young if it was most precious to the young also—the sympathy for what they believed to be an honest effort to advance their own good, and the progress of human knowledge.

Provincial Transactions.

NOTTINGHAM AND NOTTS CHEMISTS' ASSOCIATION.

On Friday, October 1, the associates of the above Society held their annual *soirée* at the rooms of the Sunday School Institute, Shakespeare Street. The Council was represented by Mr. Councillor R. Fitzhugh, J.P., President, and Mr. A. Middleton, Hon. Sec. There was a numerous attendance of associates, who were not slow in doing ample justice to the good things provided both for mind and body. Various specimens of interest to the chemist were exhibited, amongst them being some kindly lent by Professor F. Clowes and Professor Blake, of the Nottingham University College, and by Mr. W. Widdowson and Mr. A. Rogers.

During the evening the President announced that the Council had made arrangements with Professor Blake, M.A., F.G.S., for the associates to study botany at the College on Tuesday evenings from 7.30 to 9.30 p.m. The President also stated that the social meeting would be continued as usual during the coming winter on Friday evenings under the superintendence of Mr. W. Gill. Subject:—The British Pharmacopœia.

A very enjoyable evening was spent, the associates showing their appreciation of the efforts made on their behalf by careful examlnation of the objects before them.

A vote of thanks to the President and gentlemen who had contributed to the enjoyment of the evening brought the meeting to a close.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Tincture of Strophanthus.

Sir,—In the discussion at the British Pharmaceutical Conference upon the proposed formulary Mr. Symes specially pointed out the need of a formula for tincture of strophanthus. As we have so far manufactured the only commercial tincture of strophanthus in this market we beg to say that its formula and composition are not secret in any sense. We have heretofore operated upon large quantities of the strophanthus; but the proportions for a small quantity would be two and a half ounces of the prime seeds deprived of fat by means of ether, and then percolated with rectified spirit until one pint of tincture is obtained. The solution of fat in ether is of course rejected, as so far it has not been found of any use, and naturally interferes with making a clear solution of the tincture in water. All unripe, imperfect seeds, and all but full-grown pods, should be rejected, as they are very deficient in active principle. We are indebted to Professor Fraser, of Edinburgh, whose long continued experiments with strophanthus have led to its introduction in medicine, for the above formula.

Burroughs, Wellcome and Co.

Snow Hill Buildings, London, E.C.

The Unofficial Formulary.

Sir,—I am induced by the discussion now going on in reference to the above matter to propound a scheme which, some twelve or eighteen months ago, I placed under the notice of some of my pharmaceutical friends—and which they urged me to publish. The idea is that the Pharmaceutical Society should appoint a committee of practical pharmacists which should issue quarterly a pamphlet containing the new remedies in something like the following manner:—If a chemical, its method of manufacture, tests, dose and therapeutic action, its solubility, and the most effective and elegant manner of compounding it. If the substance be a drug, its origin and its conversion into some condition (extract or tincture, etc.) might also be given.

These would then be official preparations and at the end of a period of years, when a new B.P. is demanded, these quarterly pamphlets would be a fairly good means of showing what preparations had stood test of time and were duly qualified to be incoporated in the national Pharmacopœia.

I am fully aware this idea does not overcome the *nostrum* difficulty, but it may possibly be of some use now that the subject is being so fully ventilated.

Harrogate. John H. Mather.

A. B. C.—Rhamnus catharticus.

"*Marking Ink.*"—A recipe for an aniline marking ink given in the *Apotheker Zeitung* some time since, was—1·74 grams of aniline black rubbed up with 60 drops of hydrochloric acid and 42 grams of alcohol, the resulting liquid to be diluted with a hot solution of 2·5 grams of gum arabic in 170 grams of water.

Communications, Letters, etc., have been received from Messrs. Lucas, Davies, Martin, Rehm, Thompson.

THE COLONIAL AND INDIAN EXHIBITION AT SOUTH KENSINGTON.

JAMAICA—*continued.*

Perfumery is represented by two or three exhibits, which do not, however, include such a variety as might have been expected from the number of plants in the island capable of yielding essential oils and perfumes. It is consequently interesting to learn from the official catalogue that Colonel Talbot, of Worthy Park Estate, is about to establish a flower farm, and to extract perfumes, this being the first attempt of the kind that has been made in the island. The essential oils exhibited by Mr. Schaarschmidt include those of lemon, sweet and bitter oranges, pimento berries and pimento leaf (oil of bay); also spirituous perfumes derived from *Bonplandia*, *Canella alba*, red muskwood and rosewood. Pomades made with tuberose and jasmin flowers are also shown by the same exhibitor. The essential oils prepared by Mr. J. J. Bowrey, the Government analytical chemist, comprise, in addition to the above, the essential oils of *Eucalyptus globulus*, lemon grass, *Juniperus Bermudiana*, *Critonea Dalea*, *Hedyosmum nutans* and *Micromeria obovata*. Ylang-ylang fruits are shown, but no specimen of the oil.

A specimen of aloes presenting the appearance of inferior Curaçoa aloes, rather than of Barbadoes aloes, is shown by the Botanical Department. In this instance, and in many others throughout the Exhibition, it is evident that want of attention to appearance is one of the reasons that colonial products do not satisfy the requirements of commerce.

Large quills of cinchona bark are exhibited by the Botanical Department and Dr. Heaven, including *C. officinalis*, *C. Ledgeriana*, *C. succirubra*, a hybrid (*C. robusta* ?), accompanied by herbarium specimens of these trees and of *C. micrantha*, *Calisaya verde* and *Calisaya morada*.

The *C. succirubra* bark grown in Jamaica appears to have quite a different character to that cultivated in the East Indies, in not possessing the warty character of the latter, which is seen also in the South American *C. succirubra*. According to Mr. D. Morris, *C. Calisaya* was not rightly distinguished at the Government plantations in Jamaica until 1881, being included under *C. officinalis*, to which it bears some resemblance in the shape of the leaf.

Some very fine specimens of honey, both liquid and solid, are exhibited, the former by Mr. C. Gordon, and the latter by Mr. J. W. Aikman; both specimens are of good colour and fine flavour. This Court should not be left without noticing the beautiful ornamental articles exhibited by the Women's Self-Help Society, including baskets made of the luffa fruits, and of various seeds (*Leucæna glauca*, *Abrus precatorius*, *Adenanthera pavonina*, and *Coix lachryma*, etc.). The articles made of lace bark (*Lagetta lintearia*), and of the beautiful white tissue of the dagger plant (*Yucca aloifolia*), which is even more elegant than the celebrated rice paper of the Japanese, have been much admired, and would doubtless sell readily in this country. Probably the bright coloured seeds would also find a ready market in Roman Catholic countries for rosaries.

TRINIDAD.

Sugar, molasses, rum, cocoa, coffee, and cocoa-nut oil are the chief products of Trinidad, in common with other West Indian Islands, but there is one, viz., asphalt, that may be considered as peculiarly its own. This is obtained from the celebrated pitch lake, which is about ninety-nine acres in extent, and is covered with bitumen, several specimens of which are exhibited. The variety known as "lacquer pitch," has a remarkably brilliant appearance, almost like jet. It would probably be useful for varnish and lacquer. Citrate of calcium, exhibited by Mr. P. Stevens, is said by Mr. McCarthy to bear transport without the loss of citric acid, which usually takes place with crude citrate of calcium and lime juice. Some essence of limes, exhibited by Mr. C. A. Fabien, side by side with the limes from which it is prepared, explains the fact that oil of limes from Trinidad (*Pharm. Journ.*, [3], xiv., p. 1005) has a flavour of lemon, while chemical tests give results indicating that it is oil of limes. It now appears that the fruit used is a hybrid intermediate in shape and characters between the lime and the lemon. Mr. Fabien also exhibits excellent specimens of honey and of yellow beeswax.

Several products from this island are identical with those from British Guiana, such as balata, locust gum and crab oil. Among the better-known drugs from Trinidad may be mentioned castor oil, guaiacum, logwood, tous les mois, arrowroot and canella bark. A collection of the medicinal plants and roots of the island is shown by Messrs. Ardila and Dummett, including: "Semen contra," evidently *Chenopodium ambrosioides*, a well-known anthelmintic, used also both in the United States and in Brazil; "Liane tasso," consisting of the young branches of *Schnella excisa*, possessing considerable astringency, employed as a specific in diseases of the kidneys; "Manioc chapelle," the root of *Entada polystachya* and other species—contains saponin and makes a lather with water, like that of *E. scandens*—it is generally prescribed in syphilis; "Fruita de Burro," the seed vessel of *Xylopia salicifolia*, Kth.—it is used as an aromatic bitter stimulant; "Gully root," or "stinkweed," the root of *Cassia occidentalis*, is employed as a diuretic in cases of dropsy; "Guatamare" is the pod of *Myrospermum frutescens*—it is very commonly used as a carminative and stomachic in Trinidad, and a tincture is also used externally to relieve pain. When the bark is incised a balsam exudes said to be indistinguishable from balsam of tolu in appearance.

The Botanical Gardens exhibit vegetable ivory nuts, mace, nutmegs, nux vomica seeds, and coca leaves. Nine varieties of tanning substances are shown by Mr. F. J. Hill. Of these the dividivi pods have been found to yield 65·08 per cent. of tannin. A remarkable product, labelled "Cedar gum," is shown by the Rev. J. Morton in the form of long transparent tears. When dissolved in water it makes an enormous quantity of thick mucilage, deficient in adhesiveness, but forming an excellent size, like Japanese isinglass. It is probably obtained from the bastard cedar (*Guazuma tomentosa*), and seems worthy of further examination.

The excellent arrangement of the exhibits in this Court is due to the personal superintendence of the Assistant Commissioner, Mr. McCarthy, who, as a resident in the Island, and Government chemist, is well acquainted with the products and has been able to arrange them in the best manner possible.

Balata is probably worth more attention than it has hitherto received in this island. More than ten years ago attention was directed to the develop-

ment of this product by Mr. J. J. Day.* The tree, according to his statement, exists in large numbers on the north and east coasts of Trinidad and is also scattered about in the forests in all parts of the island. It appears to differ from the Demerara tree in bearing a larger fruit. Mr. Day states that a tree, by the ordinary method of tapping, yields between one and three pounds of balata, but if felled and ringed will yield from twenty to fifty pounds of the dried product. He has found that the best method of drying the milk is to evaporate it, when strained, in leaden trays fitted into wooden boxes, a space of an inch and a half being allowed between the lead and the wood to permit of the introduction of steam (at 100° C.). In about an hour and a half the milk becomes dry ; it is necessary, however, to stir it constantly during the evaporation to prevent the formation of a film. After exposure to the air for two or three days it becomes hard and of a pink colour. Vessels of iron and tinned iron injure the colour of the balata ; and the product prepared by the addition of chemicals, such as alcohol or alum, does not possess such valuable properties as the milk simply evaporated.

St. Lucia.

In this Court also, although a small one, there are many articles of interest to pharmacists. Very fine pods of *Cassia Fistula* may be observed, and fennel seed (under the name of anise); also ginger, nutmegs, musk seed, black pepper of good quality, cacao butter and gommier resin. The cinnamon bark in large thick curved pieces, of coarse texture, but rich in volatile oil, is very superior in aroma to the cinnamon in the other West Indian Courts, and would probably answer well for the distillation of the volatile oil or for use in mixed spice. Logwood forms one of the articles of export from St. Lucia, but the trade in this product has declined from 1724 tons in 1880, to 217 tons in 1884. Vanilla and nutmegs are produced in the island, but the specimens exhibited are not satisfactory. Among the oils exhibited are shark oil, whale oil, nayé oil and tête chien oil and the essential oils of pimento, orange and lemon.

Barbadoes.

The name of Barbadoes is generally associated, by druggists, with aloes and ginger, but neither of these form conspicuous objects in the Barbadoes Court. Specimens of Barbadoes tar, *i.e.*, green or crude petroleum, are exhibited by Sir George Chambers. This tar is stated to be used as a lubricator for heavy machinery of slow action. Some fine blocks of infusorial earth, or Barbadoes tripolite, consisting almost entirely of fossil *Polycystina*, are shown by the same exhibitor, and a series of microscopic slides of the different species found in it by Mr. J. B. Harrison, B.A., Professor of Chemistry in the island. The practical use of this substance is as a non-conductor of heat, and hence it is employed for packing around steam or hot-water pipes, boilers, etc. At the recent exhibition at Birmingham, specimens of packing, made of an infusorial earth mixed with a sort of glass wool, manufactured from furnace slag, were shown. Several specimens of rock, recently discovered on Oxford Estate, St. Peter's Parish, and stated to contain nearly 70 per cent of phosphates, may be seen in this Court. A very interesting series of specimens, illustrating how these phosphates are formed in the coral rock, is shown by Mr. H. E. Thorne, of the Antilles Manure Works.

In the opinion of Mr. George Hughes,* the deposit of Aruba phosphate in the island of Barbadoes, which is estimated to contain not less than 500,000 tons, has been formed from a superincumbent layer of guano, the carbonate of lime of the coral reef having been changed into phosphate by the soluble phosphate washed out of the guano by the rain, etc. The guano has, however, now disappeared. The structure of the coral rock is seen to be perfectly retained, although the chemical change that has taken place is shown in the presence of phosphate of lime to the extent of 76 per cent. The Sombrero phosphate from Sombrero Island owes it origin to another cause, viz., the direct marine deposit of bone, and another deposit in the island of Barbuda to the excrement of bats in the bottom of caves. These deposits form a valuable manure for the sugar estates.

Comparatively few specimens of materia medica are shown in this Court. Cinnamon bark, in coarse quills, ginger and black mustard seed are noticeable among the exhibits ; also a series of volatile and fixed oils, the latter including shark oil, both raw and clarified, and raw and boiled menhadden oil. The essential oils are those of orange, lime, citron, shaddock, lemon grass, geranium and bay leaf (*Pimenta acris*). The specimens of dried vegetables, including yams, eddoes, sweet potatoes, ochro and plantains are excellently dried and would probably form a valuable vegetable diet for use on shipboard.

Grenada.

This island is remarkable for the great number of fruits that it can grow. These are well represented by a fine collection of specimens preserved in liquid, which present a more natural appearance than any others in the whole Exhibition. The beautiful crimson colour of the mace is as fresh as if the nutmeg fruits were just picked, and the cola nuts, cloves, tamarinds, etc., would do credit to any museum. Capsicums, cardamoms and honey are other pharmaceutical products shown in this Court. A beautifully white specimen of "gum elemi," from the mountain gommier tree (*Amyris balsamifera*), and a similar, but coarser, specimen from the gommier tree (*Bursera gummifera*), are remarkable for their close resemblance to Manilla elemi in appearance, but do not possess the peculiar fennel-like odour of the latter. The finer specimens of this oleoresin appear to be used generally in the West Indies for incense and the coarser and dirtier pieces for torches. Some experimental specimens of india-rubber from *Ficus Radula* and *Artocarpus incisa* are shown, but these are too little elastic and too resinous to be classed under india-rubber. The seeds of *Cassia occidentalis*, or "negro coffee," are here shown under the suggestive name of chicory seeds. The ipecacuanha root in this Court is not, as the exhibitor appears to suppose, true ipecacuanha, but the root of *Asclepias curassavica* ; this drug has occasionally been sent to the London market under the name of ipecacuanha. The extract of cashew nut (*Anacardium occidentale*), being rich in tannin and being derived from the same natural order as the sumach, might probably find a use in tanning.

* Proc. Scient. Assoc. of Trinidad, vol. ii., No. 2, p. 57.

* *Quart. Journ. Geol. Soc.*, Feb., 1885, p. 80.

St. Vincent.

Several interesting exhibits are shown in this Court. There are fine specimens of nutmegs preserved wet, and of dried nutmegs and mace, and less satisfactory samples of cinnamon, turmeric dried in slices, ginger, and cloves; also black pepper, cayenne pepper and mustard. A number of specimens of tapioca, starch, and of arrowroot are shown; a jar of the rhizome of the latter, preserved wet, is in excellent condition, and gives a good idea of its appearance when fresh. The fibre left after grating the rhizome is shown as a paper material. It is a light, clean short fibre that would probably answer well for stuffing or packing purposes.

The nutmeg appears to be a favourite preserve in the island, nutmeg jam and nutmeg jelly and the fleshy coat of the nutmeg preserved in syrup and also candied, being shown. The fact that papaw chips are used as a substitute for citron, suggests that the digestive properties of the fruit might thus, if preserved in the candied state, be usefully employed in the culinary art.

The oils exhibited include whale, porpoise, and shark oil, cocoanut oil, castor oil, and groogroo oil (*Acrocomia sclerocarpa*). The oil of the last-named fruit, which is also shown in other Courts, is white, solid, and free from any very marked odour or taste. Oil of lemon grass is also prepared in the island.

The specimen of gommier resin is very white and pure, even more so than those exhibited from Grenada. It is surprising that the volatile oil of so fragrant an oleoresin does not seem to have been prepared.

The specimen of golden apple gum exhibited is of a dark colour, and does not give a satisfactory mucilage.

The tanning barks exhibited include pomegranate, guava, iron wood, Spanish ash, or red oak bark, grape bark (*Coccoloba uvifera*) and shoemaker bark. A specimen of the pomegranate bark, examined by Mr. W. N. Evans, of Bristol, was found to contain 28·16 per cent. of tannin, and another bark, named "garde rhume," apparently used in catarrhal discharges, was found by the same authority to yield as much as 42·76 per cent of tannin. This bark is, however, according to Mr. Evans, of too deep a brownish-red colour to be acceptable in ordinary tanning.

The "shoemaker bark" contains 55·695 per cent. of tannin, and also gives a remarkably bright red colour.

Noyeau bark and leaves (*Cerasus sphœnocarpa*) (see *ante*, p. 245) and sapote seeds (*Lucuma mammosum*) are used as flavouring agents, both communicating a flavour resembling that of bitter almonds to liqueurs, etc.

The purely medicinal products shown include quassia, fennel seed (labelled anise), red sarsaparilla (*Bromelia karatas*), very different in colour and appearance from the root of *Smilax officinalis*, but used for the same purposes; and olivier bark (*Chuncoa obovata*), used like ipecacuanha in dysentery, for which disease small doses are given in the form of powder or infusion; large doses have an emetic action.

"Snake wood," presumably derived from *Rhamnus colubrinus*, the bark of which has a pleasant, bitter taste, is said to be used in the preparation of a native drink known under the name of "Mabie." An article in this exhibit which seems likely to prove capable of commercial development is a kind of puzzuolana, of which the hills of the island are largely composed, and which mixed with lime forms a firm hydraulic cement when used under sea water.

"Eyebright" (*Euphorbia maculata*) is employed as the nearly allied species, *E. pilulifera*, is in Australia, viz., as a sedative for cough.

A decoction of the leaves of the hog plum (*Spondias lutea*) and pigeon pea (*Cajanus indicus*) with salt is used as a gargle for sore throat. The red sap of the blood wood (*Laplacea Hœmatoxylon*) is painted on the skin for the cure of ringworm. A number of other native remedies are exhibited, an opportunity of noticing which may occur hereafter.

Tobago.

In this Court a number of articles of pharmaceutical interest may be seen. Some of these, such as crab and grugru oils, cashew, locust, and cedar gums, etc., have already been noticed under other colonies. Egg fruit oil, kokerite oil (*Maximiliana insignis*), hog plum gum (*Spondias lutea*) and Jamaica plum gum are products that are apparently only to be found in this Court.

A series of the native remedies of the island, comprising several plants of which only the vernacular names are given, is exhibited by Dr. Tulloch. Of these the leaves of wild liquorice (*Abrus precatorius*) are used in decoction as an expectorant and those of stinking weed (*Cassia occidentalis*) to allay after-pains in child-birth.

Mustard seed, honey from native wild bees, lime juice, ginger, tous-le-mois starch and arrowroot are also among the products of this colony.

The resin of the gommier tree and manchineel milk (*Hippomane Mancinella*) may also be seen in this Court.

Antigua.

The exhibits from Antigua include lime juice, honey, castor oil seed, logwood, allspice and ginger dye. Acacia varnish, logwood dye and ginger dye are articles not noticeable in the other colonies.

A specimen of extract of aloes is exhibited by Mr. C. A. Shand, and a collection of herbarium specimen of medicinal plants by Mr. G. E. Pierez, with their vernacular and botanical names and their uses described below each specimen.

St. Christopher and Nevis.

The exhibits in this Court have no interest pharmaceutically, except those of lime juice, tous-les-mois, castor oil and lignum vitæ.

Dominica.

This is one of the most interesting of the West Indian colonies, and the exhibits of materia medica and allied objects are both numerous and varied.

Sugar, cacao, and lime juice are the three most important exports from this island. The raw juice is sold in increasing quantities; but the greater part, according to the statements published in the Official Catalogue, is boiled down until ten or twelve gallons are reduced to one, and is shipped in this state to Europe and the United States. An increasing trade in oranges and other fruits is being developed, and various kinds of essential oils are said to be prepared in the island and exported to England and the United States. Of these there are exhibited specimens of oil of limes, both hand-made and distilled, oil of lemon grass, bay leaves (*Pimenta acris*) and wild ginger (*Renealmia caribæa*, Gr.?). The drugs

exhibited include, amongst others, coca leaves, quina bark (*Exostemma floribunda*), considered to be a powerful antiperiodic in malarial fevers and dysentery, simaruba bark, quassia cups, papain, cowhage, cassia fistula, crude alum, and castor oil seeds. The bastard cabbage bark of Jamaica (*Andira inermis*), is exhibited in this Court under the name of angelin bark.

Of the tanning materials exhibited moricypre, or Bois tan bark (*Byrsonima spicata*), appears to be one of the best, for according to Mr. Evans's analysis it affords 43·17 per cent. of tannin. He is of opinion that it would be saleable if offered in this country. Olivier bark (*Chuncoa obovata*), guava bark and acacia pods (*Acacia Farnesiana*) are other materials used for the same purpose. The guava bark could be obtained in almost unlimited quantities, if found of value in this country. The cultivation of spices appears to have been commenced, specimens of nutmegs and cloves being shown. The specimens of incense gum or cachibou are of fine quality. The tree which yields it (*Bursera gummifera*) is used to make the pirouges or passenger canoes of the island. The trunk is hewn into shape, hollowed out, filled with wet sand, and allowed to spread to a sufficient width, when the fittings are inserted. The larger of these boats will hold six or eight passengers, so that the tree evidently grows to a considerable size. The oleoresin is employed as a deodorant and disinfectant at the Yaws Hospital and the Roseau Infirmary, and is burnt as incense in the Roman Catholic churches in the island.

Two or three collections of native remedies are shown in this Court, and may probably be dealt with separately in subsequent numbers of this Journal, being too numerous to be noticed here. Some fine specimens of cashew gum are shown. It is said to be obtainable in such considerable quantities that it might be made an article of export from the island. It dissolves slowly but forms an adhesive mucilage.

The specimens of beeswax are obtained by the native Caribs from wild bees, which are said to be plentiful in the island.

It is stated in the Official Catalogue that *Bumelia retusa*, which grows in the island, affords balata, but this product does not appear to be collected commercially.

Montserrat.

The name of this island is perhaps best known in this country in connection with lime juice, although the principal produce, as in most of the West Indian Islands, is sugar. The Montserrat Company exhibits lime juice in various forms, such as cordial, bitters, sauce, etc., and also ecuelled oils of limes, bergamot and shaddock, as well as distilled oil of limes and distilled oil of basil (*Ocymum sp.*). The ecuelled oil of limes, judging from a specimen received some months since, is very superior to the distilled oil.

Essential oils are also exhibited by Mr. J. S. Hollings, consisting, in addition to those mentioned above, of the ecuelled oil of orange (*Citrus Bigaradia*) and the distilled oils of *Canella alba*, cascarilla, lemon grass, bay (*Pimenta acris*) and wild basil; also the perfumed waters formed during their distillation.

Specimens of native sarsaparilla are exhibited by Mr. G. B. Wyke, and a series of drugs together with a book containing dried specimens of the plants by Mr. J. S. Hollings. These we hope to notice at length on a future occasion.

British Honduras.

The chief products of this colony are dyewood and timber, the amount of logwood anually exported reaching 17,000 tons. It is described as growing in immense thickets in marshy places, with a crooked trunk 16 to 24 feet high, and rarely thicker than a man's thigh in diameter. Two varieties of the tree appear to be recognized in this colony; one having broad leaves is considered the most valuable on account of its solidity, and of yielding a larger quantity of the dye, although the smaller-leaved variety is said to yield a better quality. Of fustic (*Maclura tinctoria*) about 100 tons are annually exported.

Two of the timbers exhibited probably merit a chemical investigation. One of these, sam or salmwood, is avoided by all kinds of insects, and doubtless contains some principle which might be utilized as an insecticide or insectifuge. The other is known as poisonwood or checkem, and appears to belong to the *Anacardiaceæ* or *Euphorbiaceæ*, since it inflames the skin of the face and the eyes.

Sarsaparilla is represented by several bundles; sponges are shown by four or five exhibitors; tamarinds, preparations of turtle, arrowroot, wild honey and india-rubber are some of the native products exhibited. A rough kind of waterproof material is shown in the form of a bag made by the Indians by coating a cotton bag with the fresh milk of the rubber tree, and when it begins to dry making figures on it with a pointed stick.

The oil of the Cahoon nut (*Attalea Cohune*) is shown by various exhibitors. It hardens at a temperature of 70° F. The seeds of *Sesamum orientale* "used for flavouring cakes" are exhibited under the name of "wangla" seeds. A number of native remedies are shown by the Belize Estate and Produce Company, Limited, but they are badly preserved and have mostly only the vernacular names and will more conveniently form the subject of a separate note. A singular use of chewstick (*Gouania Domingensis*) is mentioned in the Official Catalogue to the effect that the root is used in place of yeast to start fermentation in making ginger and spruce beer, etc.

The Bahamas.

To pharmacists these islands are best known as the geographical source of cascarilla and *Canella alba* barks and of sponges. The exports of sponge in 1885 were estimated at £60,000. Ambergris is also found on the shore and is exported to the value of £1000 per annum. It is suggested in the Official Catalogue that the cultivation of flowers for perfumery might be advantageously undertaken in these islands, as the orange flower and other scented blossoms are more odoriferous here than in the south of France. But with the exception of some perfumery made for the Commission by Mr. Rimmel there is no evidence of any attempt to make known the native perfumes of the islands. Specimens of princewood bark (*Exostemma caribbæum*), cascarilla bark (*Canella alba*), lignum vitæ, cocoa-nut oil and lime juice are among the few drugs exhibited. The most marked feature in this Court is the fine display of sponges, which will form the subject of a subsequent notice, and the many beautiful treasures of the great deep, including sea ferns, corals, sea feathers, sea stars, sea urchins and shells, etc.

The Pharmaceutical Journal.

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PHARMACEUTICAL TRAINING.

THE delivery of inaugural addresses at the commencement of a new session of the various pharmaceutical associations throughout the country affords an excellent opportunity for presenting to the younger members of the body some advice in regard to the mode in which they may prosecute the study of the subjects they will ultimately have to prove their knowledge of to the Board of Examiners. In the absence of any authoritatively recognized curriculum of study by which pharmaceutical qualification may be acquired, such a proceeding is especially valuable if it be only for the sake of pointing out how much may be done by self-help during the period of apprenticeship and how important it is that from the very commencement of an apprentice's career his attention should be directed to the scientific aspects of the materials and operations that come within the scope of his daily work. Sir HENRY ACLAND has this year led the way in this direction, and in the address delivered by Mr. GREENISH at Sheffield the mode in which the formation of habits of observation and accuracy may be combined with the routine work of a chemist's shop has been well pointed out, and the utility of making records of all facts for future reference has been illustrated in a manner that will commend itself to everyone who considers what are the essential features of pharmaceutical competence. It cannot be too strongly impressed upon the minds of all that the opportunities for acquiring technical knowledge during the term of apprenticeship should be carefully utilized. There is no need that in doing so reasonable recreation should be interfered with, and now that books are so abundant, and museums are so frequently within reach, it should be possible for earnest students to acquire such acquaintance with the scientific history of the materia medica, that when they afterwards present themselves before the examiners they will be saved the humiliating experience of finding a demand made upon them that they are utterly unable to satisfy.

In the address delivered by Mr. MARTIN at Newcastle the same principle is enforced in regard to the early education of apprentices. The possibilities of self-help are illustrated even more fully than in the Sheffield address, and the advantage to be gained from an early appreciation of the educational requirements of a successful pharmacist is put forward in a manner that deserves the thoughtful attention both of apprentices and their masters. It would indeed be a great step in the advancement of pharmacy in this country if there were a general acquiescence in Mr. MARTIN'S suggestion that registered chemists should in future decline to take as apprentices any youths who have not received such general education as to be fit and proper persons to be trained to the business. And if the further recommendation to induce apprentices to apply themselves to a systematic course of study were also followed there might be some reason to hope for an end to the disheartening records of failure in examination which are now so numerous. Although, as Sir HENRY ACLAND remarked, it is now felt to be cruel and unjust to examine youths in subjects they have not been taught to study and to seek to extract from them what they therefore cannot know, it must also be remembered that as an examining body the Pharmaceutical Society has a public duty to fulfil, and it would be a betrayal of its trust to invite students to swell the ranks of pharmacy when they are unfit for the pharmacy of the future. The absence of any adequate provision for ensuring the systematic training necessary for producing qualified pharmacists is at once the cause of great hardship to those who fail to pass the examination, and a great obstacle to pharmaceutical progress. Hence it is that, as Mr. MARTIN remarks, forty-five years after the formation of the Pharmaceutical Society pharmacy is far from having attained the position to which its founders then looked forward. The mistake of adopting as a test of legal qualification an examination that was suitable only so long as the voluntary system prevailed has been most mischievous in its consequences. The failure to associate with such an examination a preparatory systematic training renders the position and prospects of pharmacy even less satisfactory and less hopeful than they were before the Pharmacy Act was passed. This is the history and experience of the last eighteen years, and consequently it may well be asked whether the pharmaceutical body is any nearer taking the position in the world to which it should be entitled as a body of educated men.

From what has been said it will be evident that the satisfactory settlement of the educational question lies at the root of all hopes for the improvement of pharmacy in this country. It is therefore with great pleasure that we take note of any indications which testify to the appreciation of this fact among those who will be the pharmacists of the future, and there is very satisfactory evidence furnished that this is the case with the body

established in London a few years since, under the title of the Chemists' Assistants' Association. The first meeting of the Association for the ensuing session was held last Wednesday evening, when Mr. H. H. MILLHOUSE, the newly-elected President, gave upon that occasion an inaugural address in which there was a most encouraging echo of the aspirations that led to the foundation of the Pharmaceutical Society, and that have stimulated so many of its members to labour for the advancement of their calling. It is with regret that we are compelled to postpone the publication of this address by reason of the previous occupation of our space this week; but we gladly take this opportunity of congratulating the members of the Chemists' Assistants' Association on the good service they are rendering not merely to themselves, but to the entire class of which they form part. In previous sessions the character of the proceedings at the meetings of this Association has been most creditable in every respect, some very excellent papers have been produced, and they have given rise to useful discussions. The programme for the session just commenced also offers promise of a maintenance of these good features. The subject of education and examination is to be discussed at an early meeting, and besides other contributions of a scientific character there is to be provision for the social intercourse which it is one of the objects of the Association to promote. The meeting last Wednesday evening was attended by upwards of fifty members, and to judge from the interest expressed in the proceedings of the coming session it bids fair to be a very successful one. A considerable number of names were put down for election as members of the Association. At the close of the President's Address, a vote of thanks, proposed by Mr. WINFREY, and seconded by Mr. DYMOND, brought to a close one of the most successful meetings in the history of the Association.

The Annual Meeting of the Midland Counties Chemists' Association was held on Tuesday evening at the Grand Hotel, Birmingham. Mr. T. BARCLAY, the President, was in the chair. The report of the Council gave a satisfactory account of the proceedings of the past year, and of the state of the finances, special reference being made to the meeting of the Pharmaceutical Conference, and to the loss sustained by the death of Mr. WILLIAM SOUTHALL.

In the course of the proceedings a testimonial was presented to the Honorary Secretary, Mr. CHARLES THOMPSON, in recognition of the services he had rendered in carrying out the local arrangements for the meeting of the British Pharmaceutical Conference. A telegram expressing the congratulations of the Leamington chemists was received, while the presentation was being made, and duly acknowledged by the President. The officers of the association were re-elected and Mr. F. H. ALCOCK was appointed joint Secretary with Mr. THOMPSON.

At a meeting of the Committee of the Redwood Testimonial Fund held last Wednesday, it was resolved that the subscription list should be closed on the 31st of December next. It will be remembered that the form which it has been proposed the testimonial should take is that of a scholarship to be established in the School of Pharmacy of the Society. Former pupils of the Professor and others desirous of contributing to the fund should therefore communicate their intentions before that date to the Chairman of the Committee, Mr. Michael Carteighe, the Treasurer, Mr. John Williams, or the Hon. Secretary, Professor Dunstan, of 17, Bloomsbury Square, London, W.C.

* * *

Owing to the scarcity and consequent high price of cubebs it is necessary to examine them carefully for admixtures. One that is very liable to be overlooked has lately been recognized. It is a berry exactly resembling cubebs in colour and size, but has no pedicle, and the base of the fruit shows a calyx having five minute teeth. On cutting open the fruit it is seen to be two-celled, and it may be most easily recognized by the fact that it has two vertical depressions on the sides and two slightly prominent ridges at right angles to them.

* * *

A case of suicidal poisoning with prussic acid has occurred at Rochester, which illustrates how utterly the observance of the regulations prescribed by law may sometimes fail to be a protection. An assistant warder at the Borstal Convict Prison was found dead in a field on Sunday morning. Medical evidence was produced that death was due to prussic acid, and Mr. G. W. Watts, Pharmaceutical Chemist, stated that the deceased applied to him on Saturday for prussic acid enough to kill a dog. Witness at first objected to supply it, and did so only upon the representation that the man had been bitten, and that the dog was mad. A police constable who knew the deceased was a witness of the sale of the acid, which was duly registered. The court was perfectly satisfied that even more than ordinary precautions had been observed by the chemist, and the jury returned a verdict of suicide whilst of unsound mind.

* * *

The *British Medical Journal* contains an interesting communication from Dr. Granville on the preparation of what he terms "Concentric Composite Pills." He proposes that instead of mixing the several ingredients they should be arranged in concentric layers with such coatings between them as will secure their separate action. Thus, for example, when it is desired to give a drug to act upon the stomach with one to act upon the intestine, the latter is made the nucleus and coated with keratin, while the other is deposited outside that coating and protected by any of the ordinary coating materials that will dissolve in the stomach. Dr. Granville thinks this new mode of making pills opens up a wide field of opportunities for scientific medication, and that it offers the very great advantage of enabling medical men to give drugs with precision on physiological principles.

* * *

According to Gehe and Co.'s *Handels-Berichte*, an article sent out under the name "acidum aseptinicum" consists of a solution of borax in peroxide of hydrogen.

Pharmaceutical Society of Ireland.

ANNUAL MEETING.

The Annual Meeting of this Society was held on Monday, the 4th instant, at four o'clock, in the Society's rooms, No. 11, Harcourt Street, Dublin.

The President (Mr. J. E. Brunker) in the chair.

The President, addressing the meeting, said the Society had come to the end of another year of its work. He was sorry there was not a larger attendance of members. As no new member of the Council had been proposed to take the place of any of those now retiring by rotation, it would not be necessary to appoint scrutineers of the voting. All he had to do was to take one voting paper in which all the outgoing members of the Council were voted for, and declare them duly re-elected. In one sense it was satisfactory to find that the members of the Society were perfectly satisfied with the work done by the Council during the past year; but he hoped that that would not make the members of Council careless, or cause them to labour under the idea that they could do no wrong, and that, no matter what went on, their seats were assured to them. It would be a more healthy state of things if the outside members of the Society tried to infuse some new blood into the Council. Not that he wished to get rid of any of the colleagues who had worked with him during the past year. They could not shut their eyes to the fact that their transactions during the past ten years had not given complete satisfaction to every member of the Society. They heard growls like distant thunder, and it would be more satisfactory if those growls took shape, and gentlemen who thought they had cause of complaint would say what they had to say at the Annual Meeting. He could not say that the Society had much to boast of, but it had made some little progress during the year. At the Preliminary examinations forty candidates came up, of whom only twenty-one passed. In the the year before forty-four candidates came up, of whom thirty-six passed, which made a difference of nearly twenty-five per cent. between the two years. For the licence thirty candidates came up last year as against twenty-five in the previous year and the number of those who passed last year was sixteen, as against twenty-one in the year before. From having watched the examinations very closely, and also judging by the reports of the Visitor, he thought they might be satisfied that the standard of these examinations was rising, and that their licentiates and those who passed the examination possessed as high if not a higher standard of qualification than those who passed the Minor at the other side of the water. There had been only an increase of one in the number of their paying members since last year, taking into account accessions and fallings off. The principal event of last year had been the coming into force of the regulation under which the Privy Council appointed a Visitor to their examinations. That action of the Privy Council had he thought been a move in the right direction. Very interesting comments on the examinations had been made by the Visitor; and he (the President) thought the efficiency of the examinations would be very much increased by following out some of the hints that had been given. It was well that they should see themselves as others saw them, and not go on satisfied that they were doing everything right. Some of the comments had been very fair indeed, and must tend towards the improvement of the examinations. Another year had been passed without having obtained any fresh legislation. Every day that passed proved how very unsatisfactory the law was under which the Society was obliged to act. No later than last Saturday a failure had occurred in a prosecution at Navan, which could not have been foreseen. The failure exactly touched the point in which the Council had recommended an amendment in the Act. The difficulty encountered was to trace the actual proprietor of the establishment charged with illegal practices. In the case in question, though the names of two gentlemen were over the door—they were publicans who had taken out licences in their own names—the magistrates dismissed the case without prejudice because the prosecutors could not prove the responsibility of those gentlemen who had their names over the door. That showed how very defective the Act was. During the past winter the Evening Meetings of the Society had been revived, and had gone on very satisfactorily indeed. There had been fair attendances and some very interesting work, the only drawback having been the modesty of the younger members. Some came forward boldly and read very interesting papers, but it was desirable that a larger number should come forward. The Council hoped that the Evening Meetings would be still more successful in the ensuing year. His (Mr. Brunker's) period of office expired on that occasion; and if they would allow him he would like to propose a successor. Having thought that Mr. Pring, from his position as a pharmacist, and on personal grounds, was in every way entitled to the office he wrote to him, but Mr. Pring replied, stating that for many reasons he felt obliged to decline the honour.

Mr. Hodgson, the Treasurer, requested the President not to proceed further at present as regarded the appointment of a successor, and then made his financial statement. He was glad to say that it contained nothing of an unfavourable character. The Society had only lost £1 8*s.* 3*d.* through the irregularities of the late Registrar. As to the gentleman who had succeeded him he had had the greatest possible satisfaction with his monetary transactions. During last year twenty-eight fees had been received for the Major examinations, which was exactly the same amount as in the preceding year.

The President: You do not allow for re-examinations.

Mr. Hodgson: No, I suppose not. The account before me simply deals with the money that came into your hands. The amount of those fees was £147. For the Preliminary examinations forty-five fees had been received as against forty-six in the previous year. One licentiate apothecary had been registered as a pharmaceutical chemist. The total amount of the fees received had been £245 14*s.* Fifty subscriptions had been received making £52 10*s.* The total income for the year had been £405 5*s.* 1*d.* As to their expenditure it had been as moderate as possible and there was not a single item in respect of which he could suggest any reduction. The only large item was £46 4*s.* 10*d.* to Messrs. Ponsonby and Weldrick, for printing. The new year started with a balance of £92 1*s.* 1*d.* to the credit of the Society in the Bank of Ireland, and the Society had £248 3*s.* 1*d.* in the three per cent. stock.

Mr. Grindley: Are there any debts outstanding?

Mr. Hodgson: I am not aware of anything.

The Vice-President moved the adoption of the Treasurer's account.

Mr. Grindley seconded the motion, which was unanimously agreed to.

Mr. Hodgson said he had great pleasure in moving that Mr. Brunker be re-elected President of the Society. He was aware of the debt of gratitude the Society owed him for the manner in which he had transacted its business. The Society could not be better served than it had been by him, and it would be most unfortunate if by any rule the Society were prevented from re-electing him.

The Vice-President said he seconded the motion with the greatest pleasure, and he fully concurred in everything that Mr. Hodgson had said of Mr. Brunker. But unfortunately, a difficulty was created by the resolution of the Council passed on October 1, 1883, which provided that the office of President of the Society should not be held for more than three consecutive years by the same person.

The President said that as no notice had been given of a motion to rescind that resolution, it could not be departed from. He was extremely obliged to Mr. Draper and Mr. Hodgson for what they had said in favour of his continuing in the chair; but he thought the resolution of the

Council was a judicious one. It would not be right that the affairs of the Society should be managed by one person; and when he was appointed, he looked forward to not filling the office for more than three years. The great object should be to get as large a number of licentiates as possible to take an interest in the affairs of the Society, but if they found that the work of the Society was thrown on one person they would not come in. Even the Committees during the last couple of years had not been as well attended as they ought to have been; and if it had not been for the kind attendance of two gentlemen on whom the Society had very little claim, namely, Dr. Collins and Dr. Montgomery, they very often would not have had a Committee at all. Very few of them were aware how much had to be done by the President of the Society. If he had been able to do anything to advance the Society, the pleasure of having done so was his greatest reward; but he should like now to see the place filled by someone else who would work with as much goodwill for the Society, and perhaps even more successfully than he had done.

The Vice-President: Can we adjourn this meeting in order that the resolution of the Council may be rescinded and that the President may have time to think over the matter?

The President: I think the Act is mandatory as to our electing a President to-day. I confess I would like to be relieved and I do not think the interests of the Society will suffer. It would be a bad compliment to such a body as this to say that it does not contain gentlemen quite as well fitted as I am to fill the office.

Mr. Hodgson: If Mr. Brunker says he does not wish to undertake the duties of the office again, of course I have not another word to say.

The President: I must again thank you all for the kindness with which you have spoken of my exertions. I do not think you will make any mistake if you select Mr. Allen to fill this chair for the coming three years. He takes a great interest in your examinations, having watched them very closely, and is well up in the details of the work of the Society and the Council, and being himself engaged in the practice of pharmacy he knows what the wants and wishes and requirements of the pharmacists of the country are. I have great pleasure therefore in proposing Mr. Allen as your President for the coming three years.

Mr. Hayes said he had much pleasure in seconding the motion. No man was better qualified to fill the position than Mr. Allen, and he was confident that he would do honour to it.

The motion having been put and unanimously carried,

The newly-elected President took the chair and said he felt very much the honour which had been done in electing him. He feared he would very inadequately fill the position after Mr. Brunker, whom, as well as Mr. Hayes, he thanked for their kind words.

Mr. Grindley said there was no difficulty in the way of proposing the re-election of Mr. Draper as Vice-President. They could not have a better man in the position, and he had great pleasure in proposing him.

Mr. Wells said he had much pleasure in seconding the motion, and endorsing what Mr. Grindley had said of Mr. Draper.

The motion was unanimously carried, and—

The Vice-President said he felt exceedingly gratified by the choice, and assured the members that all the aid he could afford to the Society would be most cheerfully given.

Mr. Hayes, in proposing the re-election of Mr. Hodgson as Treasurer, said the Society owed him a debt of gratitude for the care and accuracy with which he had looked after the finances.

Mr. Brunker seconded the motion, which was unanimously carried, and—

Mr. Hodgson briefly responded, saying he would continue to do all in his power to conserve the Society's means and keep down expenses.

Mr. Brunker, in moving the re-election of Mr. Arthur Ferrall as Registrar, said that gentleman had been most assiduous in his attention to the duties of his office, and most courteous to all who came in contact with him.

Mr. Hodgson, in seconding the motion said he had had the greatest possible satisfaction in dealing with Mr. Ferrall, in whose integrity and propriety he had every confidence.

The motion was unanimously carried, and—

Mr. Ferrall briefly returned thanks.

On the motion of Mr. Wells, seconded by Mr. Beggs, Messrs. Hayes and Brunker were elected Auditors.

On the motion of Mr. Brunker, seconded by Mr. Hayes, the following gentlemen were appointed the Law Committee:—Dr. Collins, Dr. Montgomery, and Messrs. Payne, Evans, Brunker, Grindley and Wells.

On the motion of Mr. Brunker, seconded by Mr. Hodgson, the members of the Law Committee were requested to act as the Pharmacy Act Amendment Committee.

On the motion of Mr. Brunker, seconded by Mr. Beggs, the following gentlemen were re-elected the Committee to inspect candidates' certificates:—Messrs. Brunker, Hayes, Payne, Simpson, Wells and Dr. Collins.

On the motion of Mr. Brunker, it was agreed not to elect a Committee to visit the examinations, in order that arrangements might be made for the more general discharge of that duty by all the members of the Council in turn.

Mr. Grindley moved a vote of thanks to the Society's late President (Mr. Brunker) for the able manner in which he had filled the presidential chair during the last three years.

Mr. Wells seconded the motion, which was unanimously carried.

Mr. Brunker thanked the meeting for the kind way in which the vote had been proposed and passed. He had done his best to advance the interests of the Society, but he felt that they had not been making the advances that they ought to have made during the last three years. There was a great deal of apathy amongst the licentiates. They did not even take the trouble of reading the reports of the proceedings of the Society in the Journal, and yet were often too ready to find fault about things that were really quite beyond the control of the Council. One of the great difficulties the Council had to contend with was the defective Act under which it worked. That Act was the result of a series of compromises, and consequently was full of crudities, and worked badly as regarded the interests of the public even more than those of the Society. The Society was founded by the Government of the country, not for the protection of the trade interests of a particular body, but for the protection of the public; but the powers which had been given to it were not sufficient to enable it to work effectively for that object. He trusted that now they had Sir Michael Hicks-Beach, who was responsible for the introduction of the Act of Parliament, amongst them again they might have an opportunity of bringing before him the disadvantages under which they laboured, and that he might be able to spare a few minutes of the ensuing very busy session for the purpose of carrying into effect the recommendations made to Mr. Trevelyan, and which were so favourably entertained by him. At the interview with Mr. Trevelyan two years ago great hopes were given that what was wanted would be accomplished in a short time. Like many other pieces of practical legislation it had to give way to the sentimental legislation that had been going on, and nothing had been done. They hoped that something practical would soon be done, so that the Society might be placed in a position to advance the interests of the public and of the licentiates. He had again to thank the members for their kind recognition of any little exertions that he had made on behalf of the Society; and he assured them that though he had ceased to fill the chair, which was now so worthily occupied, he should not cease to take an interest in the Society, and any exertions that he could make to advance it he should be prepared to give.

The proceedings then terminated.

British Pharmaceutical Conference.

TWENTY-THIRD ANNUAL MEETING.

(*Concluded from page* 283.)

Wednesday, September 1.

Mr. Plowman next epitomized the two following papers :—

Quinological Work in the Madras Cinchona Plantations.

BY DAVID HOOPER, F.C.S.,
Government Quinologist.

Last year I communicated to the Conference at Aberdeen the results of some experiments made in the cultivation of cinchona. A number of analyses were given of the different varieties of bark grown on the Government and other estates. It was shown how the alkaloids were distributed in old succirubra trees ; and it was noticed how natural shade and the process of mossing promoted the increase of alkaloids in the bark. Some of these conclusions were perhaps not altogether unknown before, but I thought it desirable to confirm results which are liable to vary under different conditions of age. Another year's work shows some more extended investigations into the effect produced on alkaloids by the renewal of bark and by the manuring of trees, and tables are compiled from numerous analyses showing the rise of alkaloids in growth and their deterioration by age and other causes. I have again been permitted to quote extracts from my annual report, which has lately been forwarded to Government through Mr. Lawson, Director of the Cinchona Plantations.

Renewal by Shaving.—Shaving cinchona trees has been for some years a method of harvesting bark which in some districts works better than that of stripping and mossing. The cellular and richer portion of the bark is removed in this way, and the librous portion is left. The bark thus treated thickens again, and the shavings taken from it are found to be richer still in alkaloids. The analyses of some succirubra shavings taken from trees grown in the Ouchterlony Valley will show to what an extent trees may be improved by this method. The renewals were taken after intervals of twelve months; the experiment therefore lasted over three years.

	Quinine.	Other Alkaloids	Total.
Original bark	1·35	5·87	7·22
Once renewed	2·46	4·22	6·68
Twice renewed	3·60	3·99	7·59
Thrice renewed	3·87	3·71	7·58

The increase of quinine during the first and second year by renewing is most satisfactory; the increase is not so prominent in the third year, but the bark is good, and indicates that shaving for at least four years might be permitted. The trees upon which these experiments were made were six years old when the original bark was taken. If at this comparatively early age they are not injured by shaving, and renew their bark so well, it is not desirable to wait for the trees to become more matured.

When trees are allowed to grow until they are over twelve years of age, and then shaved, the renewal sets in more slowly, and the resulting bark does not compare more favourably with the original bark than if the tree operated upon had been half that age. This may be instanced by quoting some more analyses. Last December some interesting samples were sent by the manager of the Glenrock Company, S.E. Wynaad, consisting of some natural and renewed shavings of succirubra taken from trees of six and twelve years of age. The following is the analysis of four of the samples: —

	Sulph. Quinine.	Total.
Red bark, 6 years, natural	1·34	5·00
,, ,, renewed 2 years . .	2·54	6·95
,, 12 years, natural	2·43	7·41
,, ,, renewed 2 years .	2·71	7·01

Thus it is seen that by renewing a six year old tree, 90 per cent. more of sulphate of quinine is obtained, and by working on a twelve year old tree only an increase of 12 per cent. takes place during the same period of two years. With regard to the total alkaloids it should be also noticed that the shaving has made an increase of 39 per cent. in the younger tree, while the older bark has somewhat deteriorated. One of the most important features in these results is that the renewed bark from the six year old tree is superior to the natural bark from trees of twice the age.

I have had very few opportunities of observing the effect of shaving on pure Ledger barks, containing little, if any, alkaloid, besides quinine; but it appears that hybrid Ledgers of the broad leaved variety, holding cinchonine, are capable of great improvement by the shaving process, as the following renewals of eleven months will show compared with the natural bark of six year old trees.

	Sulph. Quinine.	Total.
Ledger, narrow leaf, natural, 1885 . .	4·09	5·97
,, ,, renewed, 1886 .	6·62	8·49
Ledger, broad leaf, natural, 1885 . .	2·90	6·61
,, ,, renewed, 1886 . .	5·19	8·51

The sulphate of quinine in the narrow-leaved Ledger had increased 62 per cent., and in the broad-leaved Ledger 79 per cent.; the greater increase in the latter variety is due to the presence of other alkaloids which appear to develop quinine in the growth of the tree.

Shaving old trees has certainly not had a beneficial effect in some trials made on Government estates. Both officinalis and succirubra trees from sixteen to twenty-one years of age cannot well bear the removal of the bark in this way ; the renewal takes place slowly, and is found to be impoverished instead of enriched. An officinalis on Dodabetta of twenty years' growth was shaved; the shavings gave 3·66 per cent. sulphate of quinine. After six months some renewed shavings were taken and found to yield only 1·85 per cent.; the bark was then commencing to decay, and the tree has since died.

Experiments in Manuring Cinchonas.—The effect of manuring cinchona trees in order to stimulate their growth and produce a greater yield of alkaloids has recently been tried at Naduvatam. The first experiment was made upon a succirubra of seven years' growth. Cattle manure, which had been previously kept for some time in closed pits, was applied some six months before the bark was taken for analysis. A sample of bark from a tree in the same plot, but which had not been manured, was collected at the same time for comparison. Two samples of magnifolia bark were taken from trees which had been manured in a similar manner to the succirubra; the first was seventeen years, the second twenty years old, and samples from unmanured trees were taken for comparative analysis at the same time. The results of the examinations are tabulated on the next page.

It will be seen that the manuring has had the effect of increasing, in each instance, the amount of total alkaloids in the bark ; and the quinine—the most important feature—has received a gain of 52 per cent. in the succirubra, and 20 per cent. in the first magnifolia. In the older magnifolia bark the quinine remains about the

	Quinine.	Cinchonidine.	Cinchonine.	Amorphous Alkaloids.	Total
Succirubra, manured . .	2·29	3·78	1·94	·52	8·53
,, unmanured .	1·51	4·13	2·03	·32	7·99
Magnifolia, 1. manured .	3·78	3 90	·28	·82	8·78
,, ,, unmanured	3·13	4·39	·56	·39	8·47
,, 2. manured .	2·59	3·49	1·21	·52	7·82
,, ,, unmanured	2·62	2 67	·67	·56	6·52

same in quantity, and if no other influence is at work it might be inferred that older trees are not so sensitive to the action of manure as younger and more vigorous growing trees which have not reached maturity. The food of such plants as cinchonas, which yield alkaloids in large quantity, must of necessity contain some nitrogenous element, and as this must be taken from the ground it is only fitting that a manure of this kind, which contains some constituents that are similar in their nature to alkaloids, should be supplied periodically to the soil. Regarding the question from a commercial aspect, the higher value would cover the expense of the manure and the cost of its application to the land. The succirubra bark mentioned in the first experiment, if the unit were 4*d.*, would realize in the market 8*d.* per pound, whereas the bark of the manured tree would be worth more than 1*s.* per pound. I believe the effect of manuring would be more apparent in crown and Ledger barks, with large proportions of quinine in the total alkaloids ; in such cases, the extra outlay on manurial agents, compared with the additional value of the bark, would be much more remunerative.

Increase of Alkaloids with the Age of Trees.—A question of much importance in cinchona cultivation is the age to which trees should grow before the bark can be profitably taken. To settle such an inquiry a large number of analyses of barks taken from trees of all ages should be available. In the following tables I have made a selection of both Ledger and red barks, and have arranged them according to age. Some of the figures are averages of two or more analyses, and as the two lists represent some forty samples, I hope they will help to throw some light on the subject.

The first list comprises natural barks of the narrow leaved variety of *C. Ledgeriana*, and, with one exception, they all came from the Wynaad district.

The second list is made by taking from my laboratory journal all those red barks whose ages have been determined, whether they came from the Government Plantations at Naduvatam, or from private estates in Wynaad, Coorg or Travancore.

Ledger Barks.	Quinine.	Cinchonidine.	Other Alkaloids.	Total.
20 months	1·68	·66	2·77	5·11
2 years	2·18	·65	2·69	5·52
3 ,, ...	3·28	·55	2 90	6·82
3½ ,, ...	4·73	·93	1·81	7·46
4½ ,, ...	4·97	·79	1·78	7·54
5 ,, ...	4·57	1·02	1·46	7·05
5 ,, ...	5·09	1·06	·55	6·70
5½ ,, ...	7·54	·31	1·15	9·00
6 ,, ...	6·52	·76	·88	8·16
6½ ,, ...	5·97	1·18	1·00	8·15
8 ,, ...	7·59	1·16	1·45	10·20
20 ,, ...	5·58	1·24	·85	7·67

In the Ledger barks it will be noticed that there is a steady rise of quinine up to the age of between five and six years, after which there is no apparent increase.

In the second table of red barks the same fact is shown, that the bark has attained its maximum content of alkaloid when between five and six years of age. The quinine increases up to twelve years, but, as pointed out before, the renewed barks of the younger trees much exceed the slightly increased value of these older barks. The trees of sixteen and twenty years show a marked deterioration in alkaloids, although the bark is often in large thick fibrous pieces, similar to the drug that was originally exported from the South American forests.

Red barks.	Quinine.	Cinchonidine.	Cinchonine.	Amorphous Alkaloids.	Total.
2 years. . .	·55	·72	1·20	1·22	3·69
3 ,, . . .	·85	1·75	1·67	·99	5·26
3½ ,, . . .	1·08	1·65	1·15	·64	4·52
4 ,, . . .	1·13	2·03	1·79	·58	5·53
4½ ,, . . .	1·02	2·64	1·78	·50	5·94
5 ,, . . .	1·23	2·72	2·36	·52	6·83
5½ ,, . . .	1·32	2·15	3·11	·63	7·21
6½ ,, . . .	1·31	3 22	2·18	·71	7·42
7 ,, . . .	1·70	2·69	2·28	·93	7·60
7½ ,, . . .	1·78	3·18	1·97	·53	7·46
12 ,, . . .	1·81	2·62	2·08	·90	7·41
16 ,, . . .	1·08	·94	1 04	1·57	4·63
20 ,, . . .	·78	1·13	1·37	·97	4·25

Effect of Mould on Bark.—It has been stated that bark loses much of its virtue when allowed to get mouldy, or when kept in a damp atmosphere. I was asked more than a year ago to analyse some mouldy bark to obtain its value, but not knowing the composition of the freshly dried bark the results would not have been very useful. I have therefore made an experiment which shows that little, if any, effect is produced by prolonged contact with mould. A sample of powdered bark of known composition was taken in December, 1884, and kept in an open dish on the floor of a dark damp room ; a fungus (*Penicillium*) set in in a fortnight, and spread itself over the surface of the powder, and slightly increased its weight. The bark was constantly stirred so that fresh bark from beneath might be influenced by the fungus. It was mixed occasionally for ten months, and as the mycelium had by then penetrated to every particle of the powder it was analysed in October, 1885, with the following results :—

	Original bark.	Mouldy bark.
Quinine	2·82	2·80
Cinchonidine	1·22	1·25
Quinidine.	·18	·11
Cinchonine	·90	·87
Amorphous	·31	·45
	5·43	5·48

It it thus manifest that the analyses being almost identical, moulded bark of ten months is not necessarily deteriorated.

Ootacamund, India,
July 16, 1886.

Cinchona Cultivation in South America.

BY DAVID HOWARD, F.I.C., F C.S.

Although Ceylon has of late occupied in the bark market the most prominent position of all the countries where cinchonas have been cultivated, it is to other quarters that we should look for reliable information on the scientific points involved.

Vast as has been the scale of the cultivation in Ceylon, the soil of the island is by no means of the most favourable for the growth of the cinchonas, and, unfortunately, far too little care has been taken to avoid the danger of hybridization, which takes place with marvellous facility whenever more than one species is found in a district, unless the greatest care is taken to isolate the seed-bearing trees. We thus find that Madras and Java give far

better opportunities of studying the effect of cultivation on pure strains of the more valuable species, and it is interesting to add to what we have learned from the plantations in those countries, some light from those in the natural home of cinchonas in South America.

The jealousy which made it so difficult to obtain cinchona plants in the first instance still remains to a great extent in Bolivia, and although we have valuable information as to the progress of the plantations in Schuhkrafft's consular reports, no scientific information can be obtained from that quarter, except what is derived from the bark which already reaches us from them in considerable quantity. This we find to be of very fine quality, far superior to the average of even selected parcels of the uncultivated bark; a yield of 6 to 7 per cent. of sulphate of quinine is quite as commonly obtained from them as one of 4 to 5 per cent. was from the importations of twenty or thirty years ago, and it is evident that the influence on the calisaya of cultivation is just as favourable in its natural home as in Java. Among them are two new species, the flowers of which are as yet unknown, but the habit of growth of which clearly marks them out as distinct from the hitherto described species. As plants of both are under cultivation, it is hoped that before long we shall be able to add botanical descriptions of them.

The first it is proposed to call *Cinchona Thomsoniana*, after Mr. Thomson, who discovered it in the Central Cordilleras of the Columbian Andes, in the districts which yield the well-known *Cinchona lancifolia*, the soft bark of commerce. It has very large leaves, and grows with a rapidity equal to that of succirubra.

The young bark analysed, which was from trees only two years old, gave already 3·3 per cent. of sulphate of quinine = 2·5 of quinine alkaloid, traces only of cinchonidine and ·55 of cinchonine. The purity of the quinine and rapid growth make this a promising species for cultivation.

The other was discovered by Señor Pombo in the forests of Ecuador; the mature bark presents marked points of difference from the species at present known and yielded.

The sample of cultivated bark of this species, two years old, gave quinine sulphate 5·70 = of quinine 4·28, cinchonidine 0·43, no cinchonine or quinidine. This test is a very high one, and, if the growth is not too slow, it ought to prove a valuable species.

For comparison, I would add the analysis of the typical sample of the finest lancifolia bark, the calisaya Santa Fè, brought over by Mr. R. Cross, from Columbia, which yielded of sulphate of quinine 4·2 = of quinine alkaloid 3·15, cinchonidine 1·90 and cinchonine ·30.

Of even more interest are samples of bark grown from plants derived from the Government plantations in Jamaica. The history of these barks shows the great influence of successful cultivation and favourable habitat upon the yield of all alike. The first samples received from Jamaica in 1872 gave the following results :—

	Quinine.	Sulphate.	Cinchonidine.	Cinchonine.
C. Calisaya . . .	1·65 =	2·2	·7	·2
C. officinalis . . .	1·35	1·8	·1	·1
C. succirubra . .	1·05	1·4	2·5	·8
C. succirubra . .	1·12	1·5	1·6	2·0

The improvement brought about by careful cultivation is shown in a marked degree by the following samples received from the some plantations in 1881 :—

Elevation.	Sulphate Quinine =	Quinine.	Cinchonidine.	Cinchonine.	Quinidine.
— Calisaya .	4·93	3·70	0·60	0·35	0·05
5500 ft. Officinalis	6·95	5·18	0 22	0·01	0·15
4800 ft. Officinalis (thirteen years old)	5·00	3·75	0·40	0·12	0·16
2400 ft. Succirubra	1 97	1·48	2·98	2·24	0·13
3400 ft. Succirubra (cold spring)	2·40	1·80	1·30	3·20	0·00

The descendants of these plants grown in Columbia give the following results :—

	Sulphate Quinine.	Quinine.	Cinchonidine.	Cinchonine.	Quinidine.
C. Calisaya, 3 years old, grown at 8000 feet.	4·32 =	3·24	0·66	trace	0·00
C. Calisaya, 22 months old. 7500 feet.	2·71	2·03	0·55	0·13	0·00
C. officinalis, 3½ years old. 8000 feet.	4·66	3·49	0·21	0·06	0·05
C. officinalis, renewed, 8 months under moss.	4·30	3·22	0·23	0·07	0·07
C. succirubra, 3 years old.	4·94	3·75	3·03	0·17	0·07
C. succirubra, renewed, 8 months without moss, grown at 7500.	7·00	5·25	1·90	0·67	0·00

All these samples are from very young trees and if we may judge from universal experience the more mature bark will give even finer results. The Jamaica calisaya is not of the finest type, the percentage of quinine is lower than in the best ledgeriana and the proportion of cinchonidine is much higher. I should have been inclined to suspect hybridization, but my late uncle, J. E Howard, F.R.S., after a careful examination of the botanical specimens in 1881, reported of this bark : "It appears to me true to the calisaya type; I should not think that it belongs either to the josephiana or ledgeriana form, but that the exact variety is perhaps not yet published. There is no appearance of hybridity." The succirubra is one of the finest specimens that I have tested. I have found very great variety in the tests of trees of this species growing alongside each other in Ceylon, the quinine varying even in the proportion of three to one and so it is possible that all the bark from the plantations will not be found of this admirable quality. Still we have here an additional proof that whether the result be due to favourable circumstances or to more or less permanent varieties, red bark can be grown of far richer quality than what we usually receive as such from the East Indian plantations.

Amid all the discouragements of excessive production and low prices that planters suffer from at the moment it cannot be too clearly borne in mind that the prospect of future profit in the cultivation of cinchona turns chiefly upon the cultivation of high testing bark. With favourable soil and climate the richer varieties grow at least as freely as the poorer and it is evident that, the cost of production being approximately the same, a bark of higher quality may yield a profit when an inferior quality may cause a serious loss. In Bolivia and Java these most important requisites are found, and the analyses I have given above show that the same favourable results may be obtained elsewhere. In the face of such competition it is evident that the profitable growing of inferior bark is impossible.

The PRESIDENT proposed a vote of thanks to the authors, which was at once carried.

The last paper read was a note on—

COMPOUND SPIRIT OF ETHER.

BY D. B. DOTT.

Among the medicaments added to the Pharmacopœia in its last edition, there are many of great value, and a few whose claims to be recognized can scarcely be considered strong. *Spiritus ætheris compositus* probably belongs to the latter class.

Thirty-six fluid ounces sulphuric acid, and 40 fluid ounces alcohol, were mixed and otherwise treated as directed. The distillation was continued until the liquid

in the flask began to darken decidedly, and to evolve sulphurous acid. The distillate amounted to 17 fluid ounces, and was agitated with lime water till neutral to test paper. The ethereal portion was then separated and found to measure 10½ fluid ounces. We are next told to expose the liquid to the air for about twelve hours, but the means of doing so is not described. I divided the liquid into two equal parts, placing one in a beaker and the other in a basin. On the expiry of the required time the liquid in the beaker measured 3½ fluid ounces, that in the basin only 80 minims. After a few hours' further exposure the 3½ fluid ounces were likewise reduced to 80 minims. The 160 ♏ consisted of two nearly equal portions, the upper of specific gravity about ·980 and miscible with water, the lower of specific gravity about 1·065 and not miscible with water. The upper layer no doubt consists essentially of a watery solution of ether, and the lower is principally the so-called "oil of wine." This latter mixture does not appear to have been exhaustively investigated, but it seems to consist for the most part of ethyl sulphate. The points which I wish to urge are the following:—

1st. That the Pharmacopœia directions for the preparation of this compound admit of a very variable result.

2nd. That the process consists principally in the preparation of ether, and the evaporating of the same into space.

3rd. That this extravagance would not be grudged if it resulted in a product of extraordinary potency, but there is no evidence to show that ethyl sulphate or its congeners are of such a nature.

4th. That the introduction of this preparation appears to be a step backward.

A vote of thanks was passed to Mr. Dott on the motion of the PRESIDENT.

The Bell and Hills Fund.

Mr. PLOWMAN then drew attention to the books on the table, provided by the Bell and Hills Fund. These books, he said, had been selected from a list sent to him from Birmingham, and in addition there were two given by Mr. Thomas Hanbury in memory of his brother, viz., 'The Science Papers' and 'Pharmacographia.'

The PRESIDENT said he had much pleasure in presenting these books to the Midland Counties Chemists' Association, and as the motto of Birmingham was "Forward," he thought a better nucleus for something to go beyond it could not possibly be given to the Association than such books as were on the table.

Mr. THOMAS BARCLAY, on behalf of the Association, said he had much pleasure in accepting this handsome gift, and all the more so as it came through Mr. Greenish, who had done so much for provincial education, not only by the address he had given on the previous day, but by his efforts for many years. He trusted that the books would be used by many future students, who at some future Conference would be able to testify to the advantage they had derived from them.

Place of Meeting for 1887.

Mr. WOOLLEY (Manchester) said that at a well-attended and very representative meeting of the pharmacists of Manchester and the district Mr. Benger and himself were deputed to offer a very cordial invitation to the Conference to visit Manchester next year. It was very evident from the tone of that meeting that everyone present was looking forward with great pleasure and interest to the possibility of the Conference visiting Manchester; it was felt that such a visit would be a great honour, and they would do all in their power to make it agreeable and interesting to the members. Manchester was not perhaps so happily situated as regarded its immediate surroundings as some places which the Conference had visited, but still they hoped to be able to show the members something that would be interesting. He alluded to scenes of natural beauty, but it was as an industrial centre that Manchester was eminent, and in that capacity she acknowledged no superior. Most of the national industries were carried on in and around Manchester on a large scale, and he was sure there would be ample material in this direction to interest the members of the Conference for so long a time as they could stay. Next year they would be engaged, along with all other Englishmen, in celebrating the jubilee year of Her Most Gracious Majesty, and in connection with that event the citizens of Manchester were engaged in organizing an exhibition which promised to be of considerable importance, and would be of universal interest to every member of the Conference. Manchester pharmacists had not hitherto had the honour of entertaining the Conference, but if putting their heart into the work would qualify them he was quite certain that none of the members would regret travelling so far. He could only say that if in Manchester they were able in any way to approach the hospitality and kindness shown them in Birmingham they would be amply satisfied.

Mr. BENGER also expressed the great pleasure with which the pharmacists of Manchester looked forward to the approaching visit of the Conference. He had had the gratification of attending fifteen or sixteen of these annual meetings, and of enjoying in common with other visitors the many kindnesses and courtesies which the Local Committee had always provided, and which had culminated in the present meeting. He could promise the Conference if it would accept the invitation it would receive a most cordial and friendly reception.

Mr. PLOWMAN then moved that the invitation so cordially given be as heartily accepted.

Mr. REYNOLDS seconded the motion, which was carried unanimously.

Mr. REYNOLDS then suggested that in order to save time the method of balloting usual in America be adopted. He would tender his ballot paper to the President to represent the whole meeting, unless anyone objected.

No objection being offered, the President declared the following duly elected as officers for the ensuing year:—

President.—S. R. Atkins, Salisbury.

Vice-Presidents.—M. Carteighe, F.I.C., F.C.S., London; S. Plowman, F.R.C.S., London; C. Symes, Ph.D., Liverpool; G. S. Woolley, Manchester.

Treasurer.—C. Umney, F.I.C., F.C.S., London.

Other Members of the Executive Committee.—W. Elborne, Manchester; A. W. Gerrard, F.C.S., London; T. Maben, Hawick; J. E. Brunker, M.A., Dublin; R. H. Davies, F.I.C., F.C.S., London; D. B. Dott, F.R.S.E., Edinburgh; T. Barclay, Birmingham; M. Conroy, F.C.S., Liverpool; W. H. Symons, F.C.S., F.R.M.S., London.

Local Secretary.—R. B. Benger, F.C.S., Manchester.

Auditors.—C. J. Arblaster, Birmingham; W. Wilkinson, Manchester.

Vote of Thanks.

Mr. SCHACHT said nothing could be more agreeable to a speaker's feelings than to have to express the sentiment of gratitude, and it was with the most sincere feelings on his own part that he had to propose a vote af thanks to the Local Committee for their exertions. As an old member of the Conference, having missed only two meetings, he might fairly say he considered the result of the exertions of their friends in Birmingham had been as satisfactory, if not more so, than on any previous occasion. In one or two respects their proceedings had shown some novelty, and on those innovations, for which the Local Committee was responsible, he thought it might fairly be congratulated. He begged to move—

"That the cordial thanks of the non-resident members of the British Pharmaceutical Conference be given to the Local Committee, especially to Messrs. Barclay, Thompson, Perry and Arblaster, for the very successful way in which the arrangements connected with the Birmingham visit had been made and carried out."

Dr. SYMES (Liverpool) seconded the motion with much pleasure, and it was at once put and carried unanimously.

Mr. THOMAS BARCLAY said he felt that the thanks of the Conference were due mainly to Mr. Thompson, the Honorary Secretary, for the very hearty way in which he had thrown himself into this work. Without his efforts they could not possibly have brought it to a successful conclusion. They had been to some degree handicapped by new arrangements but had endeavoured to carry them out satisfactorily, and he only hoped Manchester would do better next year. They would have the experience of this year to guide them, and no doubt with the wonderful ability which Manchester always displayed they would be able to improve upon the Birmingham experiment.

Mr. CHARLES THOMPSON thanked the Conference very warmly for the hearty way in which this proposition had been received and said, in doing so, it was only his duty to refer to the assistance rendered by other members of the Committee. Even those who had not taken such an active part in the arrangements had given a deal of time and attention to the matter; but whatever they had done had been amply repaid by the enthusiastic way in which this resolution had been received.

Mr. PERRY said it was not necessary to add anything to what had already been said, but he was very gratified to find that the efforts of the Committee had given satisfaction.

Retirement of Mr. Plowman.

The PRESIDENT said there was one matter, of some little importance, which he could not pass over without a word. After this meeting the Conference would lose the services of one of the Honorary Secretaries, Mr. Plowman. It was only when one was President that the amount of energy which Mr. Plowman had thrown into the work could be understood. Having held this official position he had been brought into constant contact with Mr. Plowman and could appreciate more than ever before the amount of energy and courtesy shown by that gentleman in carrying on the whole of the business connected with the Conference. He therefore begged to move—

"That this meeting of the British Pharmaceutical Conference desires to place on record its sense of the invaluable services rendered by Mr. Plowman as Honorary Secretary for the last five years and greatly regrets that he has found it necessary to relinquish the office."

Dr. THRESH thought, as Mr. Plowman's colleague, it best became him to second this vote of thanks. He had had the pleasure of knowing Mr. Plowman intimately for many years, having been his colleague first on the examination board, and again as Secretary to the Conference. The intimacy had been a most pleasurable one, and no one better than himself knew the immense amount of labour which Mr. Plowman had devoted to the Conference matters. This was more especially the case with regard to the Colonial and Indian business. When Mr. Plowman became Secretary, the Conference had only just begun to think of the Colonies and India as a field into which it might extend its labours, but through his indefatigable exertions it had now representatives and members in all parts of India, and in all the Colonies throughout the world. This was a matter upon which the Conference might specially congratulate itself, and it should bear in mind that the result was chiefly due to the efforts of Mr. Plowman.

The resolution having been carried by acclamation,

Mr. PLOWMAN said he had felt the continued success of the Conference for the last five meetings had been an ample reward to him for any efforts he had made on its behalf; but he wished to express his cordial thanks for the way in which the Conference had received the remarks of the President, and of his colleague, Dr. Thresh. With regard to the Colonial and Indian extension he felt bound to state that the idea did not originate with him. He simply carried out the details of the work. He left office with an easy conscience, because there were already inscribed in the book at the door the names of 187 members who had attended the present meeting. This was the largest attendance recorded at any meeting in the history of the Conference, and he believed a considerable number had attended who had not yet subscribed their names. Thanking the President once more for the kind way in which he had proposed this resolution, he must say that he felt that the future success of the Conference was assured for many years to come, for he had perceived many indications which satisfied him on that point. It was with much regret, and only from the pressure of other work, that he felt himself compelled to resign his office.

Votes of Thanks.

Mr. J. B. STEPHENSON then moved—

"That the hearty thanks of the meeting be given to the President and Council of the Mason's Science College for granting the Conference the use of the Chemical Lecture Theatre, and to Professor Tilden and Professor Hillhouse for their valuable assistance in promoting the success of the meeting."

That lecture hall in which the Conference had held its meetings was most convenient, and, in fact, he did not think for appropriateness he had ever seen it equalled at any previous meeting of the Conference.

Mr. MOSS seconded the motion. He said that all knew how much depended on the arrangements made for such a meeting, and on the present occasion these arrangements seemed to be almost typically perfect. He was glad too that the motion was associated with the name of his old colleague and friend Professor Tilden, whom they all rejoiced to see holding a high position in such an important town.

The motion was carried unanimously.

Mr. ALLEN (Dublin) then proposed a vote of thanks to the manufacturers who had so kindly opened their factories for inspection, in the following terms:—

"That the best thanks of the Conference be accorded to Messrs. Elkington and Co., Messrs. Heaton and Co., and Messrs. Gillott, for their kindness in allowing visiting members to inspect their works."

Mr. MABEN seconded the motion, which was carried unanimously.

Mr. GROVES then moved—

"That the best thanks of the Conference be accorded to the President for the very able and courteous manner in which he has conducted the business of the meeting."

He said there could be no doubt about the ability which Mr. Greenish had shown, and having himself occupied the same post, he could appreciate the amount of labour which was entailed in holding the office of President.

Mr. KEMP (Bombay) seconded the motion. He said the name of Mr. Greenish was known far beyond the limits of the United Kingdom, as one who had not only enriched the special science with which he was connected, but whose career was quoted as a brilliant instance of self-reliance and honourable success. As long as the Conference had a President who would preside over the meetings with the same kindness and dignity which Mr. Greenish had displayed, there could be no doubt of its success.

The resolution was put by Mr. GROVES and carried by acclamation.

The PRESIDENT, in responding, begged to thank Mr. Groves and Mr. Kemp for the very kind manner in which they had brought forward the resolution, and the members generally for the cordial manner in which it had been received. The Conference had been, of all the institutions connected with pharmacy, the one in which he had taken an especial interest for very many years. It had always been a pleasure to him to attend the meetings, and he had never attended a single Conference, from the first up to the present time, without deriving great benefit from it, and he certainly would recommend

all those who were present now for the first time to continue that attendance as long as the opportunity was afforded them. He was rather anxious about the success of this meeting at first, but was happy to think that his fears had been unfounded, and with regard to the ultimate success of the Conference he had not the slightest doubt. In fact he believed that year by year the Conference would increase not only in members but in usefulness, and in the character of the papers submitted to it. He was always glad to see a high class of paper, but not to the exclusion of pharmaceutical papers. There was still plenty of material to work upon, especially in those preparations the processes for which were by no means satisfactory.

This brought the business of the Conference to a close.

Provincial Transactions.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

On the occasion of the first meeting of the session, in Montgomery Hall, last Wednesday there was a reception at 7.30 p.m., which was largely attended. Numerous objects of interest were placed on the tables, and the evening was enlivened by vocal and instrumental music. After the prizes had been distributed to the successful students of the last session, the President, Mr. Newsholme, introduced Mr. Greenish, who delivered the following

Inaugural Address.

It is a good and wholesome custom to address the students at the commencement of a scholastic session. It is with many of the students a very important period of their life, when they are about to leave the parental roof, where much is thought out for them, to commence a career detached from home influences, in which they will for the most part be thrown on their own resources both mental and moral, and must think and act for themselves. I have cast about me and have come to the conclusion that there is scarcely an available source from whence to draw inspiration for the duty which has devolved upon me.

I have no doubt but that you have already had good advice tendered you *ad nauseam*, but if in my narrative I can introduce some little of a life's experience it may be substituting the elixir of elegant pharmacy in lieu of the infusion of a drug, somewhat nauseous to a young man, commonly called good advice. I presume that I may take it for granted that you have chosen pharmacy as your calling, or it may be that pharmacy was chosen for you,—pharmacy was chosen for me. I never knew the reason why; but at that time, half a century ago, it was sufficient to know that my father had chosen it for me, and I bowed to his decision. Parental arguments were not then in vogue, and in ignoring them parents escaped the perplexing condition which many persons find themselves in when their verdict is all one way and their reasons tend to quite the contrary direction.

It may be the same with many of you, and it would be interesting to know if, in choosing your calling, the amount or character of the education required ever formed a single item of consideration; and yet what an all-important influence will your previous education have on the future of your career, an education that should have been directed rather to training the faculties than to storing the memory.

You have by your presence here this evening in some measure acquiesced in the choice of your friends, and pharmacy has consequently become your life's vocation. I have no doubt but that many a parent will be gratified in seeing the earnest faces of the students on those benches on the present occasion, and I would fain indulge a hope there may be no disappointment to those parents during at least the coming session. You may have some members of your family, or at least some of those within your friendly circle, engaged in other pursuits demanding fewer sacrifices and enjoying more opportunities for acquiring wealth; but pharmacy, if properly pursued, will ensure you an honourable living, command respect for your acquirements and by-and-bye associate your name with those that hold a place in the history and progress of science. The time may even come when some enterprising journalist may desire your portrait, with your autograph, interview you for your life's history, and think it worth while to place you amongst "our celebrities" in connection with the progress of pharmacy.

It has been said, and often repeated, that scientific acquirements render you unfit for the every-day work of life. It need not be so; there is no reason why scientific knowledge should not be combined with thorough business qualifications, but if you point to men who have grubbed through bye-ways and dark ways and dirty ways till they have reached their ambitious ends, I am bound to tell you that the mental culture your training involves does not point in that direction.

The Mahomedans may well boast that their Prophet has said "Indulge in learning from the cradle to the grave," and the continuous acquirement of knowledge is necessary for you, as knowledge is a plant of slow growth. You may probably commence your duties in the shop,—I will not yet call it a pharmacy,—by sweeping it, and there is nothing derogatory in sweeping a shop. I did it for years and blacked my own boots, and it was one of my earliest triumphs that I got a better polish on my boots than did either of the other apprentices. After this the bottles have to be dusted daily, and cleaned occasionally. I do not believe in a dirty shop. Then commence the varied duties that devolve on an apprentice, among which "weighing up" forms an important part. As soon as possible acquire the habit of folding up parcels, small and large, neatly, as in after life you will find manipulative dexterity of great advantage to you.

You may not have many prescriptions; that "manna" may not rain in your wilderness; but if you have one occasionally, dispense that one on some recognized system. It is remarkable how few varieties there are of what may be termed typical prescriptions. In casting my eye over above two thousand written by the leading West-end physicians, about 50 per cent. merely require accurate measurement of the ingredients, without reference even to the order of mixing. About 10 per cent. have one or more salts that require to be dissolved, with or without heat, but which in houses where much dispensing is done, are generally kept in solution, so that in fact these scarcely differ from those previously mentioned. Another 10 per cent. have some powder or powders, such as rhubarb, magnesia, or chalk, to be rubbed down and mixed with the vehicle in a mortar, the remainder would embrace the emulsions, pills, ointments, pessaries, and suppositories. In making emulsions the principle has been so frequently laid down that it should be unnecessary here to refer to the manipulation or to the relative proportion of gum to a given quantity of oil, so that prescriptions that materially differ in their characters and that require difference in their treatment by the dispenser are comparatively few and should constitute no great tax on a retentive memory. Pills sometimes give trouble; the chief difficulty lies in the choice of excipient. Although we have pharmacists learned in excipients, and I honour every one that acquires deservedly a good reputation, it is possible to reach the end of a long life as a dispenser after sticking to very few excipients. Many papers have appeared in recent pharmaceutical literature containing suggestive details worthy of your careful perusal. One of these papers only I will refer to, ably written by Mr. Ince, now Teacher of Pharmacy in the School at Bloomsbury Square. He has given a variety of typical prescriptions, which may be studied with great advantage and taken as examples to be practised upon when original prescrip-

tions are very scarce. My object here is to show you that the absence of a large number of prescriptions written by diff-rent medical men is at the present day no sufficient excuse for a student, when he is somewhat advanced in the general knowledge of the drugs of the pharmacy, not being able to dispense fairly a prescription possessing no special peculiarities. Your prescription may have half a dozen or more ingredients, some requiring to be measured, others to be weighed. After the use of any bottle return it to its shelf before taking down another; do not litter your counter with bottles. With a little care and attention at first, cleanliness and neatness will become firm habits.

Commence your business life with a note book, and like Captain Cuttle, "take a note of it." Keep your note book in the breast pocket of your coat, usually now-a days devoted to a pipe, which in my younger days was considered a bad habit. If you have had anything new or suggestive brought under your notice during the day jot it down; do not wait until you can take a long stride in knowledge. In dusting your shop bottles note in your mind the name of each, so that you may readily put your hand on anyone that may be wanted. The contents also will very gradually impress themselves on your memory. One extra bottle on each day,—you will not find six bottles a week difficult,—and this habit will give you the whole shop in no great length of time. You may be all the day weighing Epsom salts, or Seidlitz powders, and find it very monotonous work. You will at first experience some difficulty in making a neat parcel, but gradually and almost imperceptibly your fingers begin to obey the trained intelligence, and the ounces of Epsom salts, with the Seidlitz powders, will assume more definite forms. And here let me tell you that no inconsiderable part of your technical training is involved in this manipulative dexterity. How valuable in a reference are the words, "He is a neat and accurate dispenser, especially neat in putting up proprietary articles." After business hours refer to your Pharmacopœia, and under "Magnes. sulph." read all that is said about it, and see whether it answers to the tests given. Out with your note book, and in half a dozen lines or thereabouts jot the facts down.

When that great oriental scholar, Sir William Jones, was a child, he used to ask his mother, and a very excellent mother she appears to have been, a great many questions. Her general reply was, "Read, my dear, and you will know." Cultivate a habit of observation, take a note of facts. Asking too many questions implies a lazy mode of acquiring knowledge. Read or search out your difficulties; the habit will become permanent,—the mind will acquire strength. With all your reading let your Pharmacopœia occupy the first place, and it will take a good deal of diligent reading fully to understand the why and wherefore of certain directions, and yet this "why and wherefore" it is, that it is essential the young pharmacist should know. It takes many years to develop a good pharmacopœia; it is a book that should be venerated by students.

"Fact on fact the hoary pile appears,
The gathered wisdom of unnumbered years."

Study your Pharmacopœia; you will find differences in manipulation which will, I have no doubt, engage your attention. You should be fully acquainted with the reason for those differences. Take, for instance, the simplest of the preparations, the infusions. You will find that two only are made with cold water and you are directed to macerate in a covered vessel for half an hour; that is in the formulæ both for infusion of quassia and calumba. In the case of infusion of calumba the object in view in using cold water is to avoid the solution of the starch by the hot water; here recognize the difference between infusion and maceration. Again, in making decoctions the directions for some are to boil for ten minutes in a covered vessel; in one of them to boil one ingredient for ten minutes and towards the end adding the other, the object being to avoid loss of the volatile principle of the cinnamon. In a third a covered vessel is not required; there is no appreciable volatile principle in this drug. Again, in the directions for making extracts, some require cold water to be used, as in ext. opii.

In making syr. ferri iodidi it is not at once apparent why the solution of ferrous iodide should be boiled with part of the syrup. You may assume that this is not a freak on the part of the compilers of the Pharmacopœia, but has as definite an object as the use of particular proportions of water and spirit in making the extract and tincture of nux vomica. In the former the formation of glucose will delay the oxidation of the ferrous iodide, and in the latter these proportions have been experimentally shown to be the most suitable for extracting the alkaloid without simultaneously dissolving the fatty matter. Many of such queries may be solved by a little thought and reference to standard works, but you will occasionally exercise in vain your highest ingenuity in endeavouring to fathom the motives that guided the compilers of the British Pharmacopœia.

In my early days, just after I had commenced business, a prescription was brought to me containing extract of opium with Goulard's extract, an external application in a case of cancer. My great desire to make my own preparations had impelled me to make, amongst the first, ext. opii; fortunately I had some for this prescription. I made the lotion, and its application afforded the patient great relief. It had been made up in several places previously, but the patient had derived no benefit, and the lotion had brought out an eruption. These facts were mentioned to the medical man in attendance, who prescribed it, a leading West-end physician. His reply was "You may rest assured you have now had it made up properly for the first time." This lotion was dispensed by me several times afterwards with the same soothing result, until death relieved the cancerous patient from all her earthly troubles. This same physician recommended me to several of his patients, some of whom are customers of mine to the present day.

Well now, what is there within your reach to stimulate you during your apprenticeship? If you make good use of your time, and step by step and stage by stage count progress, there is the Bell Scholarship, worth any amount of energy you may give to it. What does the gaining of it imply? A session of ten months' laboratory instruction, with free admission during that period to all the lectures delivered in the Society's school, and, in addition, £30 in cash to assist you in defraying the cost of living in London during that time. I daresay you all know the terms, if not, the sooner you make yourself acquainted with them the better, and if you try, and fail, you will, in effect, have acquired valuable knowledge only less in value than the scholarship itself. Emerson has said "that every institution is to be regarded as but the lengthened shadow of some great man." The Bell Scholarship carries with it the name of that great benefactor to pharmacy to whom we are all deeply indebted. You may ask me again, What is there besides or beyond the Bell Scholarship? After being trained to scientific working through your session in the laboratory, for I assume that whether you gain a scholarship or not you will spend a session in the laboratory, there is the special laboratory for research; in that the work will be thorough, and any student may, by a year or more of work on a given subject, acquire a "niche" in the Temple of Fame.

Compare now your advantages with the opportunities for young men in the time of my youth. There was at that time no cheery outlook; all was dreary; the knowledge acquired was acquired for its own sake, and the midnight hour was spent in the search after truth. Do not imagine that your education is at any time finished. I have now to work as hard and study as closely and systematically as ever I did to keep myself abreast of the progress in the science and practice of pharmacy.

It is presumed that you have passed your Preliminary

before your apprenticeship; if so, you can now during your pupilage devote yourself to that which is required of you in your first and technical examination, the Minor; by commencing early the difficulty is minimized. Make yourself familiar with the materia medica of your shop; that will result from a habit of observation and reflection in the daily routine of the business. And an occasional ramble in the country with a small text-book will materially facilitate your study of botany; if you bring home one plant only on each occasion, and study it thoroughly, it will fully engage your spare hours after business for at least one day. A few test tubes and reagents will familiarize you with the chemistry of the Pharmacopœia, the study of which would be much facilitated by a more practical knowledge of the rules of arithmetic than is possessed by many of those about to commence the scientific part of their education. This apparently slow and gradual process in the acquisition of the several branches of knowledge required will enable you to meet the examiners with a fair degree of confidence as to the result. I do not lose sight of the Major examination and the honourable title of Pharmaceutical Chemist; but I think the Minor, being the technical examination, should be passed by an educated and diligent student as the result of home study, so as to be able to give the session in the laboratory to scientific training, rather than to warp that training in order to pass the Minor examination.

The opportunities you have during your apprenticeship for acquiring technical knowledge will perhaps never again recur to you, and if you are simply scientific without being practical, you may, in so far as the safety of the public is concerned, be an unsafe assistant. This is worthy of your careful consideration as students of pharmacy.

In the evening of every day go carefully through your shop, lecture, and laboratory notes, and compare them with the text books, of which a list is given in connection with the school notices in the *Pharmaceutical Journal*. It may be thought by you that this absorption of time leaves no leisure for friends or recreation of any kind. Far be it from me to deprive you of fresh air, friends or recreation; but let these be subservient to your main occupation. Do not let a day pass without the consciousness of some progress being made, and when you have an idea that you have mastered a subject, sit down and try your hand at making from memory a fair copy; this will practise you in a very valuable habit of expressing yourself readily and clearly. You may think, and not without some reason, that your advantages here in the country do not equal those of a London student. I grant it; but it is not the abundance of advantages, but rather the use that is made of those you have, that tell in your favour as a student of pharmacy. Some of our best "all-round" candidates in the examination room are those who have never left their own provincial towns. Identify yourselves as soon as opportunity offers with those institutions which exist in your locality. The Sheffield Pharmaceutical and Chemical Society offers you a good "bill of fare," and if your hunger and thirst continue and you have exhausted that source, I am sure that I can safely advise you to visit Bloomsbury Square, where a large table is spread, where the dishes are excellent and the entertainment being *table d'hôte* the charges are moderate.

I must still say a word as regards this and other struggling provincial schools in different places throughout the country. I hope to see the time when the Council of the Pharmaceutical Society will arrange that they be systematically visited and reported on by some one or more capable persons appointed for this purpose, so as to bring the teaching of the several schools into harmony with each other, in order that assistance of the proper kind, and at the right time, may be afforded them until they become self-supporting.

But I hope there will soon be a break in the dark cloud that now hangs over provincial education, and that by means of some voluntary organization, and the formation of provincial schools at several centres throughout the country, this great relative difference may be considerably modified, and that the earnest student may find that it is possible, by making larger use of smaller advantages, to graft on preliminary technical training that scientific knowledge which is necessary now and which is every year becoming more necessary for the practice of pharmacy. "The strong man and the waterfall channel their own path," and there is a contagiousness in every example of energetic conduct.

You may very likely have to burn the midnight oil by-and-bye; I will not therefore light the lamp to-night by detaining you any longer. In bidding you farewell and wishing you God speed, I shall ever feel an interest in the school with which this evening I have been brought into pleasurable contact, and shall also indulge the hope that I may shortly see at least one Bell Scholarship awarded to a candidate from the Sheffield School of Pharmacy.

A hearty vote of thanks, moved by Mr. Ward, F.C.S., seconded by Mr. Preston, was unanimously passed, to which Mr. Greenish briefly responded.

NORTH OF ENGLAND PHARMACEUTICAL ASSOCIATION.

The Annual Meeting of the above Association was held in the Lecture Theatre of the Durham College of Science, on Thursday, October 7, at 8 p.m. The President (Mr. N. H. Martin) in the chair.

The minutes of the last meeting were read by Mr. A. Wright, in the absence of Mr. Owen, Hon. Sec. These having been confirmed, the report of the Council was read by Mr. Wright, and the Treasurer's report by the Hon. Treasurer, Mr. J. B. Payne.

It was moved by the President, seconded by Mr. Dunn, and carried unanimously, that the reports of the Council and Treasurer as now read be adopted, printed and circulated.

The list of prize awards was then read, after which Mr. B. S. Proctor offered some remarks before presenting the prizes. Mr. Proctor alluded to the value of prizes, certificates and lectures, the necessity of students carefully noting and storing up small details met with in ordinary business life, and the successful issue of such combined with careful systematic study. The small number of students entering for the present session was made the substance of some regretful remarks. The prizes and certificates were then distributed.

A vote of thanks to Mr. Proctor was proposed by Mr. Stuart, seconded by Professor Bedson, and carried with acclamation.

The President then delivered—

The Annual Address.

Gentlemen,—Your rules impose upon me to-night the obligation to deliver an address, and however conscious I may be of an inability to do this in a manner which will fulfil your reasonable expectations, I at least make no apology for attempting to perform the duty. During the past forty years, so much has been written upon the condition of pharmacy in this country and upon its future prospects, that you will scarcely expect to hear anything new from me; but at the cost of repeating what has often been said before, and perhaps better said, I think it is fitting that you should demand from me, upon whom you have laid the chief responsibility for the year in laying the foundation of this pharmaceutical association, a fuller exposition than you have yet had of the faith which I profess. If you refer to the records of the early doings of the Pharmaceutical Society, and read what was written by the eminent and unselfish men who were its founders, you will find the keynote of their work and hope was education. In evidence thereof I cannot do better than lay before you a paragraph from a paper

written by the late Jacob Bell, "On the Constitution of the Pharmaceutical Society" (*Pharm. Journ.*, [1], vol. i, p. 7), which runs as follows:—"The ultimate objects contemplated in this Society are, the union of the chemists and druggists of Great Britain into one ostensible, recognized, and independent body, the protection of their general interests, and the advancement of the art and science of pharmacy. They consider that their own interest, as well as the safety and welfare of the public, demands that no person shall become an apprentice in their business who has not had an adequate fundamental education; and that no person shall dispense medicines who has not undergone an examination as a test of his competence to perform that important office. But, in order to afford ample means of acquiring the requisite qualifications, and in order to ensure the greatest possible uniformity in the system of education, the chemists and druggists consider it expedient to establish a school of pharmacy, as a prominent feature in their Society. They propose to institute a regular course of study for the members of their Society, and more particularly for those who will in future enter into the business of a chemist and druggist." I think it will be generally conceded that to-day, forty-five years after the above was written, pharmacy has not attained the position to which the writer of these words looked forward. For more than twenty years the Pharmaceutical Society, through its school of pharmacy and its system of examination, as a voluntary body, did much to elevate the calling, and sent out through the country men who were fair representatives of what it was desirable pharmacists should be; so that when public opinion had become educated to the fact, that in the interest of public safety it was needful that all men who kept open shops for the dispensing of medicines and for the sale of poisons should be previously examined and give satisfactory evidence of their qualification, the Legislature did not hesitate to delegate those powers to the Pharmaceutical Society and to accept their hitherto self-imposed examination as the standard of efficiency. We may, I think, justly infer this was done because of the many examples there were to prove that that system of education and examination fitted men for the responsibilities with which they were to be entrusted. The weak point, however, was that our legislators overlooked the fact that an examination which, while voluntary, answered admirably as a means of testing men's competency (because only those who were properly educated, either in the Society's school or by careful private study, would present themselves for examination), would fail when rendered compulsory without provisions to ensure the needful preliminary systematic training. Without this compulsory training, men who were not students from choice, and who had neither inherent nor acquired liking for any of the scientific subjects involved in the practice of their calling, would commit to memory, with the least possible exercise of intellectual and reasoning powers, enough to enable them to pass through the hands of the examiners and to obtain the certificate without which they cannot commence business on their own account; and the real spirit which underlies the Act of 1868 would be evaded although the letter might be kept. Is not this the history and the experience of the last eighteen years? Are we to-day any nearer taking the position in the world to which we are and ought to be entitled as a body of educated men? I think you will all answer that while in our ranks there are a few who have attained distinction in the scientific world, our examinations have not obtained for us, as a body, either the respect or the rewards which our fellow-citizens are generous enough in bestowing upon those who are educated to a professional standard and practise their avocations in a professional spirit. The present condition of the chemists and druggists of this country is unsatisfactory, and the outlook of the immediate future for the majority of us is gloomy beyond description; because we are alienating—slowly, it may be, but, nevertheless, most surely—our birthright of education and its attendant privileges and accepting in their place all the ills of unscrupulous commercial competition. The Pharmaceutical Society at its institution in 1841, and more concisely and definitely in its Charter of Incorporation in 1843, set forth the object to be aimed at and the means by which it must be attained. It is commonly found that the special and technical education of a country corresponds in some degree to the general education of the masses at the same period, and when we reflect upon the condition of the general education of our country nearly fifty years ago as compared with that at present existing, it is not so surprising to us that a very large proportion of the chemists and druggists who were then in existence, many of them probably old men, should ask *cui bono*, and should stand aloof from what they considered mere new-fangled notions. But the next twenty-five years witnessed an advance in the average education of Englishmen, and the Act of 1868 rendered examinations compulsory and bestowed upon the Pharmaceutical Society the responsibility and the privilege of conducting and maintaining them. Here was the golden opportunity for the chemists and druggists of this country, and if they had realized their position, and had entered heartily into the spirit which had guided the Pharmaceutical Society in framing the Act of 1868, we should have been spared the sorry spectacle which now presents itself, and pharmacy to-day would have been on the high road to take its position as an honoured branch of the profession of medicine. The opportunity was given to the chemists and druggists of this country to raise themselves above the category of tradesmen, but it was left to their own option to embrace the opportunity or not. Unfortunately, we now know that by far the larger number preferred what they short-sightedly thought the more profitable *rôle*, and they are now the loudest in blaming the Pharmaceutical Society for not having done that which was beyond its capacity, though it was entirely within the power of the members of the profession to do it for themselves. The Pharmaceutical Society, by precept and its leading spirits by example, did all that it was possible, and the blame rests with every chemist and druggist in this country who has held aloof from the organization, and who, by opposition to its counsel, has helped to produce the condition of things which to-day he finds so unsatisfactory. Take one phrase in the extract I read to you from the pen of Jacob Bell, that "No person shall become an apprentice who has not had an adequate fundamental education." Has that been carried out? I, in common with many others, hold that no young man should enter a pharmacy until he has passed the pharmaceutical Preliminary examination, and for this reason: if the young man's opportunities of being educated have been so few, or his mental capacity is of so low an order that he is unable to fulfil the very moderate requirements of the Preliminary, at the age when boys now leave school, it is a mistake to suppose that the boy will ever become a competent pharmacist. When I have seen young men over twenty years of age come a second, third or fourth time into the room to sit for the Preliminary examination, it has appeared to me little short of cruelty to allow such candidates to enter the business at all. If when a lad presents himself and states his desire to learn the business of a chemist and druggist, his prospective master would explain to him the nature and requirements of the avocation upon which he wished to enter, and would take the trouble to ascertain that his education and school training fitted him for the necessary study, many would be stopped at the threshold, who, through sheer ignorance and under an entire misapprehension, are allowed to take an almost irrevocable step, only to find out when it is too late the mistake they have made. Such youths are in many cases deserving of our sympathy, although they help to swell the list of those who will postpone for another generation the progress of the art and calling of pharmacy. The fault

was their masters' in the first instance. Before I leave this part of my address, I should like to refer briefly to that which I have called "unscrupulous commercial competition." I do not mean to disparage competition in itself; it is in one form or other a necessary element of business, and together with its congener, ambition, has done a great deal to increase and help forward the business of the world. It is only when they are devoted to ignoble ends, or resort to devious courses, that competition and ambition become alike wrong in the individual and injurious to the community. In any trade competition which is merely directed to price necessarily gives the least scrupulous members of the calling advantages over those who are honest; and if this is so in other trades, how much more is it the case in pharmacy. In our calling when competition is directed to undersell a neighbour until he can no longer make an honest living it is directed to an ignoble end and in like manner, when competition leads a man to sell some articles at a rate of profit below his neighbours, in order that he may produce the false impression upon the public that he is cheaper than his neighbours in all other things, it is pursuing its end by devious courses. Both these forms of competition are unworthy of the ordinary tradesman and infinitely more unworthy in those to whom is entrusted the duty of handling medicines. I do not think such men as William Allen, Jacob Bell, Peter Squire, Daniel Hanbury, Henry Deane, or many others who have adorned our calling, ever advanced their businesses by underselling their competitors, but as I have had the privilege to know the secret of the success of some of them I will tell it to you. It was that they devoted all the powers of their minds to doing their work honestly and thoroughly, and in doing so thought themselves entitled to honest remuneration, and in the end they were not disappointed. It is not for us to-day to consider whether it is to the advantage of the State and our fellow citizens that the distribution of drugs should be in the hands of men individually qualified to guarantee the quality thereof. Our countrymen have through the Legislature declared their *desire* that such should be the case and the *inertia* of the members of our trade alone has hindered pharmacy from taking her proper position in the ranks of a learned profession. There are about thirteen thousand registered chemists and druggists, of whom only about three thousand six hundred are members of the Pharmaceutical Society, and of these only fifteen hundred and fifty take a sufficient interest in its doings to fill up their voting papers for the annually elected Council. If the pharmacists of this country had been true to themselves and to their privileges there is no calling which would have suffered so little at the hands of co-operative stores and the class of competition we have considered. We hear very little of co-operative stores interfering with the duties of the lawyer, the doctor or the clergyman, and for the reason that capital or merely commercial co-operation (which is only a mode of employing capital) cannot do that which it is the special function of the trained individual to perform. At the present time we are doubtless passing through a crisis, but if every chemist and druggist of this country would do his best to carry out not only the letter, but the spirit of the Pharmacy Act there need be little fear for the future. Let every registered chemist and druggist who is eligible join the Pharmaceutical Society and take an active interest in the election and the acts of its Council. Let every registered chemist in future decline to take as an apprentice any youth who is not a fit and proper person to be trained for our business, and when he has taken him use his moral influence to induce such apprentice to undergo a systematic course of instruction in some competent school of pharmacy, instead of wasting the greater part of his time and then trying to cram in three months knowledge the acquisition of which ought fairly to have taken as many years. If chemists will do this they will fulfil the objects of the Pharmaceutical Society, and will for a certainty secure the elevation, and with it the satisfactory remuneration of pharmacy throughout this country. But let them go on as they are and they play into the hands of co-operation and swell the list of unsuccessful candidates, who become discreditable competitors to legitimate pharmacy, and help to degrade it to the level of a mere trade. It is for this object and this only that I have promoted the formation of our local Pharmaceutical Association to which I will now direct your attention.

You have heard the report which has been presented by your Council. In that report there are many features which bear a promising aspect, and although there is a good deal of local as well as general indifference, I venture to hope seed has been sown which will grow and bear fruit in some future day. We must not, however, be too sanguine, we were reminded at our first meeting by one whose experience of the district far antedates my own, that this is not the first attempt which has been made for the improvement of pharmacy in this neighbourhood, and only recently I have come across a pamphlet entitled 'Report of a Meeting of the Chemists and Druggists of Newcastle and Neighbourhood invited to meet Mr. Jacob Bell, of London, held at the George Inn, Pilgrim Street, August 2nd, 1852,' and I have been struck with the fact that the remarks which Mr. Bell then made are as applicable to our condition now in 1886 as when they were first uttered. Mr. Bell found that "out of probably seventy or eighty chemists residing within a very small distance of the place of meeting it may be that fifteen or twenty come to assist in this consultation." We have perhaps a somewhat larger proportion of eligible members who have joined us nominally, but having done so they appear to take but little further interest in the matter. At the meeting which we had in October last, when no less important a subject than the practical discussion of the new Pharmacopœia was announced, only twenty-five members and associates, out of about one hundred and twenty, took sufficient interest in the subject to make the necessary effort to be present. At the final meeting the attendance fell off to eleven members and associates. This was most discouraging and may have operated to deter other members who were able from offering papers to us. I hope this condition of affairs will be altered and that every one of our members will make it a matter of personal duty, demanding if necessary some little sacrifice of inclination, to be present whenever we are able to arrange matter to occupy an evening. This will encourage other members to contribute papers, and we may enjoy many profitable evenings and accomplish much good. A wise man has said "Iron sharpeneth iron; so a man sharpeneth the countenance of his friend." Every one of us can contribute something out of his individual daily experience, and if the future of our Association is not the success which it ought to be and may become, let each member take to himself the blame which will most assuredly belong to him. I should like to allude to the material success and prosperity which have attended our first year. Our library and museum are in a flourishing condition, the former largely through the generous aid of the Pharmaceutical Society, and the latter mainly through the indefatigable exertions of our Honorary Curator, Mr. Wright, who has devoted an amount of time and energy to the work of the Association for which we are largely indebted to him. It is impossible to over-estimate the value of the work which may be accomplished through the agency of the library and museum, but here again those who are most anxious to see the fruit have no power to compel the students to come in. Whether they will or not is entirely within their own discretion.

From considering the Association, I am naturally led on to speak of the School of Pharmacy, and to address a few words to the students therein. I should like, however, my words to have a wider application, and to have reference to every student in our district, whether

circumstances have permitted him to join our classes or not.

It is not necessary for me to speculate upon what may have been the reasons which guided you in choosing the calling of a chemist and druggist, but whatever they may have been, I hope for your sakes that the accumulation of money was not one of them. If it is so you have made a mistake, and if it is not too late I should advise you to try some other avocation. If, however, you look upon your lives as worthy to be devoted to higher and nobler objects than money making, I congratulate you upon your choice, for I know of no pursuit by which men may hope to earn an honourable livelihood, where the highway is so interesting and elevating, and as to the byeways and sidelights of our business, they are full of opportunities of quiet and rational enjoyment.

The larger number of you have doubtless received a sufficient education to have enabled you to pass the Pharmaceutical Society's Preliminary examination before you were apprenticed, but to those who have not, whether it has been their misfortune or their fault, I would say lose no time in qualifying for it. If you have not learnt Latin at school, arrange to have evening lessons in the language, for you cannot possibly learn it intelligently by your own endeavours. Spend as much time as may be necessary to do this work thoroughly, and to repair as far as you can the defects of preliminary education before you commence the systematic study of more technical subjects. Some of you will doubtless continue the study of English literature, and perhaps a few will extend their acquaintance with Latin authors, but in either case this will be greatly a matter of individual taste and environment, and I am concerned only to tell you how to become practical pharmacists.

After passing the Preliminary examination those of you who can arrange to attend a course of lectures and do some work in a chemical laboratory will be fortunate, but whether you can do this or not, do not let it hinder the practical education which ought to commence from the first day you enter the shop. A good deal of the mechanical work will be at first more or less irksome, but if you will make this the occasion of training your senses of sight, touch, taste and smell, you will soon find your interest in the work increase. The first question an apprentice asks is, what books shall I get to read? In reply essentially the shop book is the Pharmacopœia, this must be your daily companion and guide. Make yourself acquainted with the names and characters of all the official drugs and preparations and in doing this you will not have proceeded far on your course before the necessity of other books is forced upon you, to enable you to understand what is written. One of the earliest of these will be some work on chemistry, and here there is no difficulty in selecting your author. Professor Attfield has written, without exception, the best and most practical book for the pharmaceutical student. If you will take this book and the word *thorough* as your guide through the course of your apprenticeship there will not be the slightest fear that chemistry will be your weak point when you come to face your examiners. Here especially beware of slipshod work at the commencement; have a complete grasp and a clear understanding of the preliminary chapters on the principles of chemical philosophy, and especially on the laws of chemical combination. On reading these chapters for the first time the probability is that your minds will be in a fog between atoms and molecules, quantivalence and atomic weights, but do not grudge the labour you will have to undergo in this part of your subject; it will repay you a hundredfold in saving labour in what is to follow, as it forms the key to enable you intelligently to understand the reactions, combinations and decompositions which are afterwards described. In this subject the advantage of oral teaching by means of lectures and of practical laboratory work is very great, but if you cannot get these, conversation with your master or some fellow-assistant who understands the subject should greatly help you to get clear ideas, and for the practical work the instructions in Attfield are so lucid that a painstaking student should have little difficulty in performing most of the experiments and understanding their significance.

In the study of the Pharmacopœia the next subject upon which you will feel the need of a text-book is probably botany. The Pharmacopœia makes use of, but does not define, terms which will be as Sanscrit to you without the knowledge of botany. In this subject, as in chemistry, there is no difficulty. Professor Bentley has written a manual which is pre-eminently the book for the pharmaceutical student. The last edition is brought up to date in the information it contains, and a young man who has honestly studied his Bentley will find his encounter with the botanical examiner not the least pleasing experience of his day of examination. In this subject make your reading as much as possible subservient to practical work; that is to say, the study of actual specimens, whether in the field or by the aid of the microscope. Sit down and read and try to remember all the definitions and terms, and you rise up with a headache and a jumble; but go out into the fields and hedges and collect examples of leaves, flowers, fruit, etc., and learn the names of all their forms and varieties with the aid of your book, and you will find the process healthful and delightful. So far from terms being a weary burden on your mind, if you learn them in this way and learn them thoroughly, they will be as household words. In studying the elementary structure of plants do the same with your microscope. Get examples, as far as possible, of every form of cell and tissue, make sections of various stems and roots, and familiarize yourselves by actual experiment with all the details of this branch of the subject. Do I hear some poor student say "that is very good advice, but where am I to get the money to buy the microscope?" My answer is, make some sacrifice for it; fortunately, to-day you can get a good instrument for less than one-third of what it cost twenty years ago, but there are successful pharmacists of to-day who made the sacrifice in those times, and they will tell you they do not regret it. I am not writing on the many uses of the microscope to you in other branches of your profession, or I could dilate on it for much longer, but in botany, if you would study thoroughly, the miscroscope is absolutely essential.

The third great subject needful to the proper understanding of the Pharmacopœia is materia medica, and here, unfortunately, no single author has done for the pharmaceutical student what Attfield and Bentley have done in chemistry and botany. A thorough knowledge of materia medica must be gleaned from various sources; but the early years of the pharmaceutical student may be well and profitably spent with the Pharmacopœia, and Hanbury and Flückiger's 'Pharmacographia' as his guides. Materia medica is essentially the history and description of substances used in medicine, and a large number of the examples necessary for its study occur in every pharmacy. Those that are not will be found here in the museum or can be obtained, by the inquiring student, from any wholesale house. Study the descriptions and characters of every drug from actual specimens, learn the botanical and geographical sources and natural orders by heart, make notes freely in your note book of all the salient points, and from time to time go over them to refresh your memory. Pay especial attention to adulterations and substitutions, and whenever possible get examples of these so as to be able to study and recognize them. Three or four years spent in this way will make you masters of the knowledge necessary to acquit you honourably in the presence of your examiners. But you must not stop here; materia medica will occupy some portion of your study all through your business career, if you would keep up your reputation as an educated pharmacist.

The next subject is one which, on its theoretical side,

includes much of the other three, and on its practical side consists in training your hands to manipulate, your eyes to see, and your noses to smell, and is called pharmacy. In the nearly quarter of a century with which I have been connected with pharmacy, it has been a matter of surprise to me, to hear so many young men say they had been rejected on practical pharmacy. They failed to recognize the various tinctures, extracts, etc., and I know this was because they have had eyes which see not and noses which smell not, in consequence of their neglect to train them, day by day, whilst they were manipulating and handling the preparations they used. In this subject the students in this district are exceptionally fortunate that they may come and learn the *rationale* of pharmaceutical processes from the lips of the only English author, who, in recent times, has written upon the subject, our respected townsman, Mr. Proctor. If you are debarred from this, get his book and learn from it the why and wherefore of the every-day processes in which you are engaged.

I have left the consideration of practical dispensing and prescriptions until last, because to be competent to perform the duties of dispensing you must have an acquaintance with all the other subjects. In performing the duties and in preparing for the examination on these subjects you will derive great assistance from Pereira's 'Selecta e Prescriptis,' and Ince's 'Latin Grammar of Pharmacy.'

This completes the course of study which, if pursued intelligently and honestly, will make you competent pharmacists; and at the same time it ought to create within you a sense of dignity and self-respect and such an amount of respect for your order, that it will cause you to demand from the public a reasonable and honourable reward for your services whenever they may be called for. In leaving this part of my subject I should like to utter one note of warning to the young, and that is to beware of the seductions of ephemeral literature. Spend your time with your chosen text-books and teachers and avoid the weeklies of pharmacy. It is worse than of no value, it is a sheer waste of your time, as a student, to read the mere local gossip called into being by the exigencies of a weekly issue, and I also advise you to avoid "Students' Corners." Your master or your fellow-assistant or apprentice can prepare for you test powders and solutions, which will be educationally of far more value to you, and you will be saved the excitement of trying for prizes in competitions in which the gain or loss has no practical bearing upon your daily training.

In conclusion, I trust you will believe that what I have said is the outcome and conviction of my business life, and if I had not feared to be egotistical, it might have been abundantly illustrated and enforced by my individual experience. I desire only the elevation and the good, in the best sense, of that branch of medicine to which I have devoted myself, and to accomplish this I know of no better means than to support heartily what I have tried to impress upon you, viz., the objects and aims of the Pharmaceutical Society and of local associations such as this.

A vote of thanks was proposed by Mr. J. B. Payne, who alluded to the indefatigable work of the President to forward the success of the Association, which was seconded by Mr. J. B. Ford, who also spoke to the same effect, and regretted that a larger number of students had not entered their names for the next session.

The election of officers for the ensuing year was then proceeded with. Mr. N. H. Martin and Messrs. B. S. Proctor and John Harrison (Sunderland) were re-elected President and Vice-Presidents respectively; Mr. T. Rheeder, Hon. Treasurer; Mr. G. B. Ford, Hon. Secretary; and twenty members of Council, representing various towns in the district.

Votes of thanks to the officers and Council for their services during the past year, and to the Council of the Durham College of Science for the use of the Lecture Theatre in which to hold the meeting were then passed.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

The Unofficial Formulary.

Sir,—The discussion that has appeared in your pages upon Mr. Reynolds's motion for a Committee of the Conference "to undertake the preparation of a formulary for non-official remedies, etc.," has been chiefly directed to the indication of what that Committee ought not to do, and has to that extent tended to withdraw from its operations much of the field originally named for its labours.

It has been pointed out that that class of "non-official remedies" typified by "Bullock's Glycerine of Pepsine," whose claims are advocated on the ground of their intrinsic excellence, affords no scope for the Committee's work, and concerning those of the "Mistura Magnesiæ et Bismuthi Comp." order, the contention has been if they are valueless the Committee had better let them alone; if of some value, why disturb the owner in the enjoyment of the fair reward of his sagacity?

If then all such "non-official remedies" as are included in these lists are to be eliminated from the field of inquiry, what is left? The only answer I can find is "new and untried remedies."

And here I venture to intrude myself into the discussion with the opinion that a Committee constituted like that of Mr. Reynolds is not competent to deal efficiently with the subject of "new remedies."

This opinion must be understood to imply no disrespect to the very excellent pharmacists who compose that Committee. My objection is fundamental.

The remedial properties of drugs and chemicals is the subject of medical inquiry, and in my opinion no committee consisting of pharmacists exclusively is justified in undertaking any such investigation. Its members are presumably untrained for the most important portions of the inquiry, and its decisions would possess no more claim to respect, perhaps even less, than those advertized by some responsible vendor.

The case, however, would be altogether different if a joint Committee of medical and pharmaceutical experts could be nominated by acknowledged representative bodies on both sides, and could be accommodated in a laboratory where pharmacological problems could be worked out upon recognized scientific lines.

I ventured when this subject was first broached at Birmingham, to urge that it came rather within the sphere of the Pharmaceutical Society's action than that of the Conference, but the suggestion was received with some signs of disapprobation; nevertheless, I repeat it now at this more advanced stage of the discussion, in the hope that it may at any rate be well considered.

The Council of the Society is known to be maturing a scheme for a research laboratory, and in no direction could the work of that laboratory be directed with fairer hope of really useful result than in the one I have just suggested. A set of workers willing to subordinate their individual powers of investigation to a general purpose planned by competent authority might with great advantage to themselves, and to science, and with some credit to the Institution that provided it, occupy the home thus offered them.

And, as I presume to think, the conclusions to which they might arrive would be accepted with a confidence that the members of Mr. Reynolds's Committee can hardly dare to hope for. G. F. Schacht.

What is Laudanum?

Sir,—I note in last week's Journal a Kent coroner and a jury have troubled the Privy Council to communicate something about laudanum. Will the Kent coroner, his jury, the Privy Council, or any one else tell me what laudanum is and their authority?—in so doing they will oblige.

Sheffield. G. Ellinor.

F. Tree.—Cornus sanguinea.

F. Davis.—It is a gall commonly known by the name of oak spangles. The insect producing it is *Neuropterus lenticularis*.

THE COLONIAL AND INDIAN EXHIBITION AT SOUTH KENSINGTON.

Ceylon.

Drugs are largely represented in this Court. A collection of three hundred and sixty-two specimens of native remedies is exhibited by Dr. Trimen, the Director of the Royal Botanic Gardens at Peradeniya, and the special catalogue gives the vernacular and botanical names of these drugs, with their medicinal uses, making it one of the most perfect of its kind in the Exhibition. A case illustrating the cultivation and manufacture of cinnamon in all its stages, accompanied by a series of photographs, and by specimens of the tools used in the process, forms a very interesting exhibit. This is from the property of Mr. David Smith, M.P. for Brighton. The exports of cinnamon appear not to have increased much during the last ten years, having been 1,262,250 bales of bark and 258,381 of chips in 1876, and 1,574,022 of bark and 628,914 of chips in 1885. The chips consist of the cuttings from imperfectly grown cinnamon branches; they are said to be largely used in perfumery and in the distillation of cinnamon oil, much of which is made in the island. The current value of cinnamon is given in the Official Catalogue as 1*s.* 3*d.* per pound for the first quality, 9*d.* to 11*d.* for the second sorts, and 6*d.* or 8*d.* for the third, these prices allowing profit only on very well cultivated and carefully managed properties. There is also a good show of cardamoms, some of the samples being remarkably fine. Two kinds of the plant are cultivated in Ceylon, viz., the ordinary Malabar kind, which throws out its racemes horizontally, and the Aleppy, commonly called the Mysore cardamom, which has upright racemes and is more robust and hardy than the Malabar kind, standing drought and a high altitude better. The Malabar cardamom is, however, usually cultivated, since it is more productive. The cardamoms known as Ceylon cardamoms are gathered by the Singhalese from wild plants, and dried in a comparatively careless manner, while the cultivated cardamoms are treated with great care. The fruits are cut off with scissors by the coolies, then spread out in trays, slowly dried, and subsequently bleached, the chief object being to prevent the capsules splitting and to have them of a whitish colour and well filled and solid. If gathered in the immature state they are of a light colour, and have what is known in trade as a "lean" appearance. A good deal of the spice is said to be consumed in India for cooking and chewing. Nutmegs are exhibited from the Kalutara and Kégalla districts. The tree is grown chiefly by natives, at altitudes ranging from 1000 to 1800 feet. The annual value of the exports amounts to only 26,000 rupees. Cloves are shown from the same districts. This spice is grown in similar localities to the last, and comes into bearing when seven years old, continuing to yield crops for fifty years or more. The yearly shipment of cloves amounts in value to 6000 rupees. Pepper is shown by three exhibitors, but although commonly grown by the natives it is not exported; several varieties of the plant are in cultivation in the island. Of vanilla there are two exhibits. According to the Official Catalogue the flowers have to be fertilized by hand, the insects of Ceylon appearing not to be able to effect this process, unlike those of the native country of the plant (Mexico). The flowers usually appear during the hot dry north-east monsoon, *i.e.*, from January to April, and the pods begin to mature about the commencement of the following north-east monsoon, increasing in size and ripeness until January. As soon as they begin to show an orange tint, they are gathered and air-dried, cotton wool being fastened round them to prevent their splitting open. The plant thrives only in rich moist ground, under somewhat lofty shade, and fruits well in the neighbourhood of Kandy; with care it has borne fruit also near Colombo.

Cinchona bark forms a very prominent exhibit in this Court. A trophy formed of trees and large quills of bark serves to illustrate the varieties in cultivation and the several modes in which the bark is removed, as well as the usual size of the trees at different ages. From these specimens it is evident, however, that the name of Ledger bark is applied to more than one kind of bark rich in quinine. It was not until 1872 that the planting of cinchona was commenced in Ceylon in earnest, and it increased between 1873 and 1878, until about 4,000,000 plants had been distributed to planters, in addition to large plantings in private nurseries. Much of the seed obtained in 1886–7 from *C. succirubra* and *C. officinalis* produced trees of a hybrid character rich in alkaloid, these trees being known under the name of *C. robusta.* The methods of harvesting adopted in the island have been by uprooting, by coppicing, by stripping, and more recently by shaving. The last-named process has usually, but not invariably, been found to yield a larger percentage of alkaloids than the original bark. The extent to which it may be carried has not yet been ascertained. Many experienced planters recommend shaving the tree at five years, and again at six, and coppicing at seven, taking care that a good-sized sucker is allowed to start from the collar before cutting down the tree. The reason that the shaving process finds so much favour is that it enables the planter to obtain handsome and continuous returns without destroying the value of the tree. Although some of the finer varieties have at times yielded as much as 10·50 per cent. of sulphate of quinine from trees three and a half years old at an altitude of 3200 feet, at the present day there are few that give 4 per cent., the largest proportion yielding only 1·50 to 2·50 per cent. The shipments of late years have consisted largely of the strippings of the branches and twigs, containing not more than ½ per cent. of quinine. The exports of cinchona bark from Ceylon have risen from 18,731 pounds in 1875 to 11,678,360 pounds in 1885. A specimen of sulphate of quinine is shown by Messrs. Symons and Cochrane, of Colombo.

The essential oils of cinnamon bark and leaf and citronelle and lemon grass oils are represented by several exhibits. According to the Official Catalogue the shipments of citronelle oil have increased from a few thousand ounces about a dozen years ago to 1,760,677 ounces in 1881 and 5,721,112 ounces in 1885, and there are now about 10,000 acres of land under cultivation; this over-production having caused the oil to fall to one third its former value, and the price being now unremunerative, growers are now abandoning many of their grass fields.

The oil of lemon grass, or as it is commonly called oil of verbena, is manufactured entirely by the natives, but not more than 8719 ounces were exported last year. Oil of cinnamon is distilled in the island from broken quills and the coarser portions of of the bark, which are incapable of being worked in

with the usual quills. The finest oil is valued at a rupee per ounce, but the inferior quality commands only one fourth of that price. The shipments of the oil have risen from 41,719 ounces in 1881 to 117,023 ounces in 1885.

Of the resins exhibited the following seem worthy of notice, viz., that of *Doona cordifolia*, shown by Dr. W. C. Ondaatje, of *D. Zeylanica*, which is colourless and hard and makes a good varnish, and that of *Vateria acuminata*, which is a good clear white dammar-like resin. A fossil resin, dug up on the island, named "Bindummala," the origin of which is unknown, is also shown. Of dye stuffs that of the jack wood (*Artocarpus integrifolia*) is worthy of note. It is used by the natives for dyeing house mats and fibres for ornamental purposes and gives to cotton and silk the peculiar pale canary colour which is required for the robes of the Buddhist priests. Mililla wood (*Vitex altissima*) is used to give a still paler yellow, but neither of these dyes are exported. Sapan wood, which in 1883 was exported to the extent of 11,404 cwts. has declined to 2834 cwts. in 1885, owing to the low price now obtained for it.

The chief tanning materials used in the island are ranarawara bark (*Cassia auriculata*), and the half-ripe fruit of the timberi (*Diospyros Embryopteris*). The latter is also used to coat the planks of boats to preserve them from the attacks of marine insects. The tannin of the plants of this genus appears to be of a peculiar character and to deserve further investigation. Very fine specimens of plumbago are exhibited in this Court from the western and north-western provinces. The trade in this article has increased from less than 1000 cwts., forty-five years ago, to 279,057 cwts. in 1883, half of which goes to the United States, and of the remainder seven-sixteenths to the United Kingdom, and one-sixteenth to British India and Europe. The yearly value of the export varies from one and a half to two million rupees, the highest qualities ranging in value from 100 to 135 rupees per ton, and the lowest quality from 30 to 45 rupees per ton. The trade is entirely in the hands of the Singhalese.

Of fixed oils cocoa-nut is the most important exhibit. The amount exported in 1885 was 274,998 cwts. The oils of the bright yellow, or "king" cocoa-nut, is said to be devoid of the strong aroma of the ordinary oil, and is highly esteemed by all classes of natives and many Europeans as hair oil. The value of gingelly oil exported is given at 7500 rupees. The cultivation of croton seed has been taken up during the last few years by a few Europeans, and the samples exhibited look fresh and clean.

The oil of *Aleurites moluccana*, known in Ceylon as kekune oil, is said to be exported to Europe for soap making and for cloth dressing, for which purpose it is reported to be superior to olive oil. Margosa or kohomba oil (*Melia Azedarachta*) is stated to be much used by native practitioners for suppurating scrofulous glands. The oil cake resulting from the preparation of cocoa-nut oil, and called "poonac" in Ceylon, is said to be used pretty generally by French military authorities for cavalry horses, since a small portion added to their ordinary food gives a glossy appearance to the coat of the animal, and at the same time promotes its general health. Jaffna, or sea moss (*Gracilaria lichenoides*), which is commonly used in Ceylon as a nutritive food for persons of weak digestive powers, is only occasionally exported. Concerning the edible birds' nests exhibited, it is stated in the Official Catalogue that the bird which makes them (*Collocalia francica*) builds in large dark caverns in any locality, from the seaside to the highest hills. They contain much less glutinous matter than those of Java and Borneo (see *ante*, pp. 41–42). The nests are built close together against the face of overhanging rocks, and the bird is of a smoky colour, and darker on the head, wings and tail than elsewhere, whereas the Java and Bornean birds are said to be bluish. The nests are collected by Chinese, who pay Government a small annual sum for the exclusive privilege of collecting them in certain caves, chiefly of the Morowa Korle of the southern province. The yearly value of the export amounts to about 4000 rupees.

In this Court, Dr. W. C. Ondaatje exhibits dried pulp of the nux vomica fruit, from which loganin was obtained by Professor Dunstan; also several medicinal barks, and the concrete milky juice of *Alstonia scholaris*, which possesses some of the properties of india-rubber. Specimens of these products have been presented to the Museum of the Pharmaceutical Society by Dr. Ondaatje.

Natal.

Although Natal aloes and Natal arrowroot are familiar to the pharmacist, there is perhaps scarcely any part of Africa where less is known of the native remedies. Comparatively few are shown, but a large series, bearing only the native names, has been handed to the Society by the Executive Commissioner for examination and report. One of the specimens exhibited is the root of *Tephrosia macropoda* or "losaan," which evidently possesses active properties, being used for killing insects and fish. Intolwana bark (*Elephantorhiza Burchellii*) contains, according to information received from Mr. Morton Green, the acting Executive Commissioner, 29·430 per cent. of tannin. It contains, however, a brownish-red colouring matter. Other tanning barks exhibited are those of the black wattle (*Acacia mollissima*), containing 47·871 per cent. of tannin, umgwenga bark (*Harpophyllum caffrum*), wait-a-bit-thorn (*Zizyphus mucronata*) and Injoni bark. Sunflower seed and oil, linseed, lime juice, cayenne pepper, "socotrine" aloes, plumbago, asbestos are other exhibits of more or less interest to pharmacists. The euphorbia juice, of which a sample is shown, is said to be extensively used for painting ships' bottoms to prevent the adhesion of marine animals.

This colony has probably a great commercial future before it. Both coal and iron abound and the climate is suitable for the cultivation of many commercial products. Coffee, sugar, and a great variety of fruits, including those of tropical as well as of temperate climes, from the apple and pear to the pine-apple and orange, can be grown without difficulty at different altitudes on the gradual slope from the sea to the mountains, and an abundance of streams permits the use of water power for machinery. Tea, of which numerous and very fine samples of excellent flavour are exhibited, is a recently introduced article. In 1881 the first 500 lbs. of tea were placed on the market, and in 1883 Natal exported tea to the value of £1499. Owing to the absence of drought in summer, larger and more frequent crops can be obtained than even in India or Ceylon. Natal arrowroot is well represented by

numerous samples. Among the fruits peculiar to this part of the world may be noticed the Cape gooseberry (*Physalis pubescens*), a Solanaceous fruit, about the size of a small cherry, which makes a very good preserve, and is constantly seen on the table of the South African steamships. The amatungulu, or Natal plum (*Arduina grandiflora*), has a pleasant refreshing flavour. One of the finest fibres in the whole Exhibition has been found in this Court by Messrs. Cross and Bevan. When worked up it is as fine and soft as wool, and at the same time strong. It is known as native hemp. Specimens of fœnugreek, coriander, turmeric, and a large black mustard seed are shown as products of the colony.

The Cape of Good Hope.

This Court possesses a high degree of interest for general visitors in the excellent display of ostrich feathers, the illustrations of ostrich farming, diamond mining and cutting, as well as the curious mineral crocidolite, recently found in considerable abundance, and now used for all sorts of ornamental purposes. The medicinal plants used by the natives and Boers are represented by no less than six collections, samples of which have been promised to the Society's Museum by Mr. S. Cowper.

The leaves of *Bubia Galbanum* are used in decoction for dropsy and gravel, and appear to possess diuretic properties. Those of *Melianthus major* have been found very serviceable by Dr. A. Brown in necrosis and foul ulcers and in promoting granulation. The root and leaves of *Lichtensteinia interrupta* are used in splenic fever, and appear to be thought highly of. The root of *Sium capense* is chewed or held in the mouth to relieve toothache ; *Leonotis Leonurus* and *L. ovata* appear to possess some narcotic property, as they are smoked by the Hottentots like tobacco. *L. Leonurus* is the Fuigo tribal remedy, and is used as an antidote to snake bite. A decoction of *Cissus capensis* is considered an excellent remedy for piles, lumbago, and dysentery. *Hyænanche globosa*, or wolf's bane, is very poisonous and used to destroy hyænas, etc. It appears to be confined to a single locality called Gift berg (*i.e.* poison mountain), in Clanwilliam.

Teucrium africanum, the tribal remedy of the Kaffirs, seems to possess antiseptic properties. When a cow has died of milk fever the Kaffirs boil the flesh along with this plant, and believe they can then eat it with impunity. It is used in ophthalmia, in glanders, and for snake bites, but in cases of very venomous snakes, *Leonotis Leonurus* is given with it. It appears to merit investigation as to its active principle. *Lantana salvifolia* appears to have similar properties, and is reputed to have the power of intoxicating birds. Dr. A. Smith found small doses of the infusion beneficial in incipient bronchial affections. The Official Catalogue states that a decoction of the leaves of *Aloe africana* is taken in cases of liver complaint, etc. ; and roasted and ground the powder is rubbed into incisions where pain is felt. Cape aloes is procured from several species of this genus. The *Aloe ferox*, Lam., a native of Swellendam, is generally acknowledged to yield the best extract. That obtained from *Aloe africana*, Null., is almost equally good, but not so bitter, nor so drastic. It is the produce of the eastern districts, whence large quantities are annually exported. The aloes commonly used by the colonists is prepared from *Aloe plicatilis*, Null., whose extract is a much milder purgative. It inhabits the mountainous range near the Paarl Drakenstein and French Hoek.

A series of herbarium specimens of the more important of the native medicinal plants is exhibited by Mr. A. Smith, M.A., of the Lovedale Mission. These are excellently preserved and carefully mounted. They include *Toxicophlœa Thunbergii*, used as a remedy for snake-bites, and for poisoning arrows, *Lantana salvifolia*, *Leonotis Leonurus*, *L. ovata*, *Teucrium africanum*, *Gunnera perpensa* and a species of Clematis known as "itylo," used for bots in horses, *Xanthoxylon capense* and *Cluytia hirsuta*, used for disinfecting the meat of cattle that have died of splenic fever, and as an antidote to blood poisoning from eating the meat of such cattle. *Withania somnifera* is used for sores in horses, and *Phytolacca stricta*, for pulmonary disease. These specimens have been kindly promised by the owner, through Mr. Albert Walsh, to the Herbarium of the Pharmaceutical Society.

A white crystalline substance named *Proteacin*, exhibited by Mr. J. H. Meiring Beck, M.B., is said to be derived from a species of *Leucadendron*, and chemically allied to salicin. It is found serviceable in the treatment of local malarious fevers. *Cassytha filiformis* is reputed to be used for washing the head, destroying vermin, and making the hair grow.

Arctopus echinatus root is said to be very valuable in cutaneous eruptions. The myrtle wax obtained from the berries of *Myrica cordifolia*, *M. serrata* and *M. quercifolia* seems to be a product that is capable of development, as it is hard and does not readily turn rancid. It is collected in the district of Humansdorp, where about 2000 acres are covered with the plants.

Excellent hops, raisins, and tobacco are produced in the colony, and several specimens are included among the exhibits. Seal oil, obtained from seals caught on the rocks and islets off the south-west coast, and shark oil are also shown.

West Africa.

The West African Court includes exhibits from the Gold Coast, Lagos, Sierra Leone, and Gambia. Among those from the Gold Coast may be noted kola nuts, calabar beans, grains of paradise, ginger, gingelly seeds, tiger nuts (*Cyperus esculentus*), and india-rubber, one specimen of which, exhibited by the Government, is of very excellent quality. A quantity of native jewellery is shown in this Court, and the rings, upon many of which, curiously enough, the signs of the zodiac are inscribed, find ready purchasers. Some ancient beads, known as aggrey beads, are so highly valued by the natives that they will give their weight in gold for them. They are occasionally found buried in the ground, and are supposed to have been objects of barter brought from Egypt and the far north, and used in trading with the inhabitants of that part of Africa.

Lagos.

The exhibits in this Court comprise a number of interesting products, among which the following may be mentioned :—Shea butter seeds, kola nuts, eguse seed, a kind of melon seed yielding an excellent sweet oil, and used as an ingredient in native dishes, calabar beans, camwood, beeswax, palm oil and palm kernels. A kind of indigo, said to yield a fine deep blue dye of a permanent character, is shown by several exhibitors. This does not belong

to the *Indigofera* genus, but is supposed by Professor Oliver and Mr. Thiselton Dyer to belong to the genus *Lonchocarpus* and to be nearly allied to *L. cyanescens*, Benth. Ogea gum (*Daniellia sp.*) is a resin that might possibly be turned to account in varnish making. By the natives it is used for fires and for lighting, and when powdered is used as a perfume by the women. The native African pepper consists of the fruits of *Cubeba Clusii*; the pod-like fruits of *Xylopia ethiopica*, which have been used in France for bronchitis, gonorrhœa and other mucous discharges with success, also pass under this name.

Sierra Leone.

A number of curious drugs are shown in this Court, many of them practically unknown. The African pepper alluded to under Lagos is here called pimento or allspice or long pepper by the English settlers, and ehru by the natives. The ginger root shown is small and of inferior quality. A number of oil seeds are shown, including gingelly seeds, physic nut (*Jatropha Curcas*), malukeh seeds (*Polygala oleifera* or *P. rarifolia*), cockwood seeds (*Aleurites sp.*), woroca seeds, laintlaintain (*Lophira elata*), eguse, pine seed, cashew nuts, aballah seed, black mangrove seed and soursop seeds, also koondee seed (*Carapa guianensis*). Of dyeing materials a bark named yellow wattle, turmeric, mango bark and coranko give a yellow or olive-yellow dye, turmeric being known as ginger rose. Under the name of cinnamon the bark of some species of *Xanthoxylum* is shown. Some Burseraceous resin is marked gum benzoin. Besides the indigo above described the fruits of some Myrtaceous plant, named boojay, are said to give a pure indigo dye.

Gambia.

A number of native remedies are exhibited, most of which are little known. The root of Banta mare (*Cassia occidentalis*) is used as a preventive of fever, a decoction being taken every morning, and the leaves are applied in erysipelas and local inflammation. As much as fifty tons of the seed are said to have been exported from Senegal as a coffee substitute. The expressed oil of coorie seeds (*Guilandina Bonducella*) is used for ear disease and a decoction of the roasted seeds for consumption or asthma. The dried flowers of *Datura Stramonium* are smoked for asthma. Denbidek root (*Xanthoxylon senegalense*) is used as a remedy in leprosy and the seeds are worn as a perfume by native women. The seeds of *Lawsonia inermis* are also used for leprosy. Ella fruits (*Hyphœne sp.*) are used in colic. Govay roots or African sumbul (*Cyperus sp.*) are made into beads and worn as a perfume. Lamay lamay seeds (*Convolvulus sp.*) are used as a purgative in doses of four or five roasted seeds. Nandeck root (*Sarcocephalus esculentus*) is used for colic and in cutaneous diseases, and keng roots are extensively used by the natives as a nervous stimulant. Taff roots and leaves are reputed to be a remedy for pneumonia and bachanchor roots in venereal complaints and as a diuretic. Foof roots are considered anthelmintic and are kept in the fresh state in the huts to drive snakes away.

The fixed oils include shark, porpoise, palm kernel, and ground nut oil, and the oil seeds the carapa, physic nut, ben seed, and homhom and gologne fruits (*Calophyllum, sp.*). The roots of "bellencoofa" (*Amomum macrospermum*) are used as a strong purgative, but the pulp of the fruit is eaten. The leaves of faftan (*Asclepias gigantea*) are employed as an anodyne in headache, and the juice and roots as a remedy for toothache. Under the name of varech seed those of *Aleurites sp.* are used.

Many of these products it would have been impossible to identify but for the kindness of Sir James Marshall, the Executive Commissioner, who at the cost of considerable time and trouble, afforded every facility for examining the specimens.

India.

The medicinal products exhibited in this Court are extremely numerous, but most of them have already been described in previous volumes of this Journal. The "Notes on Indian Drugs," by Dr. Dymock and the more recent publication of 'The Materia Medica of Western India,' by the same author have, moreover, placed within the reach of those interested full accounts of the properties and uses of these products. All available information concerning cinchona cultivation in India, together with descriptions and analyses of the barks, has also appeared from time to time in this Journal.

SALICYLIC ACID AND MONAD SALTS.*

BY R. ROTHER.

It is known that the solution of salicylic acid in water is enormously augmented by the presence of certain salts of the monad metals, and that the resulting solutions have the physiological effects of free salicylic acid. It was, however, shown that in these combinations the acid is not free in any sense, but that normal salicylates and acid monad salts are formed.

In consideration of these facts, the writer attempted the solution of benzoic and gallic acid on the same principle

It was found that benzoic acid is entirely inert in this connection under the usual circumstances, but that it liberates some acetic acid from potassium acetate on heating their mixture.

Gallic acid is much more energetic but adversely so as it generates sparingly soluble monad gallates.

Trials were then made with salicylic acid and various other salts than those heretofore used in such cases. It was found to have no effect with sulphates and hypophosphites, but it readily decomposed tartrates, pyrophosphates and borates. There are doubtless many other such saline combinations producible in this manner, but no others were sought.

This peculiar reaction led to the question of its special chemical character and the subsisting interrelations of the products. Hence the writer examined acetates, citrates, tartrates, phosphates, pyrophosphates and borates.

Potassium Acetate and Salicylic Acid.

The addition of acetic acid to a simply aqueous solution of a salicylate causes the precipitation of crystalline salicylic acid in profusion. It is therefore apparently remarkable that a normal acetate as abundantly dissolves free salicylic acid. It seems furthermore doubly strange that one molecule of the acetate conditions the solution of one molecule of the acid. This solution is however but temporary as it gradually deposits a considerable proportion of free acid. When this liberated acid is reconverted into potassium salt and reunited with the remaining solution no subsequent separation occurs, not even in the presence of any amount of excess of acetic acid. This result shows that a certain proportion of potasstum acetate is essential to keep all the salicylic acid in solution in the presence of acetic acid largely in ex-

* From the *American Journal of Pharmacy*, September.

cess. It was found that this is effected when three molecules of the acetate react upon two molecules of salicylic acid, that is, in the proportion of 294 parts of the first and 276 parts of the second. Since the commercial potassium acetate is always more or less damp and indefinite, it is better to employ instead, 300 parts of perfectly dry and well crystallized potassium bicarbonate neutralized with acetic acid aided by warmth. The expression for the reaction is written

$$3(KAc)+2(HSl)=2(KSl)+KAc(HAc)_2.$$

This makes it apparent that only enough acetic acid is displaced to generate one molecule of acid potassium acetate which then protects two molecules of the salicylate in the presence of more acetic acid. This solution, when moderately dilute, had a not unpleasant acidulous taste and hence widely different from the nauseous flavour of unmixed salicylate.

Pure potassium salicylate, when crystallized on a slide and viewed under the microscope, is seen to be in the form of stellate groups having a fine appearance in polarized light. When, however, crystallized in a similar manner from the acetate solution it is presented in a greatly improved shape, being especially elegant under the polariscope. It is best seen with a half inch objective. The rays constituting the star crystal emanate from a common centre without intercrossing. The rays thicken towards their middle and then again attenuate. They have a rather irregular contour, and in the finest samples appear slightly curved.

Potassium Citrate.

Salicylic acid is abundantly dissolved by potassium citrate. The somewhat dilute solution has an acidulous not diagreeable taste. Three molecules, 414 parts of salicylic acid requires two molecules, 648 parts of the citrate for perfect and permanent solution. This indicates that only half of the potassic radicle is replaced as represented by the following equation :—

$$2(K_3Ci)+3(HSl)=3(KSl)+K_2HCi+KH_2Ci.$$

The two resulting acid citrates, either separately or conjointly, form an amorphous mass which greatly interferes with the crystallization of the intermingled salicylate. It is however readily distinguishable under the micro-polariscope. When the dry residue is flooded with sufficient water the crystals are better seen along the margins of the liquid.

Potassium Tartrate.

Salicylic acid and normal potassium tartrate react upon each other molecule for molecule, that is, in the proportion of 138 parts of the first and 235 parts of the second, according to the following :—$K_2T+HSl=KSl+KHT$.

After filtering off the precipitated acid tartrate the salicylate is obtained in a practically pure solution. Evaporated on a slide, the salt crystallizes mixed with an occasional rhomb of the acid tartrate. On flooding the slide with water the tartrate remains and becomes very conspicuous. It also polarizes, but incomparably less florid than the salicylate.

Rochelle Salt.

One molecule or 282 parts of sodio-potassic tartrate reacts with one molecule or 138 parts of salicylic acid. The product consists practically of precipitated acid potassic tartrate and a solution of sodium salicylate. The result is expressed by the equation :—

$$KNaT+HSl=NaSl+KHT.$$

The solution dried on a slide gives a crystalline residue which, under the microscope, is shown to have a feathery appearance. In the smaller crystals there is a decided tendency to radial grouping. When the residue is flooded with water a due proportion of rhombic cream of tartar crystals remain, and an occasional short prismatic needle of acid sodium tartrate is seen. The sodium salicylate soon attaches itself to these again, and whilst completely covering them wholly confuses itself. The salicylate polarizes finely as also does the acid sodium tartrate, but in much smaller degree. A solution of pure sodium salicylate yields chiefly feathery crystals arranged in numerous concentric rings. In each ring system the crystals are all confined to rings, but radiate uniformly from the common centre of the system. The U. S. Pharmacopœia states that sodium salicylate occurs in small crystalline plates. This is entirely wrong as there is not the slightest tendency to plated formation. Under insufficient powers of the microscope the rounded groups have such an appearance, but higher powers resolve them as already stated.

The writer believes that the descriptive paragraphs of the U. S. Pharmacopœia are a most valuable feature. It is, however, the writer's opinion that ocular demonstration is worth pages of definitions, never so vividly realistic. Much energy and valuable space was devoted to the voluminous but comparatively useless tables in the Pharmacopœia. But it does appear that it would be entirely consonant with the purposes of the code to institute the most appropriate means of elevating its standards. It therefore seems that a profusion of well-executed representations would be an admirable, most simple, and yet highly effective supplement to the official pharmacognosy. Such an element would raise the microscope in pharmacy into conspicuous prominence. Furthermore, this feature, if appropriately immanent, would largely tend to develop the close scrutiny, cleanliness and care so essential in the business of pharmacy. There is no reason why every drug store should not be equipped with an effective microscope. The money annually paid for senseless luxuries would purchase every pharmacist a very serviceable instrument of this kind.

Sodium Acetate.

Sodium acetate is more definite and less changeable than the potassic salt. It therefore offers better opportunities in arriving at more decided conclusions. Aside from this, the result is analogous to that with potassium acetate, and there action is precisely similar, as follows :—

$$3(NaAc)+2(HSl)=2(NaSl)+NaAc(HAc)_2.$$

The solution evaporated on a slide yields large but coarse radial groups which do not improve under the microscope.

Sodium Citrate.

Normal sodium citrate reacts with salicylic acid on the same principle as the potassium salt. Since, in this case also, but half rather than two-thirds of the base is replaced, the writer employed disodic citrate with a view to elucidate the general reaction. In this instance two molecules of the citrate reacted with one molecule of the salicylic acid, according to the following equation :—

$$2(Na_2HCi)+HSl=NaSl+Na_2HCi+NaH_2Ci.$$

It will be seen the extra molecule of disodic citrate is apparently superfluous, as it reappears intact in the second member of the equation. It is nevertheless somehow essential to the result, as all the salicylic acid can only be dissolved by the whole amount. The solution leaves elegant crystals on the slide, which are simply magnificent under the microscope. They must be viewed with very low powers, owing to their unusual size. They now closely resemble the potassium salicylate, as formed from the acetate. They also lack the ringed arrangement.

Sodium Phosphate.

Salicylic acid reacts on disodic phosphate molecule for molecule according to the following equation :—

$$Na_2HPO_4+HSl=NaSl+NaH_2PO_4.$$

The solution yields a dry residue, in which the salicylate does not appear to advantage. It does not possess a particularly agreeable taste.

Sodium Pyrophosphate.

One molecule, or 446 parts of sodium pyrophosphate dissolves two molecules, or 276 parts of salicylic acid, and the reaction is indicated as follows :—

$$Na_4P_2O_7+2(HSl)=2(NaSl)+Na_2H_2P_4O_7.$$

The product gives rather better results under the microscope than the phosphate mixture. It also has a more pleasant taste. . . . .

Sodium Borate.

Two molecules or 276 parts of salicylic acid are dis-

solved by one molecule or 382 parts of sodium pyroborate as shown by the following equation :—

$$Na_2B_4O_7 + 2(HSl) = 2(NaSl) + H_2B_4O_7.$$

The result is rather remarkable. It differs from all the other cases in that the pyroboric acid is wholly replaced and thus set free. On evaporation, a pasty transparent residue remains. Under the microscope no satisfactory view is obtained, as the salicylate is completely obscured by the amorphous and extremely soluble pyroboric acid. The solution has a very nauseous taste.

Ammonium Citrate.

It is difficult to obtain a definite normal ammonium citrate, owing to the similar condition of the carbonates. Bicarbonate of ammonium gives the best result, but not wholly free from uncertainty. The result with salicylic acid is possibly analogous to that with the other monad citrates. The indications, however, point to the following reaction :—$(NH_4)_3Ci + HSl = NH_4Sl + (NH_4)_2HCi$.

The solution readily yields most splendid crystals of ammonium salicylate. They are so large and distiuct that very low powers serve best to exhibit them. Their form is intermediate between that of the potassium salt, obtained from the acetate, and the sodium salt derived from the citrate. The solution has a palatable sweetish acidulous taste.

All of these mixed salicylates crystallizing well are obtainable from either strong or weak solutions with equal ease. These, however, crystallizing with difficulty, appear better from weak solutions. All the solutions are more or less tinted of a brown-yellow colour. Those from the potassium tartrate and the borax have the deepest shade, whilst those from the sodium pyrophosphate and the ammonium citrate have the lightest.

The solutions resulting from borax and sodium phosphate are the most unpalatable, while those of ammonium citrate and Rochelle salt are the least so.

THE ASH OF SOME PHARMACEUTICALLY IMPORTANT SEEDS, FRUITS, ETC.*

BY H. WARNECKE.

As statements respecting the ash yielded by many seeds, fruits and parts of fruits, are entirely absent from manuals of pharmacognosy, notwithstanding that the determination of the ash is of great importance in the examination of a powder for mineral admixtures, the author offers this paper as a contribution to the history of the subject.

In the determination of the ash about 3 grams of a selected air-dried sample was rubbed to a coarse powder in an iron mortar, or in some cases (strychnos seeds, tonka beans, etc.), simply cut into small pieces, and, after carefully taking the weight, incinerated in a weighed platinum capsule, in the way recommended by E. Reichardt. The uncovered capsule was brought about 2 centimetres above the opening of a Bunsen burner, and the flame allowed to play over the dish, when the gases evolved ignited and the mass was reduced in two or three minutes to a porous coal. The capsule was then placed obliquely upon the triangle and the incineration continued gently so that only the lower part of the capsule appeared red, the current of air being increased by placing the cover with its concave side inward in the opening of the capsule. After one or two hours the whole of the carbon was burnt off. During the operation stirring was avoided, so that the mass might remain as loose as possible ; neither was the flame increased, on account of the volatility of many of the ash constituents and to avoid the running together of the alkaline ash. Finally the capsule was allowed to cool in an exsiccator and weighed.

The following figures refer to the air-dried substance and give the average of several closely concordant analytical results :—

	Per cent.
Semen Colchici	2·66
„ Sabadillæ	3·45
Semen Myristicæ*	2·00
Macis	1·39
„ after removal of 30·13 per cent. of fat	2·74
Semen Staphisagriæ	9·88
„ Nigellæ	3·67
„ Sinapis albæ	4·63
„ Rapæ	4·36
„ Gossypii arborei	4·49
Cotton Seed Flour	6·85
Pasta Guarana	1·36
Semen Cydoniæ	3·55
„ Abri precatorii	2·79
„ Tonco	3·57
„ Hyoscyami	4·51
„ Belladonnæ	2·22
„ Strychni	1·14
„ Ignatii	2·34
„ Cucurbitæ	2·88
Fructus Cardamomi	6·12
Cubebæ	5·45
Fructus Cannabis	4·83
„ Cocculi	5·20
„ Anisi stellati	2·16
„ Anisi religiosi	2·02
„ Colæ	2·53
„ Aurantii immaturi	5·85
Flavedo Fructus Aurantii	3·90
Cortex Fructus Aurantii, with the white inner tissue removed	5·28
Cortex Fructus citri	3·55
„ Fructus Belæ Indicæ	2·08
Pulpa Fructus Belæ Indicæ	3·72
Fructus Anacardii occidentalis	1·64
„ Anacardii orientalis	2·14
„ Rhamni cathartici maturi	2·80
„ Rhamni cathartici immaturi	3·67
„ Petroselini	7·04
„ Carui	5·27
„ Ajowan	10·45
„ Anisi	6·70
„ Fœniculi	7·25
„ Dauci silvestris	5·96
„ Cumini	8·09
„ Conii	6·69
„ Coriandri	5·21
„ Pimentæ	4·00
„ Capsici	4·66
Piper Cayennense	4·54

Glandulæ Lupuli are required by the Pharmacopœa Germanica to contain less than 10 per cent. of ash, but the author has not met with any sample that answered to this requirement.† All the samples were contaminated with sand, which upon shaking with chloroform sank to the bottom, the glands floating above. A sample from Wiggers's collection left upon combustion 15·33 per cent. of residue, whilst other samples from various pharmacists and drug houses, gave 18·14, 23·6 and even 44·76 per cent.; of the last mentioned 4 to 5 per cent. dissolved in hydrochloric acid the remainder being admixed sand. In order to ascertain the true ash content of hop glands the author tried to free a quantity from sand by washing it with water six times in a large beaker. After drying over sulphuric acid the lupulin gave upon incineration an average of 10·81 of residue, which still contained some sand adherent to the sticky glands. Flückiger found in a good sample, dried in a water-bath, 7·7 per cent. of ash.

In conclusion, the author estimates the ash in ipecacuanha root at 1·98 per cent.; the wood giving 1·37 per cent. and the bark 2·25 per cent.

* From the *Pharmaceutische Zeitung*, Sept. 8.

* By boiling pulv. sem. myristicæ with benzol for two hours in a return condenser 41·25 per cent. of fat was removed. The dried residual powder gave 3·77 per cent. of ash.

† The British Pharmacopœia allows 15 p. c.—Ed. *P. J.*

THE STUDY OF NATURE AND THE NATURAL METHOD OF PURSUING IT.

BY G. A. GRIERSON.

The following paragraphs form the concluding portion of an introductory lecture delivered to the Botany Class in the Sheffield School of Pharmacy:—

"There are days which occur in this climate at almost any season of the year wherein the world reaches its perfection, when the air, the heavenly bodies, and the earth, make a harmony as if nature would indulge her offspring." The sentiment here so well expressed by Emerson is one which appeals to the experience of all who love the woods and fields. The pleasure experienced on such occasions arises mainly from the influence on the mind of natural forms. "To the body and mind which have been cramped by noxious work or company, nature is medicinal and restores their tone. The tradesman, the attorney, comes out of the din and craft of the street and sees the sky and the woods, and is a man again." The lover of nature then is influenced by nature's simple beauty.

There is, however, another and a higher influence which nature has on man. It forms for him a subject of thought; it becomes an "object of the intellect." The pleasure derived from it in this light arises not only from the natural craving for knowledge being satisfied, nor only from the appreciation of the harmony which everywhere exists, but from a happy blending of those perceptions in one idea, namely, that "all good is eternally reproductive, that the beauty of nature re-forms itself in the mind, and not for barren contemplation, but for new creation." The love of beauty constitutes taste; the embodiment of it, art. The interpretation of nature constitutes science. The result of this interpretation is the discovery of the processes by which nature works, the formulation of laws. The true interpretation of nature and the discovery of natural laws does not necessarily dull the perception of the beautiful; it has rather the opposite effect, because by showing the working it impresses with the harmony of nature. The scientist may then be a man of taste. The artist, at least if he aspires to be a top-story tenant, cannot afford to be ignorant of the principles of science. To be a true artist man must embody nature as she is, and to embody nature as she is it is essential to have a knowledge of natural laws. If man's memory and observant powers were perfect this would be unnecessary, but as they are not so, in representing natural objects he is apt to overlook matters of detail which are sufficient to mar his effort. Thus, Mr. Herbert Spencer mentions the case of an otherwise careful painter who cast the shadow of a lattice window in sharply defined lines upon an opposite wall, a mistake which he could not have made had he been familiar with the laws of light, and therefore with the phenomena of penumbræ. Science and art then go hand in hand; one interprets and the other embodies nature. Neither can afford to be independent of the other. The study of either develops the love of the beautiful, which exists to some extent in most living beings, and a diligent pursuit of nature whether in interpreting or embodying her can never tend to the destruction of "taste" in man.

Our present intention, however, is not to defend art, but to show how the study of science can influence man in his life and thought, and to point out what is the only natural, and therefore the only true method of pursuing that study.

"Acquirement of every kind," says Spencer, "has two values—value as knowledge, and value as discipline." It has been urged that the value of a classical education depends on the refining and training influence which it has on the mind. Its value as knowledge, that is its value as a help to successful living, is *nil*. But science has a value not only as discipline but as knowledge. The value of science as knowledge needs nowadays no defence. No one can deny the influence which Chemistry, Physics, and Biology have had on life and living. And what better discipline can the mind have than the study of natural subjects, the investigation of natural phenomena, the discovery of natural laws. The refinement to be obtained from the study of the poetry of Homer and Virgil cannot be placed above that to be obtained by the intelligent observation of the beauties of nature, any more than a superficially polished man can be placed on a higher scale than an honest one. The one is artificial, the other natural, and the experience of the race tends more and more to the idea that natural refinement is always superior to artificial. "Those who have never entered upon scientific pursuits are blind to most of the poetry by which they are surrounded. Whoever has not in youth collected plants and insects, knows not half the halo of interest which lanes and hedgerows can assume. Whoever has not sought for fossils, has little idea of the poetical associations that surround the places where imbedded treasures were found. Whoever at the seaside has not had a microscope and aquarium, has yet to learn what the highest pleasures of the seaside are. Sad, indeed, is it to see how men occupy themselves with trivialities, and are indifferent to the grandest phenomena—care not to understand the architecture of the heavens, but are deeply interested in some contemptible controversy about the intrigues of Mary Queen of Scots!—are learnedly critical over a Greek ode, and pass by without a glance that grand epic written by the finger of God upon the strata of the earth!"—*Spencer*.

In the face of all this does it not seem strange that science has been so long in taking its true place in education? Undoubtedly this has been greatly due to the unscientific way in which it has been taught, and especially has this been so with the science in which we are at present more particularly interested.

> "These young scholars who invade our hills,
> Bold as the engineer who fells the wood,
> And travelling often in the cut he makes,
> Love not the flower they pluck, and know it not;
> And all their botany is Latin names.
> The old men studied magic in the flowers,
> And human fortunes in astronomy,
> And an omnipotence in chemistry,
> Preferring *things* to *names*."

Here then is the mistake that has been made. We have given the preference to names instead of to things, we have followed an artificial instead of a natural method in our study of nature. To make more clear the importance of this oversight let us inquire what is a natural method of study and why so. "Intellectual progress," says Spencer, "is of necessity from the concrete to the abstract." The development of the intellect in the individual corresponds in sequence to intellectual development in the race. Now it is well known that among savage tribes the phenomena of nature are well known, at least, so far as they can be known to the unaided faculties, but the laws which govern these phenomena have to them no existence. That is, they have a knowledge, and often a very exact knowledge, of things. In the more highly developed races, again, not only are the phenomena themselves known, but by the gradual collec-

tion of facts, by the comparison of similarities, by the use of the higher powers of the intellect in the life of the race, the laws which govern these phenomena have gradually been discovered. Thus the savage who lives by the sea knows that the waters rise and fall twice in twenty-four hours, but he does not know that this is due to the greater rigidity of earth than water, and accordingly to the greater action on the sea of the sun and moon according to an unalterable law, that of gravitation. It took the highest intellects of the most highly-developed races to proceed from the phenomena of the tides to the complex causes which produce them, and to connect with those causes the great law which governs the universe. Again, in the development of the infant, is not all the knowledge which it gains before the acquirement of speech obtained from the objects by which it is surrounded? It learns the attributes of form and colour from their connection with objects. After the time of speech it knows objects from their feeling and appearance, and is curious to know their attributes, to know all about them; witness the remarkable and sometimes very awkward questions put by children to their elders. In manhood again, in the absence of teachers, all the inferences we make result from the comparison of objects, in short, all self-acquired knowledge is obtained by reasoning from the concrete to the abstract, by the process known as induction. This method of acquiring knowledge, then, which is displayed not only in the evolution of the individual but also in that of the race, is surely entitled to be called a natural method, and is obviously the only correct way to acquire knowledge of all kinds, but especially scientific knowledge.

To apply the principles here laid down to the science which we come here to study, it becomes obvious that the study of botany can only be prosecuted naturally and therefore efficiently by going to nature direct, by examining for ourselves the flowers of wood, lane and hillside, by noting their form (internal and external), their colour, their relation to each other and to their surroundings, and then by referring to text book or to teacher for the abstract information necessary to the intelligent understanding of the why and how of form and relation. No information can be naturally acquired unless it is the offspring of curiosity. We must proceed from the concrete to the abstract, from the object to its attributes, from plant, cell and protoplasm to the laws, chemical and physical, which govern the existence of the protoplasm and the cell, and direct the growth and form of the plant.

But there is another advantage which is to be obtained by the use of natural methods of study. They present knowledge in attractive forms and hence make the acquirement of it pleasurable. This is no mean advantage in the study of such a science as botany, which has been so persistently classed as a science of hard names by those who have attempted to study it by the deductive method, by passing from names to things, from laws to objects which they control, from cause to effect. Not that I undervalue the deductive method. It is most important in its place, but its place is in the most advanced stages of a science, not in the elementary. "It is the order of nature in all creatures that the gratification accompanying the fulfilment of needful functions serves as a stimulus to their fulfilment, as during the self-education of the young child, the delight taken in the biting of corals and the pulling to pieces of toys becomes the prompter to actions which teach it the properties of matter, it follows that in choosing the succession of subjects and the modes of instruction which most interest the pupil, we are fulfilling nature's behests and adjusting our proceedings to the laws of life."—*Spencer.*

Practical study, then, is the only natural method of acquiring knowledge correctly and pleasantly, and we cannot do better than lay to heart and apply throughout life, the famous advice of Bacon, "*ipsis consuescere rebus,*" to accustom ourselves to things themselves.

THE LANCET ON SIR HENRY ACLAND'S ADDRESS.*

"The visit of Sir Henry Acland to the Pharmaceutical Society and the address which he delivered to the students afford one amongst many illustrations of the good relations now subsisting between pharmacy and medicine. There is no reason why these relations should not continue to exist, and become even more cordial. Though medicine has grown into a science since the time referred to by Sir Henry, when silkworms, grasshoppers, toads, kittens, etc., were contained in the Pharmacopœia, it has not grown out of the faith in drugs. More than ever it believes in the value of drugs, but more then ever it requires that drugs shall be prepared in a pure state and in an agreeable form. The very progress of medicine involves the progress and development of pharmacy. This progress should tend at the same time to a sharper line of demarcation between the two callings. If a man is to excel in the business of a pharmacist, he cannot dabble in the work of a medical practitioner. There is a fundamental difference in the two callings. The function of the one is to supply pure drugs; that of the other is to study disease and to cure it. In the higher ranks of both callings this distinction is well defined; in the lower there is a little overlapping. Sir Henry Acland maintains that the education of the pharmacist does not tend to make him intrude into the domain of the medical man. We think Sir Henry is, on the whole, right. No doubt there are many druggists who assume airs of more knowledge than it is possible for any medical man to have; but the more educated the pharmacist, the more conscious will he be of his inability to understand disease, and the more will he shrink from pretending to do so. Sir Henry's praise of the calling of a pharmacist was well deserved. There is no better servant of the public and no better friend of the medical profession than an educated and intelligent pharmacist. The best medical practitioner will learn much from him, and will be most ready to admit his obligations. He must be a rare physician who is not indebted occasionally to the suggestions of those intelligent pharmacists whom he may know and who dispense his prescriptions, and it is impossible to deny that therapeutics have been much advanced by the work of chemists and pharmacists. All this praise, of course, has no application to the druggist, who is ignorant of the distinction between his calling and that of a medical man, and who is vain enough to think that a knowledge of medicines enables him to understand their action and their application. Sir Henry Acland spoke of the steps which have been taken by the Medical Council to ensure the best methods of revision of the British Pharmacopœia—referring, doubtless, to the appointment of a committee of the Council, and the allowance of a small grant for this purpose. These are steps in the right direction. Frequent changes in the Pharmacopœia are undesirable, but the existence of many more or less rival publications is some proof that our Pharmacopœia, with all its good qualities, is not such a perfect guide as it might be to the hardworked members of the profession. And considering the responsibility of the Council for the Pharmacopœia, it is but reasonable to regret that it has not used its large funds (for which no very obvious use can be found) more freely in encouraging investigations in pharmacy and therapeutics."

* From the *Lancet*, October 16.

The Pharmaceutical Journal.

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Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

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THE OFFICIAL REPORT OF THE BRUSSELS INTERNATIONAL CONGRESS.

REVERSING the case of the mountain in labour, the "timid objections" at first raised by Belgian pharmacists to the selection of Brussels as a place of meeting for the Sixth International Congress have now been followed by the issue of such a voluminous record of the proceedings of that meeting as will suffice in itself to demonstrate the justice of the belief that our Belgian colleagues were as fully able to bear the responsibility of organizing an International Congress, with credit to themselves and satisfaction to those who took part in it, as the city of Brussels itself presents a convenient and in various respects attractive locality for such a gathering. Belgium is indeed the natural habitat of International Congresses on all kinds of subjects, and the frequency with which the French language is now understood and spoken by natives of other countries constitutes another important explanation of the fact that such is the case. Though more than a year has now elapsed since the Pharmaceutical Congress was held in Brussels, the pleasant recollection of its various features will be still so fresh in the minds of those who were present on the occasion, that it will be unnecessary to revert particularly to them now, and in making known the publication of the official report of the proceedings it will be sufficient to mention in general terms the progress that was made in regard to the several subjects that may be regarded as having been, from the first holding of an International Congress, standing topics for consideration. First among these comes the project for constructing an International Pharmacopœia, and, in regard to this, the progress made at the Brussels Congress was more considerable than on any previous occasion; for, in consequence of the laborious exertions of Mr. v. WALDHEIM, this project had been reduced to definite form, and could be presented to the Congress with such characters as to admit of its being accepted to serve as a basis for the discussion of any questions that might arise respecting the construction of a pharmacopœia for the use of all nations. In this form the draft of the proposed International Pharmacopœia is now officially published under the sanction of the Congress at Brussels, so far as that carries any weight in regard to its practical adoption eventually.

Among the other subjects of a similar nature to that of the International Pharmacopœia, pharmaceutical education may be mentioned as having been dealt with at great length by M. DE NOBELE, Vice-President of the Pharmaceutical Society of East Flanders. In his report giving a review of the conditions that prevail in different countries, he recommended that the technical course of pharmaceutical education should, in all countries, be assimilated to that required for students of medicine, or for degrees in science. In addition to this general recommendation it was suggested that the qualification for the practice of pharmacy should be restricted to the possessors of the degree of Doctor of Pharmacy and that there should be an inferior degree for the legal qualification of assistants, without which occupation in a pharmacy should not be allowed. The discussion of this subject, extending over two days, was carried out with great interest, and though some difference of opinion prevailed as to the particular details of the recommendations submitted by M. DE NOBELE, and the possibility of assimilating them with the requirements of the laws existing in various countries, there was an almost unanimous agreement that there is need for raising the standard of pharmaceutical education. This view was well expressed by Professor STOEDER, of the University of Amsterdam, in the remark that as the general instruction of a nation decides its future, so the future of pharmacy will be determined by the kind of education given to those who are hereafter to carry on its exercise. Another point, referred to by M. GENEVOIX, of Paris, as of no small importance at the present time, is the difference of the conditions under which apprentices are placed now as compared with those of former times, from the frequent absence of any opportunity for acquiring a practical knowledge of pharmacy by the preparation of galenicals and chemicals in the laboratory of the establishment where they are placed. In the opinion of M. GENEVOIX, the great misfortune of pharmacy is that there is, in this sense, no longer any pharmaceutical education. Even where opportunities exist for obtaining this requisite technical training, the preparatory education of apprentices is often lamentably deficient, and the adoption of a sufficient standard of preliminary knowledge of scientific subjects for pharmaceutical pupils as well as for students destined for the practice of medicine would conduce to the establishment of better relations between pharmacy and medicine, since the early studies pursued by the students conjointly and side by side at the universities would be productive of mutual esteem. There is much in the discussion of this subject at the Brussels Congress to be of interest to those who desire to improve the condition of British pharmacy, and the views expressed by prac-

tical pharmacists from all parts of the world as to the importance of scientific training should be carefully considered.

In many respects the proceedings of the Brussels Congress extended into departments which, to our general apprehension, are outside the scope of pharmacy proper. Thus, for instance, the adulteration of food, the analysis of potable water, and various questions relating to public health formed the subjects of animated discussions. In some instances it appeared that the interest attaching to these subjects was of a local character; but, nevertheless, it was evident that a large majority of the pharmacists present recognized the fact that, being necessarily chemists and botanists, and having a special acquaintance with drugs and the raw materials of food and manufactures, the investigation of questions of the kind above referred to was an occupation that came naturally within their province. It is to be hoped that the same view may be entertained among ourselves, and that it may be influential in directing attention to scientific study, not only as a mere means of obtaining the bare qualification required by law, but as a valuable investment by which the achievement of future success in business may be most certainly secured.

INTERCOLONIAL PHARMACEUTICAL CONFERENCE.

In pursuance of the course decided upon by the Pharmaceutical Society and the Pharmacy Board of Victoria, the several Societies and Boards in the Australian Colonies and New Zealand have been invited to send representatives to a Conference, to be held in Melbourne this month for the purpose of endeavouring to bring about uniformity in the educational qualifications required of pharmaceutical chemists in the Australian Colonies, and of promoting reciprocity in the recognition of certificates as well as the discussion of any matters on which joint legislation or action would be desirable. We now learn from Mr. Shillinglaw, the acting Honorary Secretary of the Melbourne Society, that in reply to this invitation the pharmaceutical authorities of New South Wales, New Zealand, South Australia, Queensland and Tasmania have decided to send delegates to this Conference, and that the most cordial wishes for its success have been expressed from all the Colonies unable to attend.

The Conference is to meet on the 27th inst. at the College of Pharmacy in Melbourne, and after the delivery of an address of welcome, the reception of delegates and the election of a President and Secretary, the business will be proceeded with by the moving of a resolution that a uniform system of education throughout Australia is desirable, such system to embrace a preliminary examination including the same subjects that were required by the Pharmaceutical Society of Great Britain; an apprenticeship of four years; a course of study based upon the course adopted in Great Britain, and examinations to be conducted by examiners similarly appointed, as far as possible, in conformity with the practice in Great Britain. The business set down in the programme for the second sitting of the Conference is the discussion of the desirability of uniformity in Australian pharmaceutical legislation with reference to the Acts in force, or proposed to be enacted in the several Colonies. A resolution will be moved to this effect; also that there should be uniformity in the laws relating to the sale and use of poisons, and the regulations for their custody. On the third day, a resolution is to be moved, that on adopting and giving effect to the first resolution the examination certificates shall be recognized, interchangeably, by the governing bodies of the various Colonies. Lastly, a resolution is to be moved, that the rapid increase of the trade in proprietary medicines and secret nostrums is antagonistic to the true interest of pharmacy.

The Committee that has undertaken to draw up the programme for the business of the Intercolonial Conference has given the subject careful consideration, as a result of which the opinion was arrived at that by limiting the number and the nature of the resolutions to be dealt with a much greater probability of the general acceptance of the scheme will be secured. We are glad to find that some of the initial difficulties surrounding this project appear to have been surmounted, and that there is now a better prospect of its realization than when we referred to it in this Journal last June.

At a special meeting of the Council of the North of England Pharmaceutical Association, held at St. Nicholas's Chambers, Newcastle, it was decided to go on with the classes of the School of Pharmacy notwithstanding the small number of entries, and in the hope that more students may enter for some of the classes, which commence on Friday, October 22nd. We understand that at present the fees are insufficient to cover the expenses of conducting the classes, and that the continuance of the School might be doubtful were it not for the strenuous efforts of the Council and the lecturers. We trust that their praiseworthy exertions will yet be more adequately responded to by those for whose benefit they are made.

* * *

During the past week a series of classes for pharmaceutical students has been commenced in connection with the Leicester and Leicestershire Chemists' Association. From the syllabus it appears that on Tuesday evenings a Materia Medica class will meet, from 8.30 to 9 o'clock, under the care of Mr. W. Rowe, followed by a class for the study of the Pharmacy of the British Pharmacopœia, from 9.0 to 9.45 o'clock, conducted by Mr. J. Garrett. On Thursday evenings a class for the study of the Chemistry of the British Pharmacopœia will meet from 8.30 to 9 o'clock, with Mr. E. Brice for a lecturer; after which, from 9 to 9.45 o'clock, Messrs. F. S. Burford and F. W. Goodess will conduct a Practical Chemistry class. These classes will be free to associates of the Asso-

ciation, who pay an annual subscription of 6*s.* if assistants, or 4*s.* if apprentices. This announcement would indicate that the recent merging at Leicester of the junior association into the senior one has resulted in a solid advantage to the pharmaceutical students of the district.

* * *

The Edinburgh Assistants and Apprentices' Association will hold the first meeting of a new session on Tuesday evening next, the 26th inst., in the Society's House, 36, York Place, when an Inaugural Address will be delivered by Mr. William Duncan, President of the Association. The chair will be taken at 9.15 o'clock. On Friday evening, the 29th inst., at 7 o'clock, the Apprentices' Prize Competition, will take place, the entries for which will close on the 26th.

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There seems to be good reason for believing that saccharin has no injurious physiological action when taken internally. Sir Henry Roscoe has stated "that large quantities have been given to dogs, and one dog had as much of it daily as was equivalent in sweetening power to a pound of sugar, but it did him no harm." Up to the present it has not been known to produce any injurious effect on the system, and it is therefore probable that it may be employed in pharmacy. We are indebted to Mr. C. J. S. Thompson, of Manchester, for the following notes of some rough experiments, made with the view of ascertaining how far the new sweetening principle, saccharin, may be of use in this way. He finds that a one per cent. solution of saccharin in hot water, although very sweet to the taste, has a flavour distinctly different from that of cane sugar. Ninety minims of this solution, added to one containing four grains of sulphate of quinine, quite masked the bitter taste of the alkaloid, and rendered it palatable. Thirty minims of the same solution sweetened half a drachm of tincture of iron and it required twenty minims to cover the salt taste of ten grains of bromide of potassium.

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Some uncertainty prevails as to whether the fruit of *Solanum Dulcamara* is poisonous, and the question having been raised in *Science Gossip* last month, Mr. F. Davis has made some experiments on the point, from the results of which it appears that the fruit contains an alkaloid similar to that obtainable from belladonna. Mr. Davis has found that this alkaloid has the power of dilating the pupil of the eye, and he considers that it may be intermediate in character between atropine and physostigmine. The ripe berries yield a larger amount than those which are unripe.

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It is reported that an American whaler has this season captured, in Sanz Bay, West Indies, a whale from which was taken thirty pounds of ambergris, the value of which is estimated at ten thousand dollars.

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Syrup of tamarinds is recommended by Mr. Rozsnyay as a good corrigent for the bitter taste of preparations of cascara sagrada.

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At the next meeting of the Chemists' Assistants' Association, which will be held on Wednesday evening, the 27th inst., a paper on "Richard Brinsley Sheridan" will be read by Mr. A. Heward.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

On Wednesday, the 6th instant, the monthly meeting of the Council of this Society was held at the rooms, No. 11, Harcourt Street, Dublin, at three o'clock.

The newly-elected President (Mr. William N. Allen) took the chair. The other members of the Council who attended were the Vice-President (Mr. Draper), Mr. J. E. Brunker, Dr. Montgomery, Messrs. Pring, Grindley, Evans, Wells, Payne, Beggs, Hayes, Hodgson, Professor Tichborne, and Dr. Collins.

A letter from the Agent-General of New Zealand was read, including a copy of a letter from the Registrar of the Pharmacy Board of New Zealand, stating that as the law at present stands in that country, persons holding the certificates of the Pharmaceutical Society of Ireland cannot be registered in New Zealand without passing the examination of the Pharmaceutical Society of that colony.

Mr. Brunker said this was part of a correspondence which the Registrar, Mr. Ferrall, had been conducting with different colonies for the purpose of being in a position to give replies to licentiates of the Society, asking for information. As soon as all the replies should have been received it would be well for the Registrar to put the information he had obtained into a revised calendar.

A letter was received from Mr. Charles Evans, thanking the Council for the continued confidence they had shown in him by re-electing him their Examiner in Practical Pharmacy.

The President said they would find it very hard to replace Mr. Evans.

The letter was marked read.

A memorial was received from inhabitants of Oldcastle, praying that the fines of £5 and costs which had been imposed by the magistrates there on Mrs. Elizabeth Harte, widow of an apothecary, and Mr. Philip Gaynor, publican, for breaches of the pharmacy law, might be remitted either wholly or in part. The memorial stated that Mrs. Harte's late husband commenced business in Oldcastle in 1868, and in 1877 Mr. Gaynor opened a drug store there. There was no duly qualified pharmaceutical chemist in Oldcastle, and if it were not for the establishments of the defendants, the inhabitants of the town, and of a district extending three or four miles round, would have been without accommodation in the shape of medicine for themselves and their cattle. No fatality had ever occurred through either want of skill or negligence on the part of Mrs. Harte or Mr. Gaynor, who were entirely ignorant of the law under which they were prosecuted. A majority of the magistrates had expressed the opinion that the case was eminently one for the exercise of forbearance on the part of the Society.

The President: I do not think we can do very much.

Mr. Brunker: The fines have been paid.

Mr. Payne said that even if they had not been paid, the Council could not have complied with the request made by this petition, because the Act of Parliament gave a third of every penalty to the person who was the means of bringing the defendant to justice. It was not the money of the Council. If the defendants appealed, perhaps the Chairman of Quarter Sessions might reduce the account of the fine.

Dr. Montgomery said it would be an extraordinary thing on the part of the Council to condone an offence after the parties had acknowledged it.

On the motion of Mr. Brunker, seconded by Mr. Grindley, the Registrar was directed to write to the Rev. Mr. Guehan, who represented the memorialists, informing him that the Council had no power to reduce the penalties inflicted by the magistrates of Petty Sessions.

A donation was received from the Alumni Association, Philadelphia College of Pharmacy, of their 'Twenty-second Annual Report.'

On the motion of Mr. Payne, seconded by Mr. Wells, thanks were voted to the donors.

The reports of Dr. George Duffey, the Visitor of the Society's Examinations, upon the examinations held in April and July last, and on which the discussion had been adjourned, were again read.

The President, pursuant to notice, brought forward a series of resolutions on the subject. He said they related to six points in Dr. Duffey's reports. The first was his suggestion as to the possible rejection of a candidate by half a mark ; the second was his suggestion as to the consultation of examiners ; the third was his statement that one examiner performed the duties of three ; the fourth was his recommendation as to small tables ; the fifth that as to a standard of marks for the Preliminary examinations ; and the sixth, his opinion that 10 per cent. was too small a proportion in the total of marks for elementary chemistry and botany. As to the first point, he (the President) moved that a standard of marks be adopted for the Preliminary examination, and that a committee consisting of the President, Vice-President, Mr. Brunker and Dr. Montgomery be appointed to confer on the subject with the Examiner, Dr. Tweedy. The standard should be carefully considered and arranged.

Mr. Payne seconded the motion, which was unanimously agreed to.

The President moved that the House Committee be directed to obtain estimates for small examination tables.

Mr. Wells seconded the motion, which was agreed to.

The President said it was the opinion of the Council that Dr. Duffey was in error in stating that one examiner performed the work of three. It had been thought desirable, however, to alter Regulation IV. as to examiners, which at present directed the election of "four" examiners, so as to make it read as follows :—"The Council shall elect fit and proper persons to be examiners to conduct such examinations as are directed by Clause 21, Pharmacy Act (Ireland) 1875, in each of the divisions of examination, viz :—1. Latin, English, Arithmetic, and Rudiments of Chemistry and Botany (this examination to be known as the Preliminary examination). 2. Materia Medica and Botany. 3. Pharmaceutical and General Chemistry. 4. Practical Pharmacy, Reading and Translating of Prescriptions and the British Pharmacopœia."

Mr. Brunker, in seconding the motion, said the regulation as it at present stood provided that one person should be elected to conduct a Preliminary examination in Latin, English and Arithmetic. On January 3, 1883, the Council passed a resolution including the rudiments of chemistry and botany in the Preliminary examination. The last Preliminary examiner was elected on the understanding that he would examine in all those subjects and that was notified to the Privy Council ; but its formal sanction to the arrangement had never been obtained. It was therefore necessary to amend the regulation and submit the amendment to the Privy Council for its sanction.

The motion was carried unanimously.

The President moved the insertion of a clause, in the regulations to enable the Council in the case of the absence of an examiner from illness or other unavoidable cause, to appoint another.

Mr. Payne, however, pointed out that such a power already existed under the regulations.

The motion was accordingly not pressed.

The President moved that the following reply on the part of the Council be sent to Sir William Kaye, Clerk to the Privy Council, in relation to Dr. Duffey's reports :—

"Sir,—I am directed by the Council of the Pharmaceutical Society of Ireland to forward, for the information of the Lord Lieutenant and Privy Council in Ireland, the following remarks on the reports of Dr. Duffey on the April and July examinations of the Society. Dr. Duffey proposes a conference of examiners, and in reference to this the Council would refer to its opinion expressed in a communication dated April 14, 1886, namely, 'that far from seeing any objection to a consultation of examiners, it highly approves the suggestion.' The Council would also point out, that should the examiners wish to consult it is open to them to do so, but is, at the same time, aware that of the present examiners at least two do not approve of such conference. As regards the statement that one examiner is allowed to do the work which three were elected to perform, the Council would again refer to the above-cited letter, in which it is pointed out that the Examiner in Arts was elected November 4, 1884, with the approval of the Privy Council, to examine in Latin, English, arithmetic, and rudiments of chemistry and botany. It appears to the Council that the Privy Council having approved this appointment, one examiner does not perform the duties of three. In the same communication the Council expressed an opinion that the best course to adopt would be to alter regulation 'Examiners, No. IV.,' so that the examination in Latin, English and arithmetic shall also include an examination in the rudiments of chemistry and botany, and have accordingly passed an amended regulation herewith enclosed for approval of the Privy Council. The Council is of opinion that these two subjects form but a relatively unimportant portion of the examination and must be regarded as elementary, only being subjects in which the candidates will hereafter be examined more fully. With regard to Latin, English and arithmetic, however, the case is altogether different, as it is assumed that the candidates must be proficient in these subjects. The Council thinks therefore that 10 per cent., as given by the examiner to rudimentary chemistry and botany, is amply sufficient. The Council has at present under consideration a scheme for a standard for the Preliminary examination. In the observation referring to the possible rejection of a candidate for being half a mark under the minimum, your Visitor apparently fails to apprehend the system of marking. The average minimum on the whole examination is 55 per cent.; but as an assistance to candidates who may be somewhat weak in a subject the lower minimum of 45 per. cent. in pharmacy and 40 per cent. in chemistry and materia medica and botany respectively is arranged, the candidates being required, if weak in one subject to make up the average by superior answering in the other portions of the examination. It will thus be seen that a candidate having made 39·5 per cent. in chemistry fails to pass and that by the rule laid down he has had already 15 per cent. allowed him and is actually 15·5 per cent. below the minimum of examination and not only half a mark, as is implied in Dr. Duffey's report. Dr. Duffey in the particular case referred to of a candidate who failed in one subject (pharmacy) by half a mark, omits to give the numerical value of the candidate's total which comes out 43·3 per cent., being 1·7 under the minimum in that portion of the examination, and 10 per cent. having been already allowed the half mark makes the candidate 11·7 below the average minimum of the examination. The Council has arranged the minima feeling that a lower standard would only permit incompetent men to pass and considers that a system having so much elasticity can scarcely be considered 'hard and fast.' The suggestion as to the provision of small tables had already been made by one of the examiners, and the Council have the matter under consideration. Much importance is attached by the Council to the reports of Dr. Duffey, and it feels that their suggestiveness would be seriously diminished were they made but once a year, instead of quarterly as at present."

Mr. Brunker, in seconding the motion, said Dr. Duffey's reports had been framed in the very best spirit towards the Council.

Mr. Payne said he did not see how the examiners could with any fairness alter marks after they had given them.

Mr. Wells said the idea was not that the examiners should alter marks, but that the candidates should be brought in again and asked their questions.

Dr. Montgomery thought that a conference of examiners would be desirable.

Mr. Brunker: We cannot either make them confer or prevent them from doing so.

After some further discussion, the draft letter was approved of.

A report of the Law Committee was dealt with.

Mr. Albert H. Bell of Waterford, was, on the motion of Mr. Brunker, seconded by Mr. Hodgson, elected a member of the Society.

The Council then adjourned.

Proceedings of Societies in London.

CHEMISTS' ASSISTANTS' ASSOCIATION.

The first general meeting of the tenth session of the above Association was held at 103, Great Russell Street, October 13, Mr. H. H. Millhouse, President, in the chair.

The minutes of the annual general meeting having been read and confirmed, and a number of new members proposed, the President delivered an inaugural address, of which the following is an abstract:—

After some prefatory remarks, expressing his appreciation of the honourable position in which he was placed, the President reminded his audience that the main object the promoters had in view at the inauguration of the Association was an organization for the purpose of social intercourse and promotion of good feeling amongst assistants, and for the discussion of all matters affecting their welfare. After its inauguration, the Association had advanced slowly (as young societies usually do, if they advance at all), but surely, in popular esteem, and in the value of the work it was destined to accomplish; it was not, indeed, until the session 1882–83 that it began to make much headway; the good seeds so carefully sown, and skilfully looked after, had taken root and the plant then commenced to thrive rapidly, and last session it attained to such a condition that there was reason to hope that in the not very distant future it would be possible to deal out its fruit with no unlavish hand. The publication of the Proceedings was a bold, though decided step in advance; the experiment had proved so successful and had been so highly appreciated that no future Council could possibly hesitate to continue it. He hoped the Association would be in a position this session to move still further onward in this direction, for it was eminently important that every individual member should possess a record of the great and good work that had been done in past years, which would serve as a reminder of a happy and not uneventful past and be invaluable for the purpose of reference. The future of the Association would most assuredly be a glorious one, and the ensuing session would show a largely increased membership, an unprecedented attendance at the meetings and would consequently render greater assistance in advancing those praiseworthy objects which its founders had in view.

In the programme for the first half of the session, the first item was a discussion on pharmaceutical education and examination, to be opened by Mr. T. S. Dymond one of the Vice-Presidents. This educational question, had occupied the serious attention of pharmacists for some considerable time, and had been somewhat largely dealt with recently by Mr. Thomas Greenish in his Presidential Address to the members of the British Pharmaceutical Conference. The subject was also of paramount interest to assistants (the pharmacists of the future); hence the Council thought it would be an instructive topic of discussion for the members of the Association. The Conversazione had become so thoroughly popular a reunion, that the Council had deemed it desirable this year to engage much more commodious rooms than hitherto, which would considerably increase the expenditure, and the Committee had decided to make a small charge to non-members who might wish to avail themselves of the privilege of being present. Another novel and excessively important feature in this year's programme would be a prize of £5, which Messrs. Burroughs, Wellcome and Co. had unconditionally placed at the disposal of the Council, for the express object of promoting the study of pharmacy by assistants. This prize was in itself a valuable one, but the Council was so convinced of the ultimate amount of good this kind of stimulant was destined to accomplish, that it offered as a further inducement to competitors a silver medal on behalf of the Association itself. The chief reason for doing so, was, firstly, to give successful candidates some permanent mark of distinction for the useful work they will have done, and secondly, to present them with a small but invaluable souvenir of their profitable connection with this society.

Some of his hearers might be saying to themselves, "Yes, this moralizing is all very nice, but it won't earn us bread and cheese. Tell us how to better our position." To such, he would answer, that if they wanted him to formulate a scheme that would produce immediate tangible results, he was incompetent to the task; and much more eminent and experienced men would give a similar reply. All of them worked unusually, and some of them cruelly hard, though naturally and fortunately they did not all appreciate the same kind of work. But while he thoroughly admired those who studied social advancement, he was of opinion, that too often the scientific branch of the calling was neglected, and what was still worse, there were those who were slow to recognize the value of its cultivation by others, although that branch always had been and always would be the essence of their social progression. Still he must admit that some of their purely scientific brethren, who moved but little in social circles, who mixed and conversed chiefly with men of their own stamp, and who depended entirely upon books for their knowledge of the outer world, did, by these means, so narrow their minds, that their business and social ideas become unsound and illogical, and they themselves incapable of conviction by argument.

He had no intention, and but little desire to discuss the vast question of pharmaceutical politics. In such an address it was only necessary to refer to such parts of it as directly affected the present and future interests of assistants; and as even in this respect he was convinced that their welfare was intimately bound up with, and their path in life parallel with, that of their employers, he had but little to say. This one thing should be borne carefully in mind, "the assistants of to-day are the employers of to-morrow." In the pharmacist's business it was almost universally so. The draper's assistant, and those of the grocer, stationer, publisher, etc., in the majority of cases, never aspired to the position of employers; equally so, the solicitor's clerk seldom expected to become a flourishing solicitor, or the banker's clerk a thriving banker. Hence they could afford to agitate and endeavour to force legislative and other reforms that would produce tangible and beneficial results to them as a class. Not so with chemists' assistants. By far the greater majority of them hoped eventually to conduct a pharmacy of their own, and, for this reason, it was most important that in advocating this or that reform whether of a legislative nature or as within their own ranks, they should look carefully ahead and calculate upon the effect it would have upon their future prospects.

The President then said he had been recently asked this question, "What does the Pharmaceutical Society do for chemists' assistants?" It had not been put to him by a member of that Association, although probably there were some who would not hesitate to ask it. To this

query he would reply, "Go to 17, Bloomsbury Square and examine carefully the almost perfect museum, where students (not of the Society's school alone) are constantly studying the wonderful and unique collection of specimens which grace its drawers and illumine its cases; with its efficient, painstaking and obliging Curator always ready to impart information; walk into the library and contemplate the all but perfect collection of books; call to mind the school with its eminent staff of teachers, and think of the many noted pharmacists who had acquired such lasting and invaluable knowledge within its walls. Refer to the report of the inaugural meetings of each succeeding session, and see what has been and is being done." He thought assistants could scarcely complain as a body in this direction; if anyone had fault to find it was some of the small country pharmacists, and they perhaps were scarcely cognizant of the difficulties the Society had to encounter. He was, however, strongly of opinion that the Society could and should interest itself more in the well-being of provincial chemists. But he condemned as utterly contemptible the mean sarcasm that was sometimes meted out to its Council, whether it came from private individuals or from any branch of the pharmaceutical press. Of one thing he was satisfied, that if there were room for improvement it was not to be gained by standing aloof, and throwing dust into the eyes of would-be supporters; but rather by enlisting them in the ranks, and inviting them to state their own grievances, and if possible to suggest a remedy, which they might rest assured would, if sound, receive the support of the trade at large.

Those who were just about to or had just entered upon the calling of pharmacy he advised to look well before they took the leap. In recent years, young men, encouraged frequently by their parents, had been too anxious to join a trade or profession which was considered genteel, To such youths he would seriously say "bar pharmacy;" for although as a trade it undoubtedly held a very high position, those who followed it must expect sometimes to soil their hands and bottle their pride. Such men as he had referred to were rarely fond of work; they wanted extremely short hours and remarkably good pay. As chemists' assistants they were not very likely ever to acquire this coveted position; whilst there was nothing more discouraging to the persevering assistant, and nothing more damaging to the progress of pharmacy than to be infested with dissatisfied individuals, who, instead of either endeavouring to improve their chosen lot in life or emigrating to some other sphere, were continually sowing seeds of discontent upon the very ground they should be preparing for the growth of plants that would bring forth fruit both creditable and profitable to their craft. Chemists' assistants had many hardships to encounter; their work was very heavy, both mentally and physically, more especially mentally, and he admired the views so consistently advocated by an eminent and justly popular friend of theirs. Dr. Attfield said, "A fair amount of outdoor recreation combined with bodily exercise is highly beneficial to the pharmaceutical student." Was not this applicable in no small degree to the pharmacists' assistants? If the student's mind were thus rendered more competent to comprehend and retain the perplexing subject he was called upon to study, was it not reasonable to suppose that the assistant's mind would be equally benefited, and that he would be better able to deal with the complex duties of dispensing medicines, replying to the numerous inquiries of medical men and satisfying the inquisitive and searching cross examination of a not over-scrupulous, but knowing and often poorly educated customer? He believed that if employers could manage to set aside one half day a week—or in some few instances probably less would suffice—for the recreation either of themselves or one of their assistants, they would be adding to their own and their assistants' business capacities, thus increasing instead of diminishing the quality and quantity of the work done, and proving a great motive power in advancing the health, happiness and prosperity of an over-worked and ill-paid community. There were a few pharmacists (happily in a very small minority) whose sole object in life was money making; they had no consideration either for their own happiness or that of their *employés*. Could anyone censure assistants who acted selfishly towards such men? Was it not human nature to do so? If employers compelled assistants to lose confidence in them by sharp practice and dirty actions that would be scorned by straightforward and sound business men, they must not complain if they do not receive due attention and a fair share of prosperity; for they will deserve and most assuredly receive no sympathy either from employers or employed. Was it not gratifying to be able to state, and that unhesitatingly, that with but very few exceptions, pharmacists were most anxious for the well-being of their assistants, and if it could be shown that anything could be done for the promotion of their health, happiness and prosperity the pharmacists were most willing to attempt it? He thought a few extra hours per week devoted to recreation would prove of invaluable service to both master and man, and left the arrangement of it, with the greatest confidence, in the hands of the employers.

The address was listened to with marked attention.

A vote of thanks for the address was moved by the late President, Mr. Winfrey, who referred to the advantages of the Association as a means of diminishing the exclusive and unsociable tendency which is so marked in members of the calling generally.

Mr. Dymond, Vice-President, in a few appropriate words seconded the vote of thanks, which was carried with acclamation.

The proceedings then terminated.

The British Association for the Advancement of Science.

The Past History of the Species of the Existing Flora.

Address to the Biological Section.

BY WILLIAM CARRUTHERS, PRES. L.S., F.R.S., F.G.S.,
President of the Section.

In detaining you a few minutes from the proper work of the Section, I propose to ask your attention to what is known of the past history of the species of plants which still form a portion of the existing flora. The relation of our existing vegetation to preceding floras is beyond the scope of our present inquiry: it has been frequently made the subject of exposition, but to handle it requires a more lively imagination than I can lay claim to, or, perhaps, than it is desirable to employ in any strictly scientific investigation.

The literature of science is of little, if any, value in tracing the history of species, and in determining the modification or the persistency of characters which may be essential or accidental to them. If help could be obtained from this quarter, botanical inquiry would be specially favoured, for the literature of botany is earlier, and its terms have all along been more exact than in any of her sister sciences. But even the latest descriptions, incorporating as they do the most advanced observations of science, and expressed in the most exact terminology, fail to supply the data on which a minute comparison of plants can be instituted. Any attempt to compare the descriptions of Linnæus and the earlier systematists who, under his influence, introduced greater precision into their language, with the standard authors of our own day, would be of no value. The short, vague and insufficient descriptions of the still earlier botanists cannot even be taken into consideration.

Greater precision might be expected from the illustra-

tions that have been in use in botanical literature from the earliest times; but these really supply no better help in the minute study of species than the descriptions which they are intended to aid. The earliest illustrations are extremely rude: many of them are misplaced; some are made to do duty for several species, and not a few are purely fictitious. The careful and minutely exact illustrations which are to be found in many modern systematic works are too recent to supply materials for detecting any changes that may have taken place in the elements of a flora.

But the means of comparison which we look for in vain in the published literature of science may be found in the collections of dried plants which botanists have formed for several generations. The local herbaria of our own day represent not only the different species found in a country, but the various forms which occur together with their distribution. They must supply the most certain materials for the minute comparison at any future epoch of the then existing vegetation with that of our own day.

The preservation of dried plants as a help in the study of systematic botany was first employed in the middle of the sixteenth century. The earliest herbarium of which we have any record is that of John Falconer, an Englishman who travelled in Italy between 1540 and 1547, and who brought with him to England a collection of dried plants fastened in a book. This was seen by William Turner, our first British botanist, who refers to it in his 'Herbal,' published in 1551. Turner may have been already acquainted with this method of preserving plants, for in his enforced absence from England he studied at Bologna under Luca Ghini, the first professor of botany in Europe, who, there is reason to believe, originated the practice of making herbaria. Ghini's pupils, Aldrovandus and Cæsalpinus, formed extensive collections. Caspar Bauhin, whose 'Prodromus' was the first attempt to digest the literature of botany, left a considerable herbarium, still preserved at Basle. No collection of English plants is known to exist older than the middle of the seventeenth century; a volume containing some British and many exotic plants collected in the year 1647 was some years ago acquired by the British Museum. Towards the end of that century, great activity was manifested in the collection of plants, not only in our own country, but in every district of the globe visited by travellers. The labours of Ray and Sloane, of Petiver and Plukenet, are manifest not only in the works which they published, but in the collections that they made, which were purchased by the country in 1759, when the museum of Sir Hans Sloane became the nucleus of the now extensive collections of the British Museum. The most important of these collections in regard to British plants is the herbarium of Adam Buddle, collected nearly two hundred years ago, and containing an extensive series which formed the basis of a British Flora, that unhappily for science was never published, though it still exists in manuscript. Other collections of British plants of the same age, but less complete, supplement those of Buddle: these various materials are in such a state of preservation as to permit of the most careful comparison with living plants, and they show that the two centuries which have elapsed since their collection have not modified in any particular the species contained in them. The early collectors contemplated merely the preservation of a single specimen of each species; consequently the data for an exhaustive comparison of the indigenous flora of Britain at the beginning of last century with that of the present are very imperfect as compared with those which we shall hand down to our successors for their use.

The collections made in other regions of the world in the seventeenth century, and included in the extensive herbarium of Sir Hans Sloane, are frequently being examined side by side with plants of our own day, but they do not show any peculiarities that distinguish them from recent collections. If any changes are taking place in plants, it is certain that the three hundred years during which their dried remains have been preserved in herbaria have been too short to exhibit them.

Beyond the time of those early herbaria the materials which we owe in any way to the intervention of man have been preserved without any regard to their scientific interest. They consist mainly of materials used in building or for sepulture. The woods employed in mediæval buildings present no peculiarities by which they can be distinguished from existing woods; neither do the woods met with in Roman and British villages and burying places. From a large series collected by General Pitt-Rivers in extensive explorations carried on by him on the site of a village which had been occupied by the British before and after the appearance of the Romans, we find that the woods chiefly used by them were oak, birch, hazel and willow, and at the latter period of occupation of the village the wood of the Spanish chestnut (*Castanea vulgaris*, Lamk.) was so extensively employed that it must have been introduced and grown in the district. The gravel beds in the north of London, explored by Mr. W. G. Smith for the palæolithic implements in them, contained also fragments of willow and birch, and the rhizomes of *Osmunda regalis*, L.

The most important materials, however, for the comparison of former vegetation of a known age with that of our own day have been supplied by the specimens which have been obtained from the tombs of the ancient Egyptians. Until recently these consisted mainly of fruits and seeds. These were all more or less carbonized, because the former rifling of the tombs had exposed them to the air. Ehrenberg, who accompanied Von Minutoli in his Egyptian expedition, determined the seeds which he had collected, but as he himself doubted the antiquity of some of the materials on which he reported, the scientific value of his enumeration is destroyed. Passalacqua in 1823 made considerable collections from tombs at Thebes, and these were carefully examined and described by the distinguished botanist Kunth. He pointed out, in a paper published sixty years ago, that these ancient seeds possessed the minute and apparently accidental pecularities of their existing representatives. Unger, who visited Egypt, published in several papers identifications of the plant remains from the tombs; and one of the latest labours of Alexander Braun was an examination of the vegetable remains in the Egyptian Museum at Berlin, which was published, after his death, from his manuscript, under the careful editorship of Ascherson and Magnus. In this, twenty-four species were determined, some from imperfect materials, and necessarily with some hesitation as to the accuracy of their determination.

The recent exploration of unopened tombs belonging to an early period in the history of the Egyptian people has permitted the examination of the plants in a condition which could not have been anticipated. And happily, the examination of these materials has been made by a botanist who is thoroughly acquainted with the existing flora of Egypt, for Dr. Schweinfurth has for a quarter of a century been exploring the plants of the Nile valley. The plant-remains were included within the mummy-wrappings, and being thus hermetically sealed, have been preserved with scarcely any change. By placing the plants in warm water, Dr. Schweinfurth has succeeded in preparing a series of specimens gathered four thousand years ago, which are as satisfactory for the purposes of science as any collected at the present day. These specimens consequently supply means for the closest examination and comparison with their living representatives. The colours of the flowers are still present, even the most evanescent, such as the violet of the larkspur and knapweed, and the scarlet of the poppy; the chlorophyll remains in the leaves, and the sugar in the pulp of the raisins. Dr. Schweinfurth has deter-

mined no less than fifty-nine species,* some of which are represented by the fruits employed as offerings to the dead, others by the flowers and leaves made into garlands, and the remainder by branches on which the body was placed, and which were inclosed within the wrappings.

The votive offerings consist of the fruits, seeds, or stems, of twenty-nine species of plants. Three palm fruits are common; the *Medemia Argun*, Würt., of the Nubian Desert, and the *Hyphæne thebaica*, Mart., of Upper Egypt, agreeing exactly with the fruits of these plants in our own day; also dates of different forms resembling exactly the varieties of dried dates found now in the markets of Egypt. Two figs are met with, *Ficus carica*, L., and *Ficus Sycomorus*, L., the latter exhibiting the incisions still employed by the inhabitants for the destruction of the Neuropterous insects which feed on them. The sycomore was one of the sacred trees of Egypt, and the branches used for the bier of a mummy found at Abd-el-Qurna, of the twentieth dynasty (a thousand years before the Christian era), were moistened and laid out by Dr. Schweinfurth, equalling, he says, the best specimens of this plant in our herbaria, and consequently permitting the most exact comparison with living sycomores, from which they differ in no respect. The fruit of the vine is common, and presents, besides some forms familiar to the modern grower, others which have been lost to cultivation. The leaves which have been obtained entire exactly agree in form with those cultivated at the present day, but the under surface is clothed with white hairs, a peculiarity Dr. Schweinfurth has not observed in any Egyptian vines of our time. A very large quantity of linseed was found in a tomb at Thebes of the twentieth dynasty, now three thousand years old, and a smaller quantity in a vase in another tomb of the twelfth dynasty, that is, one thousand years older. This belongs certainly to *Linum humile*, Mill., the species still cultivated in Egypt, from which the capsules do not differ in any respect. Braun had already determined this species preserved thus in the tombs, though he was not aware of its continued cultivation in Egypt. The berries of *Juniperus phœnicea*, L., are found in a perfect state of preservation, and present a somewhat larger average size than those obtained from this juniper at the present day. Grains of barley and wheat are of frequent occurrence in the tombs; M. Mariette has found barley in a grave at Sakhara of the fifth dynasty, five thousand four hundred years old.

The impurities found with the seeds of these cultivated plants show that the weeds which trouble the tillers of the soil at the present day in Egypt were equally the pests of their ancestors in those early ages. The barley fields were infested with the same spiny medick (*Medicago denticulata*, Willd.) which is still found in the grain crops of Egypt. The presence of the pods of *Sinapis arvensis*, L., among the flax seed testifies to the presence of this weed in the flax crops of the days of Pharaoh, as of our own time. There is not a single field of flax in Egypt where this charlock does not abound; and often in such quantity that its yellow flowers, just before the flax comes into bloom, present the appearance of a crop of mustard. The charlock is *Sinapis arvenis*, L., var. *Allionii*, Jacq., and is distinguished from the ordinary form by its globular and inflated silicules, which are as characteristically present in the ancient specimens from the tombs as in the living plants. *Rumex dentatus*, L., the dock of the Egyptian fields of to day, has been found in graves of the Greek period at Dra-Abu-Negga.

It is difficult without the actual inspection of the specimens of plants employed as garlands, which have been prepared by Dr. Schweinfurth, to realize the wonderful condition of preservation in which they are. The colour of the petals of *Papaver Rhœas*, L., and the occasional presence of the dark patch at their bases, present the same peculiarities as are still found in this species growing in Egyptian fields. The petals of the larkspur (*Delphinium orientale*, Gay) not only retain their reddish-violet colour, but present the peculiar markings which are still found in the living plant. A garland composed of wild celery (*Apium graveolens*, L.) and small flowers of the blue lotus (*Nymphæa cærulea*, Sav.), fastened together by fibres of papyrus, was found on a mummy of the twentieth dynasty, about three thousand years old. The leaves, flowers, and fruits of the wild celery have been examined with the greatest care by Dr. Schweinfurth, who has demonstrated in the clearest manner their absolute identity with with the indigenous form of this species now abundant in moist places in Egypt. The same may be said of the other plants used for garlands, including two species of lichens.

It appears to have been a practice to lay out the dead bodies on a bier of fresh branches, and these were inclosed within the linen wrappings which enveloped the mummy. In this way there have been preserved branches of considerable size of *Ficus Sycomorus*, L., *Olea europœa*, L., *Mimusops Schimperi*, H., and *Tamarix nilotica*, Ehrb. The mimusops is of frequent occurrence in the mural decorations of the ancient temples; its fruit had been detected amongst the offerings to the dead, and detached leaves had been found made up into garlands, but the discovery of branches with their leaves still attached, and in one case with the fruit adhering, has established that this plant is the Abyssinian species to which Schimper's name had been given, and which is characterized by the long and slender petiole of the leaf.

In none of the species, except the vine to which I have referred, which Dr. Schweinfurth has discovered, and of which he has made a careful study, has he been able to detect any peculiarities in the living plants which are absent in those obtained from the tombs.

Before passing from these Egyptian plants I would draw attention to the quality of the cereals. They are good specimens of the cereals still cultivated. This observation is true also of the cultivated grains which I have examined, belonging to prehistoric times. The wheat found in the purely British portion of the ancient village explored by General Pitt-Rivers is equal to the average of wheat cultivated at the present day. This is the more remarkable, because the two samples from the later Romano-British period obtained by General Pitt-Rivers are very much smaller, though they are not unlike the small hard grains of wheat still cultivated on

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* List of the species of ancient Egyptian plants determined by Dr. Schweinfurth. I am indebted to Dr. Schweinfurth for some species in this list, the discovery of which he has not yet published.

Delphinium orientale, Gay; *Cocculus Leœba*, DC.; *Nymphœa cœrulea*, Sav.; *Nymphœa Lotus*, Hook.; *Papaver Rhœas*, L.; *Sinapis arvensis*, L., var. *Allionii*, Jacq.; *Mœrua uriflora*, Vahl.; *Oncoba spinosa*, Forsk.; *Tamarix nilotica*, Ehrb.; *Alcea ficifolia*, L.; *Linum humile*, Mill.; *Balanites ægyptiaca*, Del.; *Vitis vinifera*, L.; *Moringa aptera*, Gærtn.; *Medicago denticulata*, Willd.; *Sesbania ægyptiaca*, Pers.; *Faba vulgaris*, Moench; *Lens esculenta*, Moench; *Lathyrus sativus*, L.; *Cajanus indicus*, L.; *Acacia nilotica*, Del.; *Lawsonia inermis*, Lamk.; *Punica Granatum*, L.; *Epilobium hirsutum*, L.; *Lagenaria vulgaris*, Ser.; *Citrullus vulgaris*, Schrad., var. *colocynthoides*, Schweinf.; *Apium graveolens*, L.; *Coriandrum sativum*, L.; *Ceruana pratensis*, Forsk.; *Sphœranthus suaveolens*, DC.; *Chrysanthemum coronarium*, L.; *Centaurea depressa*, M. Bieb.; *Carthamus tinctorius*, L.; *Picris coronopifolia*, Asch.; *Mimusops Schimperi*, Hoehst.; *Jasminum Sambac*, L.; *Olea europœa*, L.; *Mentha piperita*, L.; *Rumex dentatus*, L.; *Ficus Sycomorus*, L.; *Ficus carica*, L.; *Salix Safsaf*, Forsk.; *Juniperus phœnicea*, L.; *Pinus Pinea*, L.; *Allium sativum*, L.; *Allium Cepa*, L.; *Phœnix dactylifera*, L.; *Calamus fasciculatus*, Roxb.; *Hyphœne thebaica*, Mart.; *Medemia Argun*, P. G. v. Würtemb.; *Cyperus Papyrus*, L.; *Cyperus esculentus*, L.; *Andropogon laniger*, Desf.; *Leptochloa bipinnata*, Retz.; *Triticum vulgare*, L.; *Hordeum vulgare*, L.; *Parmelia furfuracea*, Ach.; *Usnea plicata*, Hoffm.

thin chalk soils. The wheat from lake dwellings in Switzerland, for which I am indebted to J. T. Lee, Esq., F.G.S., are fair samples. My colleague, Mr. W. Fawcett, has recently brought me from America grains of maize from the prehistoric mounds in the valley of the Mississippi, and from the tombs of the Incas of Peru, which represent also fair samples of this great food substance of the New World. The early peoples of both worlds had then under cultivation productive varieties of these important food-plants, and it is remarkable that in our own country, with all the appliances of scientific cultivation and intelligent farming, we have not been able to appreciably surpass the grains which were harvested by our rude ancestors of two thousand years ago.

In taking a further step into the past, and tracing the remains of existing species of plants preserved in the strata of the earth's crust, we must necessarily leave behind all certain chronology. Without an intelligent observer and recorder there can be no definite determination of time. We can only speculate as to the period required for effecting the changes represented by the various deposits.

The peat bogs are composed entirely of plant remains belonging to the floras existing in the regions where they occur. They are mainly surface accumulations still being formed and going back to an unknown antiquity. They are subsequent to the last changes in the surface of the country, and represent the physical conditions still prevailing.

The period of great cold during which arctic ice extended far into temperate regions was not favourable to vegetable life. But in some localities we have stratified clays with plant remains later than the Glacial Epoch, yet indicating that the great cold had not then entirely disappeared. In the lacustrine beds at Holderness is found a small birch (*Betula nana*, L.), now limited in Great Britain to some of the mountains of Scotland, but found in the arctic regions of the Old and New World and on alpine districts in Europe, and with it *Prunus Padus*, L., *Quercus Robur*, L., *Corylus Avellana*, L., *Alnus glutinosa*, L., and *Pinus sylvestris*, L. In the white clay beds at Bovey Tracey of the same age there occur the leaves of *Arctostaphylos Uva-Ursi*, L., three species of willow, viz., *Salix cinerea*, L., *S. myrtilloides*, L., and *S. polaris*, Wahl., and in addition to our alpine *Betula nana*, L., the more familiar *B. alba*, L. In beds of the same age in Sweden, Nathorst has found the leaves of *Dryas octopetala*, L., and *Salix herbaeea*, L., this being associated with *S. polaris*, Wahl. Two of these plants have been lost to our flora from the change of climate that has taken place, viz.. *Salix myrtilloides*, L., and *S. polaris*, Wahl. ; and *Betula nana*, L., has retreated to the mountains of Scotland. Three others (*Dryas octopetala*, L., *Arctostaphylos Uva-Ursi*, L., and *Salix herbacea*, L.) have withdrawn to the mountains of northern England, Wales, and Scotland while the remainder are still scattered over the country. Notwithstanding the diverse physical conditions to which these plants have been subjected, the remains preserved in these beds present no characters by which they can be distinguished from the living representatives of the species.

We meet with no further materials for careful comparison with existing species until we get beyond the great period of intense cold which immediately preceded the present order of things. The Glacial Epoch includes four periods during which the cold was intense, separated by intervals of somewhat higher temperature which are represented by the intervening sedimentary deposits. During these alterations of temperature, extensive changes in the configuration of the land were taking place. The first great upheaval occurred in the early glacial period, and was followed by a considerable subsidence. A second upheaval took place late in the glacial epoch. Various estimates have been formed of the time required for this succession of climatic conditions and earth-movements. The moderate computation of Ramsay and Lyell gives to the boulder clay of the first glacial period an age of 250,000 years, estimating the time of the first upheaval as 200,000 years ago, while the subsidence took place 50,000 years later, and the second upheaval 92,000 years ago.

The sedimentary deposits later than the Pliocene strata, but older than the glacial drift, indicate an increasing severity in the climate, which reached its height in the first glacial period.

At Cromer, on the Norfolk coast, the newest of these deposits has supplied the remains of *Salix polaris*, Wahl., *S. einerea*, L., and *Hypnum turgescens*, Schimp. This small group of plants is of great interest in connection with the history of existing species ; their remains are preserved in such a manner as to permit the closest comparison with living plants. Such an examination shows that they differ from each other in no particular. In the post-glacial deposits in Sweden, *Salix herbacea*, L., is associated with *S. polaris*, Wahl., as I have already stated. These two willows are very closely related, having indeed been treated as the same species until Wahlenberg pointed out the characters which separated them when he established *Salix polaris* as a distinct species in 1812. One of the most obvious of the specific distinctions is the form and the venation of the leaf, a character which is, however, easily overlooked, but when once detected is found to be so constant that it enables one to distinguish without hesitation the one species from the other. The leaves of the two willows in the Swedish bed present all the peculiarities which they possess at the present day, and the venation and form of the leaves of *S. polaris*, Wahl., from the pre-glacial beds of Cromer present no approach towards the peculiarities of its ally *S. herbacea*, L., but exhibit them exactly as they appear in the living plant. This is the more noteworthy as the vegetative organs supply, as a rule, the least stable of the characters employed in the diagnosis of species. The single moss (*Hypnum turgescens*, Schimp.) is no longer included in the British flora, but is still found as an arctic and alpine species in Europe, and the pre-glacial specimens of this cellular plant differ in no respect from their living representatives.

The older beds containing the remains of existing species, which are found also at Cromer, have recently been explored with unwearied diligence and great success by Mr. Clement Reid, F.G.S., an officer of the Geological Survey of England. To him I am indebted for the opportunity of examining the specimens which he has found, and I have been able to assist him in some of his determinations, and to accept all of them. His collections contain sixty-one species of plants belonging to forty-six different genera, and of these forty-seven species have been identified. Slabs of clay-ironstone from the beach at Happisburgh contain leaves of beech, elm, oak, and willow. The materials, however, which have enabled Mr. Reid to record so large a number of species are the fruits or seeds which occur chiefly in mud or clay, or in the peat of the forest bed itself. The species consist mainly of water or marsh plants, and represent a somewhat colder temperature than we have in our own day. belonging as they do to the arctic facies of our existing flora.

Only one species (*Trapa natans*, L.) has disappeared from our islands ; its fruits, which Mr. Reid found abundantly in one locality, agree with those of the plants found until recently in the lakes of Sweden. Four species (*Prunus spinosa*, L., *Œnanthe Lachenalii*, Gmel., *Potamogeton heterophyllus*, Schreb., and *Pinus Abies*, L.) are found at present only in Europe, and a fifth (*Potamogeton trichoides*, Cham.) extends also to North America ; two species (*Peucedanum palustre*, Moench, and *Pinus sylvestris*, L.) are found also in Siberia, whilst six more (*Sanguisorba officinalis*, L., *Rubus fruticosus*, L., *Cornus sanguinea*, L., *Euphorbia amygdaloides*. L., *Quercus Robur*, L., and *Potamogeton crispus*, L.) extend into Western Asia, and two (*Fagus sylvatica*, L., and *Alnus glutinosa*,

L.) are included in the Japanese flora. Seven species, while found with the others, enter also into the Mediterranean flora, extending to North Africa: these are *Thalictrum minus*, L., *Thalictrum flavum*, L., *Ranunculus repens*, L., *Stellaria aquatica*, Scop., *Corylus Avellana*, L., *Zannichellia palustris*, L., and *Cladium Mariscus*, Br. With a similar distribution in the Old World, eight species (*Bidens tripartita*, L., *Myosotis cæspitosa*, Schultz., *Suæda maritima*, Dum., *Ceratophyllum demersum.*, L., *Sparganium ramosum*, Huds., *Potamogeton pectinatus*, L., *Carex paludosa*, Good., and *Osmunda regalis*, L.) are found also in North America. Of the remainder, ten species (*Nuphar lutcum*, Sm., *Menyanthes trifoliata*, L., *Stachys palustris*, L., *Rumex maritimus*, L., *Rumex Acetosella*, L., *Betula alba*, L., *Scirpus pauciflorus*, Lightf., *Taxus baccata*, L., and *Isoctes lacustris*, L.) extend round the north temperate zone, while three (*Lycopus europæus*, L., *Alisma Plantago*, L., and *Phragmites communis*, Trin.), having the same distribution in the north, are found also in Australia, and one (*Hippuris vulgaris*, L.) in the south of South America. The list is completed by *Ranunculus aquatilis*, L., distributed over all the temperate regions of the globe, and *Scirpus lacustris*, L., which is found in many tropical regions as well.

The various physical conditions which necessarily affected these species in their diffusion over such large areas of the earth's surface in the course of, say, 250,000 years, should have led to the production of many varieties, but the uniform testimony of the remains of this considerable pre-glacial flora, as far as the materials admit of a comparison, is that no appreciable change has taken place.

I am unable to carry the history of any existing species of plant beyond the Cromer deposits. Some of the plant remains from Tertiary strata have been referred to still living species, but the examination of the materials, as far as they have come before me, convinces me that this has been done without sufficient evidence. The physical conditions existing during even the colder of the Tertiary periods were not suitable to a flora fitted to persist in these lands in our day, even if the period of great cold had not intervened to destroy them. And in no warmer region of the earth do these Tertiary periods now exist, though floras of the same facies occur, containing closely allied species. The sedimentary beds at the base of the Glacial Epoch contain, as far as we at present know, the earliest remains of any existing species of plant.

It is not my purpose to point out the bearing of these facts on any theoretical views entertained at the present day: I wish merely to place them before the members of this section as data which must be taken into account in constructing such theories, and as confirming the long-established axiom that by us, at least, as workers, species must be dealt with as fixed quantities.

Parliamentary and Law Proceedings.

Prosecution under the 17th Section of the Pharmacy Act, 1868.

At the Salford Police Court, on the 13th inst., before Z. Makinson, Esq. (Stipendiary), and Messrs. B. Armitage and G. W. Gadd, Charles James Jarman, of 20, Montague Street, Lower Broughton, trading as a dry-salter and sundryman, also one of the School Board Inspectors for the Borough of Salford, was charged for having unlawfully sold, on September 29 last, to Alfred Wright, Assistant Secretary to the Chemists and Druggists' Trade Association of Great Britain, a certain poison, to wit, half an ounce of laudanum, the same being a preparation of opium, and not labelled with the name of the article, the word poison, and the name and address of the seller of the same, contrary to the statute made and provided.

Mr. Thomas Price, Messrs. Sampson and Price, Solicitors, Manchester, appeared for the prosecution, and the defendant appeared in person.

Mr. Price, in opening the case, said the facts of the case were as follows:—On September 29 last, Mr. Wright visited the shop at 20, Montague Street, kept by the defendant, who, however, was not a duly qualified chemist or druggist, and purchased amongst other articles, from a woman behind the counter, half an ounce of laudanum, for which he paid 2*d*. The bottle containing the laudanum was handed back to Mr. Wright without being labelled with the name of the article, the word poison, or the name and address of the seller of the same. Mr. Wright would tell the bench that he had analysed the contents of the bottle and found it to be laudanum, a preparation of opium, which was a poison scheduled under Part II. of the Pharmacy Act, 1868.

Mr. Alfred Wright, called, sworn and examined, gave evidence in support of the opening statement.

Mr. Swift, agent for the Manchester and Salford Building Society, was called, sworn, and examined by Mr. Price. He stated that Jarman was the tenant of the shop situated at 20, Montague Street, Lower Broughton.

Defendant, on being questioned by the bench, stated that he did not sell poisons, but his family was troubled with diarrhœa, and he had taken a 4 oz. bottle he kept for his private use and reduced it in strength for their use. When Mr. Wright called, his wife thought he was a medical man, and that was the reason she sold him the laudanum. He (witness) further stated that he had obtained twenty-five years' experience in London and Manchester, and was competent to take a pharmaceutical situation.

Mr. Price in reply to a question from the Stipendiary, said further proceedings were contemplated by the Pharmaceutical Society against the defendant.

The Stipendiary, after a consultation with the bench, said the defendant would be found 5*s*. and costs.

Mr. Price applied for extra costs.

The Stipendiary said after the explanation given by the defendant, he was of opinion that it was a very trivial case indeed.

Mr. Price said the defendant was not authorized to sell poisons at all.

The Stipendiary, however, declined to allow extra costs.

Obituary.

JOHAN CAREL BERNELOT MOENS.

The death is announced of this celebrated Dutch quinologist at Haarlem on the 2nd inst. Born in 1837, Moens at the age of sixteen became a pharmaceutical student, and when twenty-one went to Java in the Government service as a military pharmacist. After residing about eight years in Java, Moens became associated as chemical assistant with Van Gorkom, who was then Director of the Dutch Government Plantations in Java, and in 1872 he succeeded Van Gorkom as Director. In that office, which he held during four years, Moens contributed largely to the advancement of the scientific cultivation of the cinchona plant, and his experience was embodied in an important work entitled 'Kina-Cultur in Azië.' In 1880 he visited India and Ceylon, with a view to reporting on the conditions of cinchona cultivation there, and in 1883 he returned to Holland.

Notice has also been received of the death of the following:—

On the 26th of September, Mr. William John Fairbanks, Chemist and Druggist, London. Aged 23 years.

On the 30th of September, Mr. Richard Morison Bennett, Chemist and Druggist, Plymouth. Aged 52 years.

On the 30th of September, Mr. James Henry Adams, Chemist and Druggist, Salcombe. Aged 51 years.

Mr. Robert Fouracre, Pharmaceutical Chemist, Yaas, New South Wales. Mr. Fouracre had been a Member of the Pharmaceutical Society of Great Britain since 1859.

On the 4th of October, Mr. Samuel Booth, Chemist and Druggist, Broadbottom. Aged 74 years.

On the 6th of October, Mr. Arkas Sapp, Chemist and Druggist, Basingstoke. Aged 40 years. Mr. Sapp had been a Member of the Pharmaceutical Society since 1869.

On the 12th of October, Mr. William Charles Smith, Chemist and Druggist, Hammersmith, London. Aged 55 years. Mr. Smith had been a Member of the Pharmaceutical Society since 1869.

On the 14th of October, Mr. George Shadford, Chemist and Druggist, Spalding. Aged 48 years.

On the 14th of October, Mr. James Joce, Chemist and Druggist, Bideford. Aged 77 years.

On the 14th of October, Mr. Henry Davis, Pharmaceutical Chemist, Leamington. Mr. Davis was one of the Founders of the Pharmaceutical Society, and for many years held the position of Local Secretary for Leamington.

BOOKS RECEIVED.

PROCEEDINGS OF THE EIGHTH ANNUAL MEETING OF THE NEW YORK STATE PHARMACEUTICAL ASSOCIATION, 1886. From the Association.

PROCEEDINGS OF THE FIFTH ANNUAL MEETING OF THE MASSACHUSETTS STATE PHARMACEUTICAL ASSOCIATION, 1886. From the Association.

A COMPENDIUM OF DOMESTIC MEDICINE AND COMPANION TO THE MEDICINE CHEST. By JOHN SAVORY. Tenth Edition, London: H. K. Lewis, 1886. From the Publisher.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE UNOFFICIAL FORMULARY.

Sir,—The Conference Committee has an important problem to deal with, and it is sincerely to be hoped that its labours will tend to the general good of the profession. I, for one, voted for the sum asked (£25), as an experiment worth trying, and probably was also influenced by the known ability and moderation of the gentleman who moved the resolution. There is no doubt that medical men prescribe new and secret remedies brought under their notice, when they think benefit will result to the patient, and if the Committee presents to us new and improved medicines and publishes the best mode of preparing them, it is very likely indeed the doctor will be only too glad to use those preparations of which he knows the strength and composition—let us hope to the great benefit alike of patient, prescriber and dispenser.

At the same time I do hope the preparations for which some makers are well known (and which are not secret, but depend for their excellence chiefly on the care and special knowledge used in their preparation) will not be brought within the scope of the Committee's work, as when such knowledge, often obtained after patient research, has produced an improved medicine, it is only just that the commercial reward should be secured to the manufacturer.

I presume it is chiefly new drugs the Committee intends to work upon, and if the isolated position of the members of the Committee interferes with the unanimity and authority of its work, I hope application will be made to the Pharmaceutical Society to undertake a similar research in its new laboratory, and also that the authority and concurrence of the medical profession may be secured. We might then, Sir, expect a valuable result, and there can be little doubt that the Medical Council would recognise the value of the work, and (unless I am too sanguine) avail itself of it for the next and following editions of the British Pharmacopœia.

It is much to be desired that our Society should do some work of public utility, in addition to protecting the rights and interests of its members, which indirectly is of course for the public safety; as I feel sure no better or more honourable way can be devised to enlighten the public and the Legislature as to the value of improved pharmaceutical education, to influence the decision of Parliament when a new Pharmacy Act is applied for, and perhaps even to hasten that very desirable consummation.

195, *Brompton Road, London.* R. A. ROBINSON.

Sir,—In Mr. Schacht's letter in your last number he says, "The class of non-official preparations typified by 'Bullock's Glycerine of Pepsine' affords no scope for the Committee's work." Why should they be excluded? We have no official form for a liquid preparation of pepsine, and yet they are constantly prescribed, and their number is very large. Some time ago I counted the preparations of pepsin and pancreatin I had in stock, and it was then over forty, and several new ones have been added since. A representative committee should be able to tell us which is the best solvent for pepsine, if a mixture of acid and glycerine, or weak spirit or anything else. A formula having the authority of several well-known names should have more weight than a secret preparation of one person, however eminent. Another preparation which has been referred to in this discussion is hazeline, and the proprietors of that nostrum published a form. We do not want a form for hazeline, but should like to know what would be the best preparation of witch hazel—if a distilled water contains nothing, as has been stated by a medical committee in America, or if it is an active remedy, as seems to be the opinion of some medical men in England.

Another set of preparations for which we have no official formulæ are syrups of hypophosphites. We constantly get prescriptions for syrup of hypophosphite of soda or lime or iron or "comp." Would not a recognized form tend to promote uniformity. At present we look in Squire or Martindale, or to a back number of the Journal, and in my case, if I cannot find a better authority, I fall back on "Neve." Sometimes we get the prescription with "Jones" at the end of the name of the article; then we send to all our neighbours and see if they have it—"generally unsuccessfully"—then have to keep the patient waiting till we can find who Jones is, and get the article. I suppose "nostrums" bother us seaside folk more than the rest of the world, our customers being so constantly changing and coming from such various districts. Anything tending to diminish their number would be a boon.

St. Leonards. F. C. NEVE.

Sir,—In the remarks on the proposed unofficial formulary, which were published in your last issue, you say that there is in the letters which have been published "a total absence of any just discrimination between nostrums and preparations which, though in fact proprietary, are not in any sense secret preparations, but appeal to the public and medical men for recognition on the simple ground of their inherent merits." As the writer of one of the letters referred to I desire to say that I had no intention of recognizing different classes of proprietary preparations. I can find no line by which it is possible to separate proprietary medicines into well-defined classes, nor do I think such a separation is desirable.

It appears to me that it is to the best interests of the public that the composition of all proprietary medicines should be known to pharmacists. If proprietors will not give the formulæ for these, then as near approximations to them as analysis can supply should be adopted.

I cannot endorse your view that because a particular preparation has especial merits the proprietor is therefore entitled to remain the only maker of it; the view that he is, certainly is not acted upon by the trade, for the most re-

spectable wholesale and manufacturing firms do assuredly send out imitations of the leading proprietary medicines.

That an article is of admitted value and much used is, I think, a sufficient reason for the publication of a formula for its preparation by such an authority as would command the confidence of medical practitioners, of pharmacists, and of the public, too.

In my previous letter I pointed out that owners of proprietary articles have means of protecting themselves without relying on the forbearance of those whose means of livelihood they are doing their best to take away; and surely no one supposes that the Committee would recommend preparations made from its formulary to be substituted for those of some particular maker when they were asked for.

I know of no other trade or industry in which manufacturers do not imitate articles produced by others, and the public in supporting them recognize that they have a right so to do. In manufactures the maker relies upon the quality of his product and upon his adjustment of the wholesale price to the cost of production. If proprietors of medicinal compounds would rely more upon excellence of product and resonableness of price, and less upon secrets of composition and methods of manufacture, they would deserve better of those whose patronage they seek.

Blackpool. JOHN LAURIE.

ELECTION OF ANNUITANTS.

Sir,—The election of annuitants to the Benevolent Fund is again approaching, and with it comes the annual shower of circulars from applicants, needy or otherwise.

I protest, sir, against this unworthy system, and am of opinion that the Council should prohibit it altogether. The subscribers are surely able to make up their minds from the official statement issued by the Council, without individual applicants who can afford to do so, or their friends, trying thus to steal a march over their poorer and probably more deserving competitors.

I, for myself, invariably decline to vote for the canvassing applicants, believing that if they can afford to spend £20 or £25 on postage and printing, it need not matter very much to them whether they are elected on their first application or not.

A SUBSCRIBER.

WHAT IS LAUDANUM?

Sir,—In reference to the query raised by Mr. G. Ellinor, is not the modern use of the term "laudanum" restricted to tinct. opii? Formerly it was either ext. opii alone, or combined with other ingredients. The 'Pharmacopœia Universalis' gives laudanum opiatum s. simplex as a synonym of ext. opii aquos.; but in Quincy's 'Dispensatory' (my copy is dated 1728) I do not find ext. opii so named, although it is stated to be "very convenient for any composition of laudanum." Under laudanum londinense (composed of spirituous extract of opium, extract of saffron, etc.) Quincy says "this is the laudanum the college retain in their 'Dispensatory,'" and he also gives laudanum alterum and laudanum balsamicum, both of which are of the consistence of extracts. Dr. Sydenham's preparation is distinctly specified as laudanum liquidum sydenhamii, Dr. Sydenham's liquid laudanum. As further examples we have laudanum liquidum c. spiritu salis nitri dulcis; laudanum liquidum c. camphora, etc.

Coventry. H. W. JONES.

FIREPROOF TREES.

Sir,—The "Fireproof Tree," described by Mr. Dyer in the *Gardener's Chronicle*, and referred to in your issue of October 2, would seem to lend some credence to the wonderful tales of Methodius, Nieuhoff (quoted by Folkard) and others, of similar "vegetable salamanders" growing in various parts of the world. One of these, near the city of Buran, in Natolia, is described as rooted in fire, and yet flourishing in great luxuriance and beauty, whilst another, somewhere in Tartary, even when cut down and thrown into the fire, can neither be ignited nor consumed, for though it becomes glowing red in the flames, yet as soon as they are extinguished the wood is again cold, and precisely the same in appearance as before. You ask, naturally enough, "to what cause this immunity is due?" Is it possible these trees belong to the same order as the one described in Bishop Fleetwood's 'Curiosities of Nature and Art' under the name of *Mesoneidereos*, which grows in Java, has iron wire for pith, and produces a fruit impenetrable by iron? Or perhaps they are related to that equally wonderful plant which Sir John Maundeville saw in the city of Tiberias:—"In that cytee (says he) a man cast an brennynge dart in wratthe after owre Lord, and the hed smote in to the eerthe, and wex grene, and it growed to a gret tree; and yit it growethe, and the bark there of is like colcs." However this may be we shall have in future to read these old travellers' tales somewhat less sceptically than heretofore.

Whilst I am writing may I say that I, too, like Mr. Ellinor, should like to be told authoritatively what laudanum is. The dictionaries tell me it is ladanum or labdanum, the resinous juice of *Cistus ladaniferus*, and my general reading confirms the statement that the name, at least, comes from hence. But whether the thing is extract of opium, wine of opium or tincture of opium I cannot ascertain, having found the term given officially to each in turn (except the last, to which is now popularly applied), and, indeed, to other preparations besides these.

Epworth. C. C. BELL.

Caution.—A correspondent wishes a note of caution to be published in respect to the operations of a swindler who presents a prescription, apparently of French origin, ordering "Vin de Mariani" and some pills. In some cases he has been allowed to take the wine away with him, giving an address for the pills to be sent to, which has turned out to be incorrect.

"*Jay Pe.*"—The phenomenon observed is strictly analogous to the disintegration that takes place upon scratching a "Rupert's drop."

E. H. B.—The address is fully reported in *Nature* for September 2.

Student.—(1) Apply to the Secretary for a copy of the pamphlet entitled 'Hints to Students.' (2) This question should be addressed to the Secretary to the Apothecaries' Company.

Roath.—There is an article on the subject in the *British Medical Journal* for last week written by the Surgeon to the Cancer Hospital, but we should think that either of the large London hospitals might be mentioned.

W. Puckey.—The preparation is, we believe, an American one, and has been recommended as useful in the treatment of functional heart disease.

F. W. Wood—(1) *Scabiosa succisa.* (2) *Polygonum Persicaria.* (3) *Euphorbia exigua.* (4) *Agrostemma Githago.* (5) Probably *Lychnis diurna.* (6) *Geranium Robertianum.* (7) Not British; send a specimen in fruit.

Assistant.—The meetings of the Chemists' Assistants' Association are held at 103, Great Russell Street. Information could be obtained from either of the Honorary Secretaries, Mr. W. B. Botham, 14, Holborn, E.C., or Mr. E. H. Farr, 50, Southwark Street, S.E.

Member.—According to Regulation 2, applying to the administration of the Benevolent Fund, the expediency of electing pensioners on the Fund, and, if so, the number has to be decided by the Council at its meeting in October. The election takes place in December.

J. Fennell.—The statement is quite correct. The Council Examination Prizes, including the Pereira Medal, may be competed for by any person who has passed the Major examination during the year, provided that he was an Associate of the Society at the time of passing the examination. It does not matter where he may have obtained his education.

Andrew.—In the Petroleum Act the term "petroleum," used alone, has a general application to "any rock oil, Rangoon oil, Burmah oil, oil made from petroleum, coal, schist, shale, peat or other bituminous substance," and any products of petroleum or any of the above-mentioned oils; but the more limited term "petroleum to which this Act applies," means such of the petroleum so defined as when tested in a prescribed manner gives off an inflammable vapour at a temperature of less than 73° F.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Farr, Watts, Wright, Tyrer, Ince, McConnell, E. H. B

"THE MONTH."

Urochloralic Acid.

It is generally accepted that chloral hydrate splits up in the organism under the influence of the alkalinity of the blood into chloroform and formic acid; but it is also known that this decomposition does not take place always completely and that, under certain conditions, after the administration of chloral hydrate a substance apparently derived from it has been found in the urine, which was first separated by von Merring (*Year Book*, 1875, p. 139) and named "urochloralic acid." This observation has raised the question how a compound so easily decomposed by alkalies as chloral hydrate could pass the alkaline juices of the organism unchanged, and Dr. Liebreich thought an answer might be found in a different behaviour of chloral hydrate in the forms of cake and separate crystals, since the former variety had been proved to dissolve in water with contraction of volume and the latter with expansion (*Chem. Zeit.*, Oct. 3, p. 1220). But in trying whether the two varieties behaved differently towards alkalies a phenomenon was observed which whilst affording a possible explanation of the occurrence of urochloralic acid in the urine is thought to be very suggestive as to the manner in which such reactions may take place in the organism. When

'Dead Space' in Chemical Reactions.

an aqueous solution of chloral hydrate, either in cake or crystals, was treated with sodium carbonate a nebulous separation of chloroform took place more or less quickly according to temperature and concentration; but it was observed that there was usually a "dead space," in which no chemical reaction seemed to take place. When tubes were used the separation was limited by a line curved reversely to and below the meniscus. Upon filling a capillary tube laid horizontally a "dead space" appeared at each end, and if the column of liquid were shortened so that its length did not exceed the sum of the lengths of the two "dead spaces" no reaction took place. Further experiments showed that if the perfectly full tube were closed with an elastic membrane the "dead space" was still maintained, which is important in its bearing upon what may occur in a physiological cell. It was also found that in narrow tubes generally there was a retardation of the reaction. If, therefore, a physiological cell be regarded as a space bounded by an elastic membrane it will be seen that within its minute limits many mixtures will scarcely undergo any reaction, or only such as may occur about the centre of the cell. The "dead space" has also been observed in other reactions, as in the separation of iodine from iodic acid by sulphurous acid, which is rendered very distinct by starch solution. The sudden blue coloration only extends at first to a definite point below the meniscus, whilst the "dead space" remains colourless for several seconds. In tubes the reaction is seen to go on in thin thread-like lines, the colour afterwards diffusing through the tube. The phenomenon is probably due to the influence of cohesion.

Another interesting observation, somewhat similar in its nature, made by Herr Gerstmann, is that

Capillarity and Solutions.

liquid mixtures and saline solutions are affected in their proportional composition whilst passing through capillary passages (*Chem. Zeit.*, Oct. 3, p. 1220). For instance, when alcohol of 30 per cent. strength is passed through capillary tubes the first portion that issues is richer in alcohol than the original mixture. On the other hand, in the case of alcohol of 70 per cent. strength the first runnings are poorer in alcohol. The rule was found to hold good with solutions of sodium chloride, oxalic acid and sodium hydrate; porous earthenware and pressed sand being used as percolating media. Herr Gerstmann explains these results by supposing that in the passage of the mixture an equal layer of each constituent alternately adheres to the side of the tube, so that as long as this continues the constituent present in least quantity loses a proportion larger relatively to the total volume than the preponderating constituent.

In an interesting paper on dissociation and contact action, read before the British Association (*Chem. News*, Oct. 8, p. 179), the Rev. Mr. Irving discusses the conditions under which combinations are brought about by the intervention of heated spongy platinum, platinized asbestos, or other porous or finely divided bodies. He presumes that the enormous proportion of solid surface in such porous materials is coincident with a corresponding increase in the number of collisions in a given time between the molecules of gaseous matter contained in the pores and such solid surface. The consequence, he thinks, may be that internal work is done among the atoms of the molecules, by increasing the intensity of their vibratory motions, which may facilitate dissociation and so start the combination of gaseous bodies that in their free molecular state do not, under ordinary physical conditions, act upon one another. The action once initiated the heat of combination would, in many cases, cause a rise in temperature that would result in the dissociation taking place in an increasing ratio, corresponding to what is known actually to occur. In a letter published subsequently (*Chem. News*, Oct. 22, p. 121), Mr. T. P. Blunt, of Shrewsbury, suggests that this theory may be extended to include the phenomenon of condensation. Supposing that the walls of a containing vessel could be narrowed until it becomes a pore not greater in diameter than the mean free path of the molecule, Mr. Blunt conjectures that the motion of the molecule would then consist in great measure of a violent rebound from wall to wall, leaving the space behind it comparatively free from pressure, and, consequently, adapted for the close approach of another molecule in the rear. He would therefore expect, on *à priori* grounds, that any minutely porous body would effect this condensation of gases.

Dissociation and Condensation.

The results of some further researches by Dr. Arthur Downes as to the effect upon various ferments of exposure to sunlight seem to have a direct bearing upon the manner of keeping those physiological ferments which are now commonly found in pharmacies. In experiments made with active solutions of malt diastase, pancreatic diastase, and trypsin, he found that they were all rendered inert after being exposed in half-filled flasks to sunlight for one month (*Nature*, Oct. 7, p. 546). A solution of pepsine was also rendered inert after equal exposure, but the pepsine was not a well-prepared sample. Rennet, on the other hand, when treated similarly, retained after a month's insolation its specific properties, though distinctly enfeebled. In control experiments, made under identical conditions as to temperature, but where the flasks were kept in the dark, the ferments always retained their activity. In a previous

Ferments and Light.

investigation, undertaken with Mr. T. P. Blunt, Dr. Downes found that the invertive ferment of sugar is destroyed by oxidation on prolonged exposure to sunlight.

Medicated Gas.

The treatment of pulmonary phthisis with rectal injections of medicated gases has been reported upon favourably by Dr. Bergeron (*Brit. Med. Journ.*, Oct. 2, p. 651). About four or five litres of carbonic acid gas is passed through one-quarter to half a litre of a mineral water containing sulphur and then introduced into the rectum, two injections being made in the course of twenty-four hours. After two days of this treatment cough is reported to have been cured, expectoration modified in quantity and character, profuse perspiration stopped, and the general condition improved, even in cases in the confirmed stages of phthisis.

Methylal.

Attention has been called by Signor Personali (*Nouv. Rém.*, Oct. 15, p. 459), of the Pharmacological Institute of Turin, to the possible value as an anæsthetic and hypnotic of methylal, a compound which was first obtained nearly half a century ago, but has hitherto remained without application. Methylal is represented by Roscoe and Schorlemmer ('Hist. Carb. Comp.,' p. 195) as having probably the constitution $CH_2(OCH_3)_2$. It is prepared by distilling methyl alcohol with an oxidizing mixture of manganese dioxide and sulphuric acid, and treating the distillate with potash lye to separate methyl formate, which passes over with the methylal. The methylal is a very mobile, volatile, colourless liquid, sp. gr. 0·8551, boiling at 42° C. and slightly reddening litmus paper. It has an odour recalling those of chloroform and acetic ether, and a burning aromatic taste, but produces a sensation of cold when placed on the skin. When injected subcutaneously into dogs in the proportion of 0·10 to 0·15 per cent. of their weight it quickly produced anæsthesia, followed by a deep sleep in which reflex action was suspended. Rabbits were not quite so susceptible. Recovery was rapid in consequence of the rapid elimination of the methylal, which did not appear to leave any disagreeable after-effects. It augmented slightly the heart beats, lowered slightly the blood pressure, and caused the respiration to become slower and deeper. Signor Personali has found methylal also to be an antidote to strychnine, a small quantity being sufficient to suspend the tetanic spasms. In the human subject it is said to relieve nervous pains of the stomach when administered as a draught, and in the form of an ointment or liniment to constitute an excellent anæsthetic. Several formulæ are given, among which are a liniment (oil of almonds, 85 grams; methylal, 15 gr.),—an ointment (lard, 30 gr.; wax, 3 gr.; methylal, 5 gr.),—a "potion" (syrup of red currants, 40 gr.; methylal, 1 gr.; water, 110 gr.),—and a syrup (methylal, 1·5 gr.; simple syrup, 100 gr.).

Eulylyptol.

"Eulylyptol" is the name given by Dr. Schmeltz to a mixture consisting of six parts of salicylic acid to one each of carbolic acid and oil of eucalyptus, which he considers preferable as an antiseptic to iodoform, corrosive sublimate or carbolic acid (*Journ. Pharm.*, Oct. 15, p. 361). Dr. Schmeltz considers that a chemical combination takes place between the ingredients, since carbolic acid cannot be detected in the mixture. It is described as having a strong aromatic odour and an acrid burning taste, and as being nearly insoluble in water, but very soluble in absolute alcohol, ether, chloroform, and a mixture of equal parts of alcohol and glycerine. It is also soluble in ammonia and alkaline solutions. According to Dr. Schmeltz, it completely arrests the fermentation of all putrescible substances, a small quantity added to urine, under any condition, being sufficient to preserve it during a month.

Saccharin.

The alleged antifermentative property of saccharin has been the subject of a comprehensive series of experiments by Messrs. Aducco and Mosso (*Chem. Zeit.*, Oct. 10, p. 218). It was found that in the proportion of 0·16 per cent. saccharin distinctly and persistently diminished the activity of beer yeast at a temperature both of 16° and 30° C. In a mixture of equal parts of a 0·32 per cent. saccharin solution and urine, kept at a temperature of 16° to 17° C., ammoniacal fermentation had not commenced at the end of seven days, when a mixture containing the same proportion of salicylic acid had broken down. A saccharin solution retarded the lactic fermentation in milk, and the action of a preparation of pancreas was also considerably slackened by it. Added to a pepsin liquor in the proportion of 0·16 to 0·032 per cent. saccharin retarded the peptonizing of coagulated albumen, though without stopping it, but upon reduction of the saccharin to 0·0064 per cent. the gastric juice was then scarcely affected. Comparative experiments showed benzoic acid to be equally powerful in this respect and salicylic acid a little more so. In the proportion of 0·16 to 0·32 per cent. in acid and neutral solutions saccharin proved capable of affecting the amylotic action of saliva, the effect being least in the neutral solution. Salicylic acid proved rather more powerful in similar solutions and boric acid had about the same effect as saccharin. Professor Salkowsky also reports results that are practically in accord with the foregoing (*Chem. Zeit.*, Oct. 10, p. 218). He states that the antiseptic property of saccharin is due to an acid action, and is greatly diminished upon neutralizing with sodium carbonate.

Iodine Irritation.

The external application of a tincture of iodine made with a badly rectified spirit, containing acetone, may be followed by great irritation of the epidermis or even vesication, and similar results may occur when a preparation of good quality is used on a susceptible patient. M. Carles points out (*Journ. Pharm.*, Oct. 1, p. 315) that the irritation may be removed immediately by the application of alkalies and alkaline salts, dilute ammonia or soda crystals being permissible where the epidermis is robust, as on the hands, whilst alkaline sulphites, bisulphites, or hyposulphites are preferable for more delicate skin. But the best agent, in M. Carles's opinion, is sodium sulphydrate, an aqueous solution containing one to ten per cent., according to circumstances, giving relief in a few minutes. It may also be used for removing iodine stains.

Absorption by the Skin.

The absorptive power of the skin and the extent to which it can be utilized in the administration of food or medicine has been the subject of much difference of opinion. A recent writer is of opinion (*Brit. Med. Journ.*, Oct. 16, p. 726) it has now been amply proved that the skin has a very limited power in absorbing simple liquids such as water or milk, and that although they may be taken up to an appreciable

extent by the superficial layers, they are subsequently lost by evaporation rather than absorbed into the blood vessels or lymphatics. The evidence of the power of the skin to absorb non-volatile salts is considered by the writer to be hardly less unsatisfactory, and he mentions digitalis, aconite and opium as agents that were once confidently asserted to be absorbed by the skin, though the weight of evidence is quite against this view now. The cases in which they appear to have been active are attributed as a rule to the existence of sores or abrasions on the cutaneous surface, whilst the palliative effect with which poppy head fomentations are so widely credited is thought to be probably exercised on the nerve terminations in the skin. There is no doubt as to the absorptive power of the skin for volatile substances and gases, and for non-volatile salts and alkaloids and certain metals when applied by inunction. This leads to some remarks upon the relative value of the substances used as bases for ointments, and lard is preferred greatly before vaseline as an agent for facilitating cutaneous absorption. Vaseline is considered admirable as a protective, but as tending to hinder rather than promote absorption. Lanolin has been too lately introduced to allow final judgment on its merits, but what is known of it is said to be in its favour.

Sulphurized Suint.

According to M. Rohart, the grease of sheep's wool, at the temperature at which it melts, very readily absorbs certain sulphur compounds (*Nature*, Sept. 30, p. 531). For instance, it will fix as much as one hundred times its volume of sulphuretted hydrogen. After this treatment it is easily saponifiable in the cold state, by simply treating it for less than an hour with an alkaline carbonate, caustic alkali not being required. This treatment is said to be applicable to all kinds of fat when sulphurized. M. Rohart recommends a sulphurized soap prepared from suint for use in vine cultivation.

Iodized Hydrogen Water.

The use of an iodized hydrogen water by persons suffering from uric acid accumulations is recommended by Dr. J. Mortimer Granville (*Lancet*, Oct. 23, p. 795). The method suggested for its preparation is to iodize distilled water very slightly, or dissolve in it a minute quantity of hydriodic acid,—not enough of either to render the taste disagreeable,—and then to pass well-washed hydrogen gas through the water.

Ethyl-Cocaine.

It will be remembered that Herr Merck, encouraged by his success in converting benzoylecgonine into cocaine by the introduction of a methyl group into the molecule, extended the field of his experiments to homologous compounds, and amongst other products obtained one in which an ethyl group replaced the methyl group in cocaine, and which he named ethyl-cocaine (*Pharm. Journ.*, [3], xvi., 544). This compound has been experimented with physiologically by Professor Falk, of Kiel, who reports (*Pharm. Zeit.*, Oct. 13, p. 622) that qualitatively its action is the same as that of cocaine, but that quantitatively it differs in being weaker and less toxic, for which reason he thinks it might probably be sometimes substituted for cocaine advantageously in the treatment of specially nervous persons. It does not appear to exercise any mydriatic action. The base is freely soluble in alcohol and ether, almost insoluble in water, and melts at 102° C.

Colchicine and Colchiceine.

Although colchicine, which occurs in all parts of the *Colchicum autumnale*, has been the subject of several investigations, considerable uncertainty has hitherto existed as to its composition, which nearly every investigator has represented by a different formula, due probably to the different conditions of the substances obtained. At a recent meeting of the Austrian Chemico-Physical Society Dr. Zeisel gave some details respecting a substance prepared by a new method, which he claimed to be pure colchicine (*Pharm. Post*, Oct. 23, p. 721). When a moderately strong solution of Dr. Zeisel's product is slightly warmed a partial separation takes place, but the two fractions were found to be otherwise identical in composition and behaviour. Analysis gave results corresponding with the formula $C_{22}H_{25}NO_6$, and this formula was confirmed by analysis of the crystallized gold double salt. The apparently amorphous colchicine combines with chloroform to form a crystalline compound, represented by the formula $C_{22}H_{25}NO_6.2CHCl_3$, which is readily split up by water into its components. Colchiceine, which is formed upon boiling colchicine with dilute mineral acid, is considered by Dr. Zeisel to have the composition $(C_{21}H_{23}NO_6)_2.H_2O$, the water of crystallization being lost at a temperature between 140° and 150° C. This formula is supported by an analysis of the compound of colchiceine with gold chloride and with copper, and by the fact that methyl alcohol is formed during the decomposition. Taking into consideration that colchiceine shows the character of a monobasic acid, or a monatomic phenol, and probably contains an hydroxyl group in the molecule, Dr. Zeisel thinks the decomposition may be represented as follows:—

$$\underset{\text{Colchicine.}}{C_{21}H_{22}(OCH_3)NO_5} + H_2O = \underset{\text{Colchiceine.}}{C_{21}H_{22}(OH)NO_5} + CH_3OH.$$

Synthesis of Coniine.

A few months since it was reported (*Pharm. Journ.*, [3], xvi., 838) that Professor Ladenburg, by the reaction of paraldehyd upon α-picoline and treatment of the product with reducing agents, had obtained a substance which he considered probably identical with coniine (α-propylpiperidine). Further experiments, in which larger quantities were produced from synthetically prepared α-picoline, have confirmed the supposed identity, the artificially produced base and its salts corresponding in all their chemical, physical and physiological properties with those of natural coniine. At first complete identity could not be completely established, because the artificial product was found to be optically inactive. Assuming, however, that it consisted of detro and lævo portions an attempt was first made to separate them by the action of a penicillium, but without success, though the separation was effected in another way. The dextrotartrate of dextroconiine is very soluble in water and easily forms supersaturated solutions, but when a crystal of the salt is added to such a solution the whole after a short time solidifies to a crystalline cake. Upon adding a crystal of the dextro-salt to a supersaturated solution of tartrate of the artificial base the crystallization went on more slowly and was only partial, but the crystals when separated proved to be optically active, the specific rotatory power of the base being exactly that of natural coniine. By suitable treatment of the mother-liquor to remove some dextroconiine that remained in solution a lævo-coniine was

obtained that showed an equal rotatory power to the left. It may be mentioned here that more than eight years since (*Pharm. Journ.*, [3], viii., 649) M. Petit suggested as an explanation of the differences observed in the rotatory powers of commercial coniine that the base as extracted from conium fruit might be a mixture in variable proportions of coniine active and inactive upon polarized light. Professor Ladenburg claims that the synthesis of optically active coniine constitutes strictly speaking the first complete synthesis of an organic vegetable alkaloid, which he defines as a base "standing in near relation to pyridine (*i.e.*, containing a nucleus in which there is nitrogen)." It seems therefore worth while to record the steps by which this synthesis has been effected, which are as follows:—acetic acid, by Kolbe and Melsens; from acetic acid through acetone and isopropyl alcohol to glycerine, by Friedel and Silva; from glycerine to trimethylene bromide, by Erlenmeyer, Géromont and Raboul; from trimethylene bromide to piperidine, by Ladenburg; from piperidine to pyridine, by Königs and Hofmann; from pyridine to α-picoline, by Lange; and from α-picoline to coniine by Ladenburg.

Aluminium Salts.

In a review of recent pharmaceutical novelties in the *Berliner klin. Wochenschrift* two new aluminium salts are noticed, viz., acetic tartrate of aluminium and the acetic glycerinate, both of which are easily soluble in water and act as astringent caustics. The first, in the form of powder, is considered to be well adapted for use in ozœna and other chronic affections of the upper respiratory tract, the caustic effect lasting nearly a week (*London Med. Record*, Art. 5985).

Ericin.

Ericin, the yellow colouring matter obtained from the woody tissue of heaths, has been discovered in the young wood of different species of poplars (*Ph. Zeit. f. Russl.*, Sept. 28, p. 647). It is prepared by boiling the young twigs, finely divided, in a solution of alum in the proportion of 10 kilos of wood to 1 kilo of alum and 30 litres of water. After boiling twenty to thirty minutes the liquid is filtered. The turbid filtrate becomes clear after standing some time, depositing a yellowish-green resinous precipitate. The liquid is again filtered and exposed to the air and sunlight for three or four days or longer. The solution assumes a fine golden-green colour and can be used in this condition for dyeing. The colouring matter can also be precipitated from the above solution and used as a harmless solid pigment.

Fungus Pigments.

Herr Bachmann contributes (*Ber. deutsch. Bot. Ges.*, iv., 68) a description of the substances which give colour to fungi. He finds them to be of three kinds, viz., (1) A product of excretion on the cell-wall or in the intercellular spaces: in *Paxillus atrotomentosus* and *Agaricus armillatus* this excretion is crystalline; in *Lenzites sœpiaria* of the nature of a resin. (2) A pigment colouring the cell-wall itself: of this description are all those which give the brown, red or reddish-brown colour to the apothecia of lichens. (3) A constituent of the cell-contents, as in the Uredinæ, Tremellini and many species of *Peziza*, where an oily substance serves as the matrix. The characteristic reaction for this substance is a blue colour with sulphuric acid, and a green colour with potassium biniodide. To this class belongs also the red pigment in the latex-tubes of *Lactarius deliciosus*, while the green colour of the pileus is due to a pigment in the cell-wall. Coloured substances occur also in the hyphæ of many fungi. In about thirty species of fungus examined, the author found seven red, three violet and about seven yellow and orange pigments. Among the red were *Russula integra* and other species of *Russula*, *Cladonia coccifera*, *Agaricus armillatus*, *Peziza echinospora*, *P. sanguinea*, *Gomphidius viscidus* and *G. glutinosus*. Those which yielded a violet pigment were *Agaricus laccatus*, *Cortinarius violaceus* and *Lactarius deliciosus*. Among the orange and yellow pigments were *Gymnosporangium juniperinum* (æcidia of *Sorbus Aucuparia*), *Melampsora Salicis-capreæ* (uredo form of *Salix caprea*), *Puccinia coronata* (æcidio form of *Rhamnus cathartica* and *R. Frangula*), *Triphragmium Ulmaria* (primary uredo form of *Spiræa Ulmaria*), *Uromyces alchemillæ* (uredo form of *Alchemilla vulgaris*), *Peziza bicolor*, *P. scutellata* and *Bœomyces roseus*. The number of pigments appears to be greater than in the petals of flowering plants. Many species seem to be distinguished by a specific pigment, while other colouring matters are common to several species of a genus, or to a number of species belonging to different genera.

Mycology.

Students of mycology will be glad to learn that the second volume of the 'Enumeration of the British Hymenomycetes,' by the Rev. J. Stevenson, has just been published. At this time of the year fungus forays are most numerous, and the work in question will be found most useful, the descriptions being exceptionally good, and evidently written by one who is thoroughly familiar with the appearance and variations of the plants he describes.

Test for Coniferin.

A new reagent for recognizing the presence of coniferin in woody tissue is described by Herr Molisch (*Ber., deutsch. Bot. Ges*, iv., 301). It is prepared by diluting a 20 per cent. solution of thymol in alcohol with water so long as the mixture remains perfectly clear. To this liquid, chlorate of potassium is added in excess, and the mixture allowed to stand some hours and then filtered. On moistening woody tissue containing coniferin with this liquid and adding a drop of concentrated hydrochloric acid a fine bluish-green colour is developed, even in darkness. In this particular it possesses an advantage over the reagent usually employed, viz., phenol and hydrochloric acid, which requires sunlight to produce the coloration.

Phlox Carolina.

The root of *Phlox Carolina*, from which much of the commercial pink root was at one time derived, has been analysed by Mr. H. Trimble. He finds it to contain resin, tannin, and a peculiar camphor, which, with a red fluorescent colouring matter, is soluble in petroleum spirit. The camphor can be obtained in the form of acicular white crystals by treating the residue, after evaporation of the petroleum spirit, with alcohol of 60 per cent. to remove the red colouring matter. The camphor is soluble in absolute alcohol, ether and chloroform, as well as in glacial acetic acid, from which latter water precipitates it; it has a melting point of 155·4° C., and sublimes at a little above that temperature. Concentrated alkaline solutions have no apparent effect on it, but concentrated sulphuric acid dissolves it with a brown coloration, and strong nitric acid acts slowly on it without decided coloration. "Phloxol" is the name suggested for this new camphor. *Spigelia marilandica* does not yield any such substance to petroleum

spirit. The residue left on evaporation of the ethereal solution of the red colouring matter, treated with water, and the water evaporated over sulphuric acid, gave a small quantity of crystals which were not further examined (*Amer. Journ. Pharm.*, Oct., p. 480).

Xanthoxylon Bark.

The bark of *Xanthoxylon fraxineum*, Willd., has been examined by Mr. E. T. Moffit (*Amer. Journ. Pharm.*, Sept., p. 417). He finds it to contain a greenish fixed oil, a crystalline resin, tannin, colouring matter, an acrid resin, and an alkaloid. The latter was obtained by adding ammonia, agitating with chloroform and evaporating, when yellowish crystals of the alkaloid were left. It is insoluble in benzine, ether and benzol and has a slightly bitter taste. Nitric acid forms with it a yellow solution, and sulphuric acid a brown one, changing to dark red.

Sophora speciosa.

Some years since a poisonous alkaloid was detected by Dr. H. E. Wood in the seeds of *Sophora speciosa* (*Pharm. Journ.*, [3], viii., 284, 1047). These seeds have again been examined by Messrs. Kaltmeyer and Neil, who find that the alkaloid is present both in the testa and the nucleus, and in larger proportion in the former (*Amer. Journ. Pharm.*, Oct., p. 668). The colouring matter of the testa is not soluble in ether or petroleum spirit, but is soluble in alcohol and alkalies and is precipitated by lead acetate and gives a light pink coloured dye with alum as a mordant. The alkaloid is soluble in chloroform.

Malic Acid.

Dr. G. Kraus, from some experiments made on the composition of the cell sap in some plants of the natural order *Crassulaceæ*, has been led to the conclusion that the malic acid and calcium malate, which is present in some dried plants to the extent of 25·9 per cent., acts the part of a reserve food material, being decomposed into carbohydrates, since the decrease in quantity of malic acid is accompanied by a corresponding increase in the amount of sugar and starch. As malic acid contains a larger proportion of oxygen than the carbohydrates, the transformation must be accompanied by the evolution of oxygen gas. If Dr. Kraus's statement be confirmed this metastasis will explain why acid fruits become sweet or mealy as they ripen, as is the case with apples and pears, etc.

Trientalis europæa.

In the *Gardener's Chronicle* (Oct. 2., p. 448) an illustration is given of the curious tubers formed by the somewhat rare British plant *Trientalis europæa*. These are formed at the end of underground branches, independent of the root, like those of the potato. Probably few who have gathered the plant have noticed this curious mode of reproduction.

Soluble Starch.

A variety of starch which has been described by Dr. J. Dufour under the name of "soluble starch," is believed by him to differ altogether from ordinary starch in its physiological function, being simply a secondary product of excretion. It is found in the epidermal cells of the leaves of *Saponaria officinalis, Bryonia dioica* and some other plants belonging to widely separated natural orders, both of monocotyledons and dicotyledons. It is soluble in water and ordinary alcohol, less so in absolute alcohol, and only with difficulty in ether, benzine and chloroform. Acids and alkalies extract it rapidly, but without imbibition or swelling. It crystallizes in the form of yellowish sphæro-crystals, and it is capable of combining with iodine to form beautiful acicular blue crystals, in addition to an amorphous condition. It also occurs in the stem and floral organs of *Saponaria*, but is absent in the claw of the petals, although present in the epidermis of both sides of the lamina (*Journ. Roy. Micr. Soc.*, Oct., p. 819).

Œta Palm.

In a note in 'Timehri' (vol. v., part i., p. 121), on the Œta palm, various products of which tree are shown in the British Guiana Court at the Colonial Exhibition, the editor quotes a statement to the effect that the Warrow Indians prepare from the interior of its trunk a flour which they call "aru-aru" and use in the form of a pap for the relief of dysentery, and that this native name is probably the origin of the English word arrowroot. The saccharine liquor extracted from the unexpanded flower is said to afford a liquor resembling champagne in its briskness. Œta champagne, however, does not appear as yet to have become an article of commerce, or at least is not visible at the Colonial Exhibition.

Omphalocarpum Radlkoferi.

A species of *Omphalocarpum* from the Cameroon mountains has recently been examined by Dr. Pierre and found by him to be distinct from *O. procerum*, Pal. Beauv., in the peduncle of the flower being bractless, and the anthers cordate, lanceolate and acuminate, while the fruit has only seventeen instead of twenty-five cells. This new species, to which he has given the name of *O. Radlkoferi*, contains, like *O. procerum*, a kind of gutta-percha (see *Pharm. Journ.*, [3], xii., p. 478), and confirms the opinion previously expressed in this Journal that the genus should be placed rather in Sapotaceæ than in Ternstrœmiaceæ. Dr. Pierre, however, remarks (*Bull. mens. de la Soc. Linn. de Paris*, 1886, pp. 577, 582), that the Sapotaceæ might be placed without inconvenience near the Ternstrœmiaceæ, or still better near the Guttiferæ. The position of the genus *Omphalocarpum* should, he thinks, be between *Bassia* and *Mimusops*.

Convolvulus arvensis.

A curious variety of the *Convolvulus arvensis*, growing in considerable quantity, has been found in Germany, in which the corolla is split nearly to the base into five segments, the petals being snow-white and the flowers somewhat smaller, so that it bears some resemblance to the flower of *Ornithogalum umbellatum* (*Ber. d. deutsch. Bot. Ges.*, iv. p. 258).

Spiræa filipendula.

Spiræa filipendula is stated by Dr. Fürst Ignatz Jagell to be a remedy for hydrophobia. He asserts that during the twenty-five years that he has paid attention to the disease in Russia he has treated eighty-eight persons bitten either by rabid dogs or wolves, twenty-six of whom had already begun to exhibit early symptoms of the disease when medical treatment was commenced. They were all treated with an infusion of the root bark, and he did not lose a single case (*Lancet*, Oct. 2, p. 645). So many vegetable remedies have been stated to be specifics for the disease from time to time, that it is evident these statements must be received with caution.

Xanthium spinosum.

Xanthium spinosum in ten-grain doses, given three times a day, and followed by steam baths on alternate days is also strongly recommended as a cure for hydrophobia by Dr. Makaveeff, a Russian doctor. He is not, however, the first who has recommended the plant

for the purpose, Dr. Gryzmala having, more than ten years ago (*Pharm. Journ.*, [3], vii., 80), claimed to have obtained invariably successful results with it during twenty years' practice. In consequence of the attention drawn to the subject at that time eleven inoculated dogs were treated with the drug in the chemical school at Alfort, but with only negative results (*Pharm. Journ.*, [3], vii., 698). The plant possesses diaphoretic, diuretic and ptyalogogue properties, but no alkaloid has as yet been found in it.

QUILLAIA BARK AS A SUBSTITUTE FOR SENEGA-ROOT.*

BY PROFESSOR DR. FREDERICK B. POWER.

At a meeting of the Society of German Naturalists, held at Strassburg about a year since, Dr. Kobert directed attention to the valuable medicinal properties of quillaia bark, and proposed it as a substitute for senega in affections for which the latter is indicated.† Its advantages over the latter are stated to consist in the fact that the glucoside to which it owes its activity is present in about five times the amount of that contained in senega, and by containing a considerable amount of sugar its decoction possesses a sweet taste, while another and not unimportant consideration is its relative cheapness. The experiments of Dr. Kobert are stated, moreover, to have proved that patients bear quillaia better than senega, that it rarely produces vomiting or diarrhœa, and is readily taken by children, while its expectorant action is beyond all question.‡

Although quillaia bark was made officinal in the last revision of the United States Pharmacopœia, no preparations of it were adopted, and its virtues appear to have remained unknown to the medical practitioners of America. Indeed, in the last revision of the 'United States Dispensatory,' p. 1212, we find the statement that "the bark has no application in practical medicine. Its infusion is much used in the arts as a detergent for washing silks, cloths, etc., but we know of no sufficient reason for its introduction into the Pharmacopœia." It has found no place in the British Pharmacopœia nor in the Pharmacopœa Germanica *editio altera*, and although officinal in the new French Codex under the title of *Bois de Panama* (Panama-wood), the tincture prepared therefrom is employed simply as a emulsifying agent for the preparation of emulsions of various balsams and oils, such as tolu, copaiba, oil of cade, etc. It may also be incidentally remarked that a powder sold under the name of "emulsine," for the preparation of oil emulsions, appears to consist essentially of saponin, or the saponaceous principle of quillaia bark.

The object of this paper is, therefore, to afford a somewhat more extended notice of the undoubted merits of quillaia bark as a medicinal agent, with the hope of eliciting further experiments regarding its therapeutic action, and likewise to present a few practical observations relating to pharmaceutical preparations therefrom, which are best adapted for convenient employment.

In reviewing the chemical literature of the subject considerable discrepancy will be found in connection with the amount of active constituents of each drug, which is doubtless due not only to the method of separation, but also to the relative degree of purity in which the substance was obtained. Thus the so-called senegin of Gehlen (1804), or the polygalic acid of Quevenne (1836) and Procter (1859), which are recognized by Flückiger§ as amorphous saponin, is stated by Christophsohn‖ to be contained in senega to the amount of about $2\frac{1}{2}$ per cent., while other investigators have obtained as much as 5 per cent.; but the amount of this principle is probably not constant in the same drug. On the other hand Christophsohn obtained from quillaia 8·82 per cent. of saponin,* and Flückiger, *loc. cit.*, p. 135, gives the amount of the latter as about 2 per cent. The further investigation of this subject, with the employment, as nearly as possible, of the same methods of isolation and purification would seem quite desirable. In this connection it would also be important to consider that, as Dr. Kobert has shown,† pure saponin, $C_{13}H_{30}O_{10}$, is perfectly destitute of physiological action, and that commercial saponin is mostly a mixture in varying proportions of four organic and some inorganic substances, namely: a substance for which the term saponin is retained, a carbohydrate, lactosin, $C_{36}H_{62}O_{31} + H_2O$, discovered but a short time since by A. Meyer‡ in the roots of various plants of the family of Caryophyllaceæ, together with two extremely poisonous substances, quillaic acid and sapotoxin, upon which the harsh taste and frothing property of commercial saponin depend. It would thus seem that the activity of quillaia, and probably also of senega, depends chiefly upon the two last-named proximate principles, and the estimation of these, rather than of the impure saponin, would probably indicate more exactly the therapeutic action of the respective drugs.

From a pharmaceutical standpoint the absence of *pectin* bodies in quillaia renders the ordinary liquid preparations of this drug permanent and elegant, and the use of ammonia, as was recommended by Kennedy§ in the preparation of the fluid extract and syrup of senega, and adopted by the U.S. Pharmacopœia, becomes entirely unnecessary. I have prepared a fluid extract of quillaia by the following process, which affords as handsome a preparation as could be desired, and appears to thoroughly represent the activity of the crude drug: 100 grams of quillaia, in No. 40 powder, were moistened with 40 grams of dilute alcohol, packed firmly in a cylindrical percolator, and enough dilute alcohol subsequently added to saturate the powder and leave a stratum above it. It was then allowed to macerate for forty-eight hours, after which period the percolation was allowed to proceed, with the use of dilute alcohol as the menstruum. The first 90 cubic centimetres of the percolate were reserved, the percolation continued with dilute alcohol until the drug was exhausted, and this second percolate evaporated to the measure of 10 cubic centimetres and mixed with the reserved portion.

The finished fluid extract is of a deep reddish-brown colour, and by simple admixture with syrup, in proportions corresponding to those of the officinal syrup of senega, namely, 4 parts of fluid extract and syrup to make 25 parts, a perfectly transparent and handsome syrup of quillaia is obtained. The preparation with which experiments were instituted in Germany as reported in the *Aerztl. Int. Blatt*, 1885, No. 48, was a decoction made from 5 parts of the bark for adults, and 3 parts for children, with 180 parts of water and the addition of 10 parts of syrup; the dose being a tablespoonful every hour.

The use of quillaia is stated to be contra-indicated in inflammation of the intestines or stomach or in ulcerated states of the mucous membranes.

Although a drug so long employed and so highly esteemed as senega will doubtless continue to retain its place in our materia medica, yet so admirable a substitute as quillaia would, nevertheless, appear to be well worthy of the attention of our medical practitioners, as also of the Committee of Revision of the Pharmacopœia, with a view to the adoption of suitable preparations of the same.

* Read at a meeting of the Wisconsin Pharmaceutical Association. From the *Pharm Rundschau*, September.

† *Pharm. Journ.*, [3] xvi., 289.

‡ *Pharm. Rundschau*, 1886, p. 42, also *Ther. Gazette*, 1885, p. 606, from *Centralblatt für Klin. Med.*

§ 'Grundriss der Pharmakognosie,' p. 95.

‖ Dissertation. Dorpat.

* Husemann, 'Die Pflanzenstoffe,' second edit., p. 533.

† *Pharm. Journ.* [3] xvi., 366.

‡ *Ber. d. Deutsch. Chem. Ges.*, xvii., p. 685.

§ 'Proc. Amer. Pharm. Assoc.,' 1879, p. 721.

It may finally be stated incidentally that the cultivation of quillaia has been undertaken during the past year in British India, where it has resisted well the frosts of winter, and has already attained a height of over six feet.*

THE DETERMINATION OF MELTING POINTS.†

BY HENRY C. C. MAISCH.

A pharmacist has many compounds of different properties to work with. A method for the determination of melting points used with one of these compounds may work well, while it can be used for few others. We must, consequently, adapt the method to each subject under consideration; thus phosphorus could be melted under water, but not on mercury, while the different camphors may be melted on the latter. From these remarks it can easily be seen that the best manner of treating the subject of melting points would be to class those articles together whose melting points could best be determined by the same methods. The headings under which I propose to consider the different methods are as follows: Class I. Camphors, resins, waxes and alkaloids; Class II. Fats; Class III. Substances not readily oxidized; Class IV. Substances easily oxidized in contact with air.

Class I. *Camphors, resins, waxes and alkaloids.*—A convenient and practical method, which I would advise being used for this class, is the following: A small beaker is filled two-thirds full of mercury, into which a thermometer is suspended so that the mercury just covers the bulb of the thermometer. A small quantity of the article under examination is placed directly on the mercury and kept as close to the thermometer as possible. Heat is then gradually applied so that the rise of the mercury in the thermometer does not exceed two or three degrees, Fahrenheit, a minute. When the first indications of melting are visible, note the number of degrees and carefully regulate the heat so as to keep the temperature stationary at this point for a little time to see if the whole quantity will melt. If the article under examination does not melt completely, again apply heat very carefully until the whole quantity is melted to a transparent liquid. The temperature at which this takes place may be regarded as the melting or fusing point near enough for all practical purposes, though if greater accuracy is required it is first necessary to examine a body with a known melting point under the same conditions as are those when examining the body with the unknown melting point. We obtain thus the ratio of variation in this particular instance, and the required melting point can then easily be obtained from the given data. This comparison can be used in all subsequently named classes.

Class. II. *Fats.*—The above method can be used here also, but it will not give such satisfactory results as the following:—A small thin-walled glass tube is drawn out very fine, and the melted fat then sucked up into the tube, the capillary portion of which is then melted to a point. The part to be used is then laid aside for two or three days in a cool place. The tube is then attached to a thermometer by means of a rubber band, in such a manner that the capillary portion is as close to the bulb of the thermometer as possible. The apparatus is now placed so that the liquid, either water or sulphuric acid, just covers the bulb of the thermometer. Now gradually apply heat, being careful about the rise of the mercury in the thermometer. The melting point is that degree at which the fat becomes transparent. Another method is to have the capillary tube open below, and noting the temperature at which the fat is pressed upward in the tube. This latter method does not give as accurate results as the former, some fats becoming very soft before they are entirely melted; but it can be used to good advantage in the determining of the melting points of some resins and waxes.

Class III. *Substances not readily oxidized.*—The method given under Class I. can be used here, but only in such cases where no reaction takes place. Where this method cannot be used, we must resort to the sand-bath and a thin porcelain capsule. The temperature registered by the thermometer, if placed in the sand-bath, will be several degrees too high; as a correction we can use the comparison mentioned under Class I. Or the bulb of the thermometer is immersed in the material, which is slowly heated to liquefaction.

Class IV. *Substances easily oxidized in contact with air.*—Sulphur, phosphorus, and other bodies which easily burn or oxidize, or in which there takes place dissociation or other chemical change when heated in air, must be melted in some liquid in which the article under examination is not at all or only very slightly soluble, and with which no chemical decomposition takes place. The best manner in which to apply this method, is to suspend a piece of the substance in the liquid, and keep the bulb of the thermometer as close as possible to it. This method has been tried by Gerardin (*Compt. Rendus*, 1862, liv., 1082) with sulphur and phosphorus in different media, and he found the melting point to be invariably 111·5° C. and 44·2° C. respectively.

At various times descriptions of apparatuses for the determination of melting points have been published, of which the following may be briefly mentioned. Dragendorff ('Analyse der Pflanzen' 12, 13) does not apply heat directly to the beaker spoken of under Class I. He allows the rim of the beaker to rest on the top of a filter-dryer and covers the whole with a bottle, the bottom of which has been taken out. The thermometer is suspended through the neck of the bottle, and is there fastened by a cork. The whole apparatus stands on an iron plate, the filter-dryer being of such a height that the beaker does not rest on the plate. Heat is now applied gradually to the iron plate, carefully regulating the temperature.

Another form of apparatus has been described by Gustav Oldberg (*Rep. d. Anal. Chem.*, 1886, 94). The apparatus consists of two glass tubes of different diameters; a bulb is blown into one end of the narrower tube, and the tubes are then connected above and below with each other by two glass tubes, the upper one being the widest and being attached somewhat slanting. The apparatus is then filled with water or some other liquid, so as to almost fill the upper connecting tube; a thermometer, with the subject under examination in a fine glass tube, is then adjusted so that the bulb of the thermometer is in the bulb of the apparatus. The liquid in the apparatus is then heated gradually in the wide, upright glass tube.

Authors differ very much in regard as to which point shall be taken as the melting point. F. Rüdorff (*Pogg. Ann.*, 1870, cxl., 420) holds that the congealing and melting points are identical, and that the temperature at which the substance congeals shall be regarded as the melting point. Other authors, opposed to the foregoing, hold that the congealing and melting points of certain bodies are at different temperatures.

In conclusion, I would like to make a few remarks as to the value of the melting points given in the Pharmacopœia. Melting points should not be given in the Pharmacopœia except in such cases where they are necessary for establishing the quality of medicinal articles, for example acidum aceticum glaciale, oleum theobromæ, petrolatum, etc; the melting points of the various alkaloids and several other articles not being useful for this purpose, are entirely out of place. The Pharmacopœia should state the general effect of heat if characteristic for the drug; but it should only contain such melting points as will be necessary for testing the purity of the material, and all the rest should be left where it belongs, viz., the text books.

* See *Pharm. Zeitung*, 1886, No. 42, p. 320.

† Read before the American Pharmaceutical Association, in Providence, R.I.

NOTES ON THE PHARMACY OF HYDRONAPHTHOL.*

BY THOMAS D. MCELHENIE.

Hydronaphthol was introduced about a year ago by Messrs. Rigney and Wolff, of New York. The principal literature on the subject is a series of articles by George R. Fowler, M.D., of Brooklyn, on its uses in surgery, the first of which appeared in the *New York Medical Journal*, for October 3, 1885. About this time, at Dr. Fowler's request, I prepared two cases of sponges with the new antiseptic for use in St. Mary's Hospital, and have taken some interest in it since. Dr. Fowler reviews the chemistry of hydronaphthol, showing its relation to the phenol series, and then describes very exhaustive investigations into its antiseptic properties. A few notes on its chemical nature may not be out of place here. There are two hydroxyl substitution compounds of naphthalin known as *alpha-* and *beta*-naphthol, made by heating naphthalin with sulphuric acid; alpha-naphthol is formed between 60° and 90° C., and beta-naphthol between 180° and 190° C.

The alpha- or beta-naphthol monosulphonic acid thus formed is decomposed by sodium hydrate into sodium naphtholate, sodium sulphite, and sodium hydrate. The sodium naphtholate, when decomposed with hydrochloric or sulphuric acid, yields naphthol, which is then purified by sublimation. The term hydronaphthol, although slightly vague in a scientific sense, indicates the origin and chemical kinship, and is a convenient term for commercial use. It is found to be about twelve times as strong as phenol in antiseptic power, and possesses several other advantages over that substance. It is non-irritant and non-corrosive and non-poisonous. The latter point was definitely ascertained by Dr. Wolff, of Philadelphia, by physiological experiments conducted at Jefferson Medical College. It is soluble in 1000 parts of water at 60° F., and 100 parts at 212° F., from which the excess separates on cooling in beautiful brown feathery crystals. The saturated solution (1 in 1000) has a slight aromatic odour, but it is practically tasteless. In somewhat stronger warm solutions, it has a bitterish, pungent taste. It sublimes at 90° C. It occurs in silvery white pulverulent laminæ, and dissolves in 4 parts of alcohol, 3 parts of ether, and about 10 parts of cotton-seed oil. The latter requires the heat of a water-bath, but remains permanent on cooling. All these solutions show a black sediment on standing, probably some tarry impurity, which will be gotten rid of as the process of manufacture is improved. It dissolves in 10 parts of glycerin at the heat of a water-bath, but is almost entirely recrystallized on cooling, and remains suspended for days. It is stated by the manufacturers to be freely soluble also in chloroform and benzol. This I have not confirmed, but from the nature of it, it seems probable. Hydronaphthol is not germicidal, at least in the proportion of 0·5 in 100 parts, or five times the strength of a saturated aqueous solution, but it is reliably antiseptic in proportion of 0·1 to 0·05 per cent., preserving solutions of beef, glue, gelatin, starch, gums, and fresh urine, etc. Thinking that so valuable an antiseptic must prove useful in various ways in pharmacy, I have been testing it during the summer, and noted the following behaviour to reagents. In all cases, the saturated aqueous solution was employed. This solution exposed to sunlight soon begins to darken, passing through various shades of opalescence, becoming brown after a month or so, and depositing a film on the entire inner surface of the bottle.

With tinct. chlor. iron .	No change resulted.
With tinct. iodine. . .	Discharged colour of first two or three drops, but became opaque on further addition.
With ammonia. . . .	Light purplish tinge, changing to straw colour after some hours.
Sol. potassa	No change.
Acid. tannic.	No change.
„ salicylic. . . .	No change.
„ acetic.	No change.
„ sulphuric. conc. .	No change.
„ hydrochl. „	No change.
„ phosphoric.„	No change.
„ nitric. „	An orange-yellow colour, changing in a moment to a dense turbid olive-green by transmitted light, and dull purple by reflected light.
Acid. nitro-hyd'chl. conc.	Same as nitric.
„ „ „ dil. .	No change.
„ nitric. „ .	No change.

Among the first uses to occur to the pharmacist will be the preservation of alkaloidal solutions. I have prepared some for trial, but they are too recent to prove anything at this meeting, being only made within three weeks. But I think that a solution of hydronaphthol, say five to seven grains to a pint of distilled water, will furnish a perfect basis for delicate solutions. I have noted, however, one exception. Sulphate of strychnine is decomposed and probably reduced to the alkaloid. The use of hydronaphthol will enable pharmacists to prepare fresh beef juice by sprinkling on the finely chopped beef a little of the powder, say ten grains to the pound; warm over a fire to about 130° F., and press quickly. The product would contain all the albumen and be infinitely better than the commercial meat extracts. The physician would best appreciate this after restoring a patient from extreme debility.

* Read at the meeting of the American Pharmaceutical Association at Providence, September 7 to 10, 1886.

STRYCHNOL.*

BY W. F. LOEBISCH AND P. SCHOOP.

Strychnol or *strychnine hydrate*, $C_{21}H_{22}N_2O_2 + 2H_2O$, is prepared by boiling strychnine with a mixture of sodium ethoxide and absolute alcohol. The strychnine dissolves with a yellow coloration. On evaporating the mixture to expel the alcohol, a brown oil remains, which in time becomes solid. On dissolving this in water and passing a stream of carbonic anhydride, strychnol separates as a slightly yellow precipitate, which can be further purified by solution in ammonia and reprecipitation. It then forms a white, crystalline mass, consisting of microscopic, wedge-shaped needles; it does not give the strychnine reaction with potassium dichromate and sulphuric acid, but is coloured an intense carmine-red with sulphuric and nitric acids. At 150° the greater part of the water is lost, but decomposition takes place, and strychnine cannot be obtained from the residue. Strychnol is precipitated from acetic acid solution by the usual alkaloidal reagents; it is very sparingly soluble in cold water, easily in hot. Boiled with dilute acids, or allowed to remain for some time with strong acids, it is dehydrated, and strychnine is formed. Strychnol differs from strychnine in being very readily oxidized; it even reduces an ammoniacal solution of silver oxide.

The authors point out the close relation between the colour reactions of strychnol and brucine, and also the identity of their respective actions with bromine. Strychnol gives no compounds with ammonia, trimethylamine, or aniline; it dissolves in all these, but any compound formed is dissociated on evaporation.

Strychnine when heated with aqueous potash does not yield strychnol in the same way that nitrostrychnine yields xanthostrychnol, but a substance is formed which is probably identical with Gal and Etard's *dihydrostrychnine*.

The authors have also repeated Goldschmidt's experiments, and have confirmed the formation of indole by fusing strychnine with potassium hydroxide. They also obtained evidence of the presence of butyric acid in the fused mass.

When an alcoholic solution of strychnine is reduced with metallic sodium, an additive product—strychnine hydride—is apparently formed.

* *Journ. Chem. Soc.*, from *Monatshefte f. Chemie.*

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THE AMERICAN PHARMACEUTICAL ASSOCIATION AND UNOFFICIAL PREPARATIONS.

COMPLAINTS of the depressed and unremunerative condition of pharmacy as a business have of late years been so frequent, and there are so many obvious reasons for these complaints to be recognized among ourselves, that it cannot fail to be of interest to note what is said upon the same subject by pharmacists in other countries. Depression of a somewhat similar kind to that experienced in this country has been long felt in the United States, and hence it is not surprising that the fact should have met with some comment from the President of the American Pharmaceutical Association, in the Address delivered by him at the annual meeting recently held at Providence. And there is a special inducement to refer to what was said on that occasion, because the attempt was made to indicate one at least of the causes that have contributed to bring about the evil complained of. Moreover, in the opinion of Mr. ROBERTS, such a cause exists in the increasing demand for proprietary medicines, inasmuch as it has the effect of filching from the pharmacist a large portion of his legitimate profits. The fact that this cause is of a strictly pharmaceutical character served as a justification of the reference to a subject that might otherwise have been regarded as not falling strictly within the scope of the Association's business. Although the preparations of this class, in many instances, reach consumers chiefly through the hands of the pharmacist, they do so in a manner that does not call into exercise the skill and other qualifications which he is properly required to be the possessor of, and apart from other inconveniences consequent upon the multiplication of proprietary preparations the pharmacist is in the sale of them reduced to a level with the most ordinary vendor of packeted articles. This recognition of the mischief that has been done by the cultivation of "elegant pharmacy" is by no means an affair of the present moment, and a representative Committee has been for some length of time engaged in devising means for counteracting the "intolerable annoyance" experienced by American pharmacists. As a result of the labours of this Committee a formulary has been published under the title of the 'New York and Brooklyn Formulary of Unofficial Preparations,' in which directions are given for the making of eighty-one preparations of that class which caused most trouble from their multiplicity. A large number of pharmaceutical associations throughout the United States have assisted in this work and it has been agreed to accept this formulary as the nucleus for the preparation of one that shall eventually be national in its application to every State.

The next step to be taken is that of securing the aid and countenance of physicians, so that the evil complained of may be controlled and lessened, and in regard to this important point Mr. ROBERTS expressed the opinion that since physicians, if properly approached, would be found ready to assist all measures for promoting the interest of pharmacy and public good, the views entertained on this subject should be brought under the attention of medical associations and their members with a request that they should confine their prescriptions to official remedies and such as have formulæ which have received the sanction of the Pharmaceutical Association. This may be regarded as practically the same object as that contemplated in the discussion which recently took place at the British Pharmaceutical Conference, and it may, therefore, be useful to consider the course of procedure adopted by the American Committee in carrying out the work entrusted to it. Naturally, much diversity of opinion prevailed at the outset as to the scope of the proposed formulary, and it was finally agreed that the wisest plan would be to gradually include in the formulary every preparation which legitimately belongs to pharmacy, and is in professional and popular demand, but for which no standard is prescribed by the United States Pharmacopœia. In deciding upon the merit of rival preparations great difficulty has been encountered. Even when making the preparations it has not always been found possible to appreciate the particular meritorious feature that might be claimed for anyone in particular, and it was deemed essential in all doubtful cases that the proposer of a formula should furnish a sample of the preparation in question as made by himself.

The original Committee had in the first instance to ascertain what particular non-official preparations appeared to be most frequently prescribed or called for in the cities of New York and Brooklyn. For that purpose circulars were addressed to all the pharmacists of those cities requesting them to communicate the titles of preparations for which it was considered desirable that there should be standard formulæ. At the same time a request was made that such formulæ should be submitted for consideration. The replies to this application were very limited in number, and eventually the Committee had to undertake the task of ascertaining and selecting the most frequently used unofficial preparations. It then remained to determine in a

general way their composition and the means of making them correspond in strength and as far as in appearance with the corresponding preparations already in common use. In some cases great discrepancy was found to prevail in this respect between preparations nominally of the some kind, and the Committee had to establish a suitable standard. In thus providing a guide for making unofficial preparations there was no desire to trespass upon the field of therapeutics, but simply to place at the disposal of the physician and pharmacist such formulæ as would be pharmaceutically correct and constitute a justification for the request that only such preparations should be prescribed. Working in this way and holding meetings almost weekly during the year many hundreds of specimens were examined and analysed until at length suitable formulæ were adopted. At the late meeting of the American Pharmaceutical Association the preliminary draft of a national formulary thus prepared was presented and it was recommended that it should be printed immediately after the meeting so that copies could be placed at the disposal of the Committee for distribution.

PHARMACEUTICAL ORGANIZATION.

It is remarkable that there should have been in several respects a close relation between the subject matters discussed at the meeting of the American Pharmaceutical Association and the British Pharmaceutical Conference in Birmingham. It is further interesting to notice that the prevailing tendency was in both cases much the same. Not only in reference to the matter of proprietary preparations, but also as regards provincial organization this similarity is recognizable. The President of the American body in his address spoke of the large increase that there has been during the past few years in the formation of pharmaceutical associations in the several States of the Union, and he expressed his dissent from the view held by some that the multiplication of these State associations is inimical to the parent Association. On the contrary, he holds that State associations, properly worked, give great promise of benefit for the promotion of progressive pharmacy. For some years past the numerical growth of the American Association has not been quite satisfactory, and it is considered that the cause of its waning popularity may be traced to the circumstance that there is perhaps too strong a disposition to exclude from its proceedings everything that is not strictly scientific. If that be the case, and the consequence is a loss of usefulness, it will certainly be desirable to give greater consideration to the fact that there are material interests connected with the welfare of pharmacists which cannot be ignored. From this point of view it was suggested that it may be useful to extend the scope of the discussions and to include a variety of details that are of importance mainly in connection with the daily work of pharmacists. According to the opinion expressed by the President, the maintenance of the status of the Association that is the national representative of the interests of the pharmacists of the United States will not permit of anything being ignored which appertains to either the science or the practice of pharmacy and to the welfare of pharmacists. As one among many methods of ensuring attention to this point, and of maintaining those intimate relations and that cordial feeling which ought to exist among members of the body, it was suggested that the activity of the State associations should be encouraged in order to add strength and usefulness to them as well as their national representative.

There is in these suggestions a marked analogy to the proposal of establishing branch organizations of the members of the Pharmaceutical Society throughout this Kingdom, and at such centres as may be suitable for the purpose. The appointment of local secretaries in various places is no longer sufficient for satisfying all the requirements that arise in connection with the interests of pharmacy, and it may well be considered whether something could not be done by the concerted action of the Society's members in different parts of the country, not only to promote their local interests, but also that of the representative body. In the development of a scheme for provincial organization by Mr. GREENISH in his address at Birmingham, especial prominence was given to the educational aspect of the matter, and it is true that the needs of pharmacy in this repect are so great, that they may well force themselves into prominence to the exclusion of other wants. But there are many other directions in which the activity of members of the Society might be usefully exercised through the formation of provincial organizations, in the same manner that the President of the American Pharmaceutical Association has suggested for adoption by the State associations of the Union. With this object it was suggested by him that a series of questions for discussion should be instituted by the National Association of such a nature as to bear upon the business interests of pharmacy more particularly than the scientific questions now usually propounded for stimulating the investigation of various matters by individuals. In some instances it might be desirable to apply to local organizations to appoint Committees for considering and reporting upon questions of practical importance, such as the desirability of amendment in the law relating to the sale of poisons under conditions affecting particular localities, and various other matters that will readily suggest themselves. In such cases the opinions of pharmacists acquainted with the local circumstances would be especially valuable in their bearing upon any proposed measures. But above all it would be useful to obtain in this way a trustworthy indication of the wishes and views of members in certain localities by which it would be possible to guide or modify

attempted legislation so as to command general approval. Certainly it might be expected that by thus engaging local organizations throughout the provinces in the same kind of deliberative work that occupies the executive body of the Society, a more sympathetic appreciation of difficulties to be contended with might be diffused among members of the Society. By this means greater interest might be excited in the current work of the Council and there might also be some beneficial influence exerted in making the aims and endeavours of the Society more popular with the great majority of those engaged in the drug trade than they are at present. These are the ideas expressed in the address of the President of the American Pharmaceutical Association as being worth giving practical effect to among our transatlantic brethren, and the expression of them suggests that there is at home an equally ample opportunity for putting them into practice.

In a recent number of the *Ceylon Observer* a proposition has been made by Mr. James Sinclair that the Ceylon planters should combine to exercise some control over the export of cinchona bark from the island. The enormous and unexpected supplies of bark from Ceylon have had a most depressing influence upon the market and have reduced the price of bark so much as to make its cultivation unremunerative. Mr. Sinclair appears to be of opinion that cinchona bark is now being sold at one half what the Ceylon planters can afford to grow it for, and he thinks that if the present price could be doubled it would be an advantage not only to growers of bark but also to manufacturers of quinine, without causing any abnormal rise in the price of quinine as a medicinal agent. If the statement made by a leading firm of London brokers that "the price of cinchona bark depends entirely on the shipments from Ceylon" be well founded, it certainly seems desirable that the Ceylon planters should take suitable steps for regulating their supply more in accordance with the natural demand.

* * *

A very interesting and largely attended meeting of the Aberdeen Society of Chemists and Druggists was held in the Rooms, Bridge Street, last week, at which a handsome oxidized silver drawing-room clock was presented to Dr. R. D. Presslie on the occasion of his marriage, in recognition of his services to the Association. Dr. Presslie became associated with the Association as a pharmaceutical chemist, but after going into the medical profession he continued this connection, rendering service to the members as a teacher of botany and curator which the chairman, Mr. James Sim, acknowledged in the highest terms when making the presentation.

* * *

The first meeting of the London Section of the Society of Chemical Industry for the new session will be held in the Chemical Society's Rooms, Burlington House on Monday next, November 1, at 8 o'clock, when a paper entitled "What shall we do with our Tar?" by Mr. L. T. Wright will be read.

* * *

At a meeting of the Chemists' Assistants' Association, to be held on Wednesday next in the Rooms, 103, Great Russell Street, a paper entitled "Laboratory Notes," by Messrs. Braithwaite and Farr, will be read.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN EDINBURGH.

October 19, 20, 21, *and* 22, 1886.

Present on each day—Messrs. Clark, Dott, Gibson, Gilmour, Kinninmont, Maben. Nesbit and Stephenson.

Professor Sir Douglas Maclagan was also present on each day on behalf of the Privy Council.

MAJOR EXAMINATION.

19*th.*—*Two* candidates were examined and were declared qualified to be registered as Pharmaceutical Chemists:—

Coull, George .....Edinburgh.
Stephenson, Thomas .....Edinburgh.

MINOR EXAMINATION.

19*th.*—*Twelve* candidates were examined. *Eight* failed. The undermentioned *four* passed, and were declared qualified to be registered as Chemists and Druggists:—

Alexander, Thomas .....Dollar.
Aspinall, Hortensius.....Liverpool.
Bisset, James .....Burntisland.
Broadbent, John Beaumont ...Honley.

20*th.*—*Thirteen* candidates were examined. *Seven* failed. The undermentioned *six* passed, and were declared qualified to be registered as Chemists and Druggists:—

Cruickshank, Gavin Lang .....Aberdeen.
Dalziel, Charles Michie .....Aberdeen.
Govan, John Wallace .....St. Andrews.
Hector, Alexander Burnett.....Aberdeen.
King, Alexander William .....Ayr.
MacDougall, Allan Murray ...Greenock.

21*st.*—*Fourteen* candidates were examined. *Seven* failed. The undermentioned *seven* passed, and were declared qualified to be registered as Chemists and Druggists:—

McGillivray, Finlay .....Nairn.
Marshall, Alexander James ...Linlithgow.
Miller, Thomas.....Leith.
Mitchell, James .....Blairgowrie.
Nairn, James .....Peterhead.
Ormiston, Robert.....Alloa.
Wallace, William..... ..Edinburgh.

22*nd.*—*Thirteen* candidates were examined. *Eight* failed. The undermentioned *five* passed, and were declared qualified to be registered as Chemists and Druggists:—

Simpson, Alexander Tweedie...Edinburgh.
Smith, Catherine Love .....Glasgow.
Thomson, Alexander .....Buckhaven.
Troughton, Reginald .....Edinburgh.
West, Arthur Thomas Taylor...Hull.

PRELIMINARY EXAMINATION.

19*th.*—The undermentioned certificate was received in lieu of the Society's examination:—

Certificate of the University of Cambridge.

Tulip, Peter Alexander .....Edinburgh.

EXAMINATIONS IN LONDON.

October 20, 21, 22, 27 and 28, 1886.

Present on each day—Mr. Carteighe, President; Mr. Gostling, Vice-President; Messrs. Barnes, Blunt, Bowen, Corder, Fletcher, Gale, Gerrard, Greenish, Linford, Symons, Tanner, Taylor and Thresh.

Dr. Greenhow was present on the 21st, on behalf of the Privy Council.

MAJOR EXAMINATION.

20*th.*—*Eight* candidates were examined. *Three* failed. The undermentioned *five* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Davidson, Peter .....Insch.
Everard, Arthur George .....Epping.
Hargrave, Matthew .....London.
Hilton, Ivor Ajax Robinson ...Myerscough.
Lewis, Arthur John.....Abergavenny.

27*th.*—*Eight* candidates were examined. *Three* failed. The undermentioned *five* passed, and were declared qualified to be registered as Pharmaceutical Chemists :—

Martin, William .....Exeter.
Richards, Thomas Coombs.....London.
Rye, Frank .....Northampton.
Smee, Walter Wallis .....Axminster.
Wright, Herbert Cassin.....London.

MINOR EXAMINATION.

20*th.*—*Twenty-six* candidates were examined. *Fourteen* failed. The undermentioned *twelve* passed, and were declared qualified to be registered as Chemists and Druggists :—

Aplin, Albert Edward.....Weymouth.
Armitage, John Lister .....Mirfield.
Ashton, George .....Buxton.
Atterbury, Clive .....Burton-on-Trent.
Barnaby, William Arthur .....Lincoln.
Baselow, Arthur Augustus J....Cardiff.
Bentley, John Richard .....Thirsk.
Blankley, Thomas Ernest B. .. Sleaford.
Booth, James .....Insch.
Calhaem, Richard E. Kean.....Bristol.
Carpenter, Joseph Montague ...Manchester.
Clark, Henry Sowerby.....Barton-on-Humber.

21*st.*—*Thirty-four* candidates were examined. *Nineteen* failed. The undermentioned *fifteen* passed, and were declared qualified to be registered as Chemists and Druggists :—

Baker, William James .....Bradford.
Church, Albert Victor John ...Norwich.
Clark, Robinson Urwin .....Jarrow.
Cockle, William Henry .....Lynn.
Coleman, Frank Henry .....Chapel Brampton.
Colley, Alfred James .....Coventry.
Curtis, Harry Edwin .....Watford.
Davis, George Albert .....Cheltenham.
Duggleby, Septimus.....Hull.
Evans, Alfred Philip .....London.
Garibaldi, Joachin Angel .....London.
Gibbs, Sydney .....Eastbourne.
Gibson, John William.....Richmond.
Green, Edmund Clement F. ...Dover.
Griffiths, Richard Lloyd.....Llanidloes.

22*nd.*—*Thirty* candidates were examined. *Twenty* failed. The undermentioned *ten* passed, and were declared qualified to be registered as Chemists and Druggists :—

Colman, Alfred Ernest ..... Newport, I.W.
Davies, John.....Llandovery.
Harrison, Richard C. Clark ...Birmingham.
Heath, Henry Stoneham.....St. Mary Cray.
Hewitt, Joseph.....York.
Hill, Major .....Sleaford.
Jones, James .....Newcastle Emlyn.
Marrett, Charles Ayton .....Peterborough.
Matthews, Henry Paget.....Aldershot.
Morris, Ernest William .....Market Harborough.

27*th.*—*Twenty-three* candidates were examined. *Twelve* failed. The undermentioned *eleven* passed, and were declared qualified to be registered as Chemists and Druggists :—

Davies, John Albert .....Aberystwith.
Heath, Josiah Wedgwood .....Alcester.
Lewis, John Lloyd .....Llandyssul.
Palmer, Frank Thomas .....Cheltenham.
Pinson, Harry Everitt Kerr ...London.
Pratt, Alfred James .....Chichester.
Ridley, Albert Paul.....Ipswich.
Riley, Alfred Thomas.....London.
Sloan, Robert Coulthard.....Penrith.
Sweetapple, Thomas Pyke .....Taunton.
Sykes, John .....Heaton Chapel.

28*th.*—*Thirty-one* candidates were examined. *Twenty-three* failed. The undermentioned *eight* passed, and were declared qualified to be registered as Chemists and Druggists :—

Birkett, John .....Stockport.
Buchanan, Margaret Elizabeth.London.
Edwards, Alfred Egbert.....London.
Neve, Mary Elizabeth Beck .. Eastbourne.
Tighe, John Wynne.....Exeter.
Turner, Richard Vicary .....Exeter.
Vallance, Arthur Clayton .....Mansfield.
White, William Everard.....Bottesford.

MODIFIED EXAMINATION.

20*th.*—*One* candidate was examined and failed to pass.

PRELIMINARY EXAMINATION.

28*th.*—The undermentioned certificates were received in lieu of the Society's examination :—

Certificates of the College of Preceptors.

Challis, Frank .....Langport.
Millman, Thomas R. .....Barnstaple.

Certificate of the Royal Colleges of Physicians and Surgeons of Edinburgh.

Walker, David.....Edinburgh.

Certificates of the University of Cambridge.

Baynard, Eustace James.....Overseal.
Clark, Roger.....Kennington.
Dickinson, Charles .....Llandudno.
Dickinson, George ....Hackney.
Lazenby, Arthur .....York.
Monks, Ernest .....Radcliffe.
Thorp, Edward F. William.....Sheffield.

Certificate of the University of London.

Woodland, William.....Selhurst.

Certificate of the University of Oxford.

Hodgkin, John.....Lancaster.

The report of the College of Preceptors on the examination held on October 12th was received.

Two hundred and fifty-eight candidates had presented themselves for examination, of whom *one hundred and thirty* had failed. The following *one hundred and twenty-eight* passed, and the Registrar was authorized to place their names upon the Register of Apprentices and Students :—

Andrews, Frank .....Redditch.
Appleby, Robert Colquhoun ...Hull.
Archer, George.....Portobello.
Baillie, Daniel .....Glasgow.
Baker, Herbert William.....London.
Beadle, Thomas Alfred .....London.
Bell, William Smith .....Aberdeen.
Benton, William .....Loughborough.
Birnie, Alexander Stephen .....Aberdeen.
Blair, T. Balfour ....Glasgow.
Branson, John Thomas .....Barrow-in-Furness.
Bridgman, William Herbert ...Holsworthy.
Buckle, John Dolphin.....Scorton.
Clark, David.....Strichen.
Clayton, Frank Ponsonby .....Melton Mowbray.
Coleman, Edgar Thomas.....Northampton.
Collingwood, Robert .....Rochdale.
Connard, Septimus .....Southport.
Cooper, Lionel .....Southsea.
Cornish, James Thomas .....Budleigh Salterton.
Corrigall, Peter .....Newcastle-on-Tyne.
Cox. Matthew .....Bishop Auckland.
Crawley, William Pashler .....Oundle.
Davies, Daniel Edward .....Llanon.
Devereux, Arthur Edward .....Stoke-on-Trent.

Dixon, James Herbert.....Nottingham.
Dixon, Stephen Henderson.....Blyth.
Dixon, Taylor .....North Shields.
Drackley, Thomas .....Coventry.
Eastman, Sydney .....London.
Edwards, Thomas ....Pontypridd.
Eldred, Archibald Pottinger ...Leicester
Evans, John David .....Carmarthen.
Foggitt, Frederic Addison .....Thirsk.
Fulton, John.....Liberton.
Furney, Frank .....Warminster.
Gallimore, James Samuel .. ...Tutbury.
Gamble, Frederic William .....Kings Lynn.
Geary, Samuel.....Leicester.
Gee, Thomas Henry.....Macclesfield.
Glasspool, Alfred George .....East Cosham.
Glendinning, Robert .....London.
Gordon, Alexander .....Friockheim.
Green, Edward Joseph .....Boroughbridge.
Green, Sydney .....Coggeshall.
Gutteridge, George Needham...Dewsbury.
Harper, Frederick Wm..... Stranraer.
Harris, Hamilton George .....Havant.
Heagherty, Daniel Geo. B.....Tweedmouth.
Hellett, Frederick Charles.....Brighton.
Hirst, Percy .....Manchester.
Hodder, Harry Gibson .....Wareham.
Holford, Samuel Skinner .....Godley.
Hoole, Christopher Fred. Wm..Sleaford.
Hunt, Archibald James .....Reading.
Hunt, Harold Edward .....Poole.
Hurlston, Alfred Frederick.....Coventry.
Husband, Arthur..... Leven.
Jary, Tolver Postle .....Norwich.
Jecks, Ernest Horsey .....Reading.
Jones, Edward David .....Llanrhaidr.
Keeble, James Purcell E. .....St. Mary Cray.
Kerruish, Henry .....Ramsey, I.M.
Kingdon, Arthur James.....South Molton.
Kirk, James Robert.....Rawcliffe.
Lawrenson, George .....Manchester.
Lester, William Henry .....Foleshill.
Lewis, Tom .....Burry Port.
Ling, Ralph Michael ....Beccles.
Low, Robert .....Arbroath.
Lumb, Edward John .....Bradford.
Lyall, William Pascall .....Arbroath.
McBain, James .....Aberdeen.
McConnachie, George .....Aberdeen.
McCowan, John .....Edinburgh.
McCreadie, James .....Glasgow.
Macdonald, David Mitchell ...Aberdeen.
McNaughton, Alexander .....Mintlaw.
MacRossen, James Rollo .....Brechin.
Magor, Martin .....Birmingham.
Martin, William Montague ...Plymouth.
Marwick, Edwin Hinchcliffe ...Edinburgh.
Mitchell, Walter Richard .....London.
Moorman, Charles Edgar .....Shanklin.
Murray, Adam.....Leith.
Neal, Frederic .....Barton-on-Humber.
Neale, Charles Albert .....Stamford.
Nurthen, Frederick William ...London.
Oswell, William Henry .....Corwen.
Parker, Robert..... .Rishton.
Pennie, William .....Aberdeen.
Phillips, Francis Daniel .....Haverfordwest.
Place, Edward Bland ....Pickering.
Porter, Fred .....Jedburgh.
Prosser, Harold Horatio.....Cardiff.
Rackham, Charles George .....Halesworth.
Reed, William Henry .....Exeter.
Rees, Richard Thomas .....Carmarthen.
Rodgers, John Edward James..Leicester.
Rose, Alfred, Jun. .....London.
Sangster, Charles .....Monquhitter.
Scott, Joseph .....Barrow-in-Furness.
Scott, Malcolm.....Edinburgh.
Scruton, Frederick William ...Sheffield.
Shepperson, Arthur ....Falkingham.
Small, George Smith .....Brechin.
Smith, David .....Edinburgh.
Smith, James Spence ....Haddington.
Smith, Robert ....Dundee.
Stirling, John ....Biggar.
Stone, Ernest Frederick.....Exeter.
Suttie, Robert .....Cambuslang.
Taylor, William .....Macclesfield.
Turner, Calvert Daykin .....Alfreton.
Turton, Frederick William.....Liverpool.
Turver, Charles Henry .....Newark-on-Trent.
Tute, James Scott ....Chigwell.
Vine, Herbert Edward .....Ilminster.
Warmington, Harry .....Barrow-in-Furness.
Warnock, William Scott.....Helensburgh.
Watkins, Alfred .....Lincoln.
Watt, James.....Haverfordwest.
Whaley, Charles Hulbert .....Stockport.
Wilkinson, Charles Edward ...Bridgnorth.
Williams, George Frederick ...Tregarth.
Wilson, Charles .....Louth.
Woodman, Edward .....Sutton, Surrey.
Wright, William Nevill .....Great Yarmouth.

The following is a list of the centres at which the examination was held, showing the number of candidates at each centre and the result:—

	Candidates.				Candidates.		
	Examined.	Passed.	Failed.		Examined.	Passed.	Failed.
Aberdeen	14	9	5	Inverness	1	0	1
Birmingham	8	7	1	Lancaster	5	4	1
Brighton	3	1	2	Leeds	9	3	6
Bristol	8	1	7	Lincoln	7	4	3
Cambridge	1	0	1	Liverpool	13	4	9
Canterbury	1	0	1	London	27	13	14
Cardiff	8	3	5	Manchester	15	7	8
Carlisle	2	0	2	Newcastle	8	3	5
Carmarthen	12	5	7	Northampton	2	1	1
Carnarvon	2	1	1	Norwich	7	4	3
Cheltenham	1	0	1	Nottingham	13	8	5
Darlington	3	1	2	Oxford	3	2	1
Douglas	1	1	0	Peterborough	2	2	0
Dundee	8	6	2	Sheffield	7	1	6
Edinburgh	21	13	8	Shrewsbury	2	1	1
Exeter	8	6	2	Southampton	7	5	2
Glasgow	10	5	5	Truro	3	1	2
Guernsey	1	0	1	Worcester	1	0	1
Hull	6	2	4	York	8	4	4

The questions set for examination were as follows :—

LATIN.

(*Time allowed—from* 11 *a.m. to* 12.30 *p.m.*)

I. Translate into English either A. (Cæsar) or B. (Virgil).

(*Candidates must not attempt both.*)

A. Cæsar.

1. Dum ea conquiruntur et conferuntur, nocte intermissa, circiter hominum milia VI. ejus pagi, qui Verbigenus appellatur, sive timore perterriti, ne armis traditis supplicio afficerentur, sive spe salutis inducti, quod, in tanta multitudine dedititiorum, suam fugam aut occultari, aut omnino ignorari posse existimarent, prima nocte ex castris Helvetiorum egressi, ad Rhenum finesque Germanorum contenderunt.

2 Ex concilio dimisso, iidem principes civitatum, qui ante *fuerant* ad Cæsarem, *reverterunt*, *petieruntque*, uti sibi secreto de sua omniumque salute cum eo agere *liceret*. Ea re impetrata, sese omnes flentes Cæsari ad pedes *projecerunt*; non minus se id contendere et laborare, ne

ea quæ *dixissent enuntiarentur*, quam uti ea quæ *vellent* impetrarent; propterea quod, si enuntiatum esset, summum in cruciatum se venturos *viderent*. *Locutus est* pro his Divitiacus Æduus; Galliæ totius factiones esse duas: harum alterius principatum tenere Æduos, alterius Arvernos.

II. *Grammatical Questions.*

(For those Candidates who take Cæsar.)

1 Decline in full (singular) *prima nocte* (Par. 1).

2. Write in full the indicative perfect and subjunctive present of the verbs *conquiruntur, afficerentur, posse* (Par. 1).

3. Give the principal parts of the verbs in italics (Par. 2).

4. Account for the cases of *sibi, salute, Cæsari*, and for the mood of *contendere* (Par. 2).

B. VIRGIL.

1. O socii; neque enim ignari *sumus* ante malorum;
O passi graviora; *dabit* Deus his quoque finem.
Vos et Scyllæam rabiem, penitusque sonantes
Accestis scopulos: vos et Cyclopia saxa
Experti. Revocate animos, mœstumque timorem
Mittite: forsan et hæc olim *meminisse javabit.*
Per varios casus, per tot discrimina rerum,
Tendimus in Latium; sedes ubi fata quietas
Ostendunt; illic fas regna *resurgere* Trojæ.
Durate, et vosmet rebus servate secundis.
2. Obstupuit simul ipse, simul percussus Achates
Lætitiaque metuque: avidi conjungere dextras
Ardebant; sed res animos incognita turbat.
Dissimulant; et nube cava speculantur amicti,
Quæ fortuna viris; classem quo litore linquant;
Quid veniant: cunctis nam lecti navibus ibant,
Orantes veniam, et templum clamore petebant.

II. *Grammatical Questions.*

(For those Candidates who take Virgil.)

1. Decline in full (singular and plural) *res incognita* (Par. 2).

2. Write in full the indicative perfect and subjunctive present of the verbs *speculantur, ibant, petebant*, (Par. 2).

3. Give the principal parts of the verbs in italics (Par. 1).

4. Account for the cases of *malorum, his, casus,* and for the mood of *meminisse* (Par. 1).

III. (*For all Candidates.*) *Translate into Latin*:—

1. The camp was taken by the enemy.
2. He said that he could not come.
3. Useful things delight a wise man.
4. I fear that I shall not be able to overcome the enemy.
5. Having given this answer, he went away from the house.

ARITHMETIC.

(*Time allowed—from* 12.30 *p.m. to* 2 *p.m.*).

(N.B.—The working of the examples, as well as the answers, must be written out in full).

1. Multiply the difference between 12 cwt. 3 qr. 17 lb. 10 oz. and 5 cwt. 2 qr. 23 lb. 11 oz. by 528.

2. If a tradesman marks his goods 20 per cent. above the cash price, what ready money would he take for an article marked 26*s.*?

3. A man paid away $\frac{1}{3}$ of a legacy, then $\frac{1}{4}$ of the remainder, and finally $\frac{1}{6}$ of his first payment. After these three payments, he had £90 6*s.* 2*d.* left. Find the value of the original legacy.

4. Multiply $2\cdot\dot{3}$ by $5\cdot\dot{6}$; and divide 3·995418 by ·00753.

5. Write out the Metric Table of Capacity, and give approximately the equivalent of the *litre* in English cubic inches. How many bottles, each containing 30 centil., can be filled out of a cask containing 86 lit. 40 centil.?

6. What will be the cost of painting the walls of a room, at $9\frac{1}{2}d$ per square yard, if the length of each side is 19 ft. $10\frac{1}{4}$ in., of each end 16 ft. $1\frac{3}{4}$ in., and the height 10 ft. 3 in?

7. A. and B. enter into partnership; A. invests £550 in the business, and, after two months, adds £250; B. invests £750, and, after six months, takes away £250; at the end of the year, the profits are £367 19*s.* 4*d.*: how should they be divided?

ENGLISH.

(*Time allowed—from* 3 *p.m. to* 4.30 *p.m.*)

1. How do you distinguish between *personal* and *relative* pronouns? Give in full the personal pronouns of the third person.

2. Analyse the following sentence:—

"When the moon shone, we did not see the candle;
So doth the greater glory dim the less."

3. Parse the following sentence:—"Some men, like pictures, are fitter for a corner than a full light."

4. In the following passage, supply the necessary capital letters, and put in the stops and inverted commas where necessary:—the two accomplices were then confronted young with unabashed forehead denied everything he knew nothing about the flower pots if so cried nottingham and sidney together why did you give such particular directions that the flower pots at bromley should be searched i never gave any directions about the flower pots said young then the whole board broke forth how dare you say so we all remember it still the knave stood up erect and exclaimed with an impudence which oates might have envied this hiding is all a trick got up between the bishop and blackhead."

*5. Write a short Composition on one of the following subjects:

(i.) The present Condition of Ireland.
(ii.) Earthquakes.
(iii.) Our Colonies.
(iv.) Music.
(v.) Life Insurance.

The following facts in connection with this (October) Preliminary examination have been supplied by the College of Preceptors:—

"Of the 258 candidates, examined at thirty-eight centres, 128 passed and 130 failed.

Of the 130 candidates who failed,
56 failed in one subject only;
39 „ „ two subjects;
29 „ „ three subjects;
6 obtained the minimum in each of the three subjects, but failed to secure the pass aggregate.

Of those who failed in *one* subject only,
9 failed in Latin;
40 „ „ Arithmetic;
7 „ „ English.

Of those who failed in *two* subjects,
21 failed in Latin and Arithmetic;
6 „ „ Latin and English;
12 „ „ Arithmetic and English.

"*Latin.*—Of the 258 candidates, 248 took Cæsar and only 10 Virgil. The majority of the candidates acquitted themselves very fairly in the translation and grammar; but few succeeded in translating correctly into Latin the simple English sentences given, and 18 candidates failed to attempt this part of the paper.

"*Arithmetic.*—The large number of failures in arithmetic is undoubtedly owing mainly to inaccuracy of work, as one fact will sufficiently prove. The first question was one in compound subtraction and multiplication. 'Question 1. Multiply the difference between 12 cwt. 3 qrs. 17 lbs. 10 ozs. and 5 cwt. 2 qrs. 23 lbs. 11 ozs. by 528.' Of the 73 candidates who failed in arithmetic only 8 gave the correct answer to this sum.

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* This must be attempted by every Candidate.

"*English.*—Gross errors in analysis and parsing were rare, and the punctuation has much improved since a question set specially to test this has been introduced. The English composition was attempted by all the candidates with three exceptions, and on the whole was done very creditably. Five subjects were given, every candidate being required to write a short composition on *one* of them. The following table shows the selection made by the 258 candidates:—

The present condition of Ireland	72
Earthquakes	60
Our colonies	51
Music	50
Life insurance	22
(Essay not attempted)	3

Of the 25 failures in English 17 are attributed to bad spelling.

"It will be observed that few candidates fail to pass who obtain high marks in two subjects, or even in one subject. Of the 130 candidates who failed only 7 succeeded in obtaining the pass aggregate. The want of accuracy which the arithmetic paper specially detects generally makes itself evident by a careless and slovenly style in the other subjects.

"Considering the nature of the work that these candidates will be called upon to perform in the profession they are desirous of entering, it cannot be doubted that *accuracy* should be insisted upon from the very commencement, and probably there is no better way of emphasizing this than by applying a fairly difficult test in arithmetic at the Preliminary examination."

Proceedings of Societies in London.

CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting of this Association was held at 103, Great Russell Street, October 20, 1886. Mr. H. H. Millhouse, President, in the chair.

The minutes of the previous meeting were read and confirmed and a few new members proposed.

Mr. J. E. Lane handed round a specimen of strophanthus follicles for the benefit of members who had not previously seen any.

Mr. Dymond was then called upon to open the discussion, which he did by reading the following paper:—

Education and Examination.

BY T. S. DYMOND.

Forty-five years ago a number of men, the most eminent pharmacists of the day, banded together with the object of establishing a system of education which would "give professional character, influence and respectability to the whole body" of pharmacists. For this purpose a school of pharmacy was opened in London in 1842, and provincial schools were formed at Manchester, Bath, Bristol and Norwich the year after. A charter of incorporation was granted to them in 1843, for the purpose of "advancing chemistry and pharmacy, and promoting an uniform system of education to those who should practise the same." The provincial schools of pharmacy soon decayed, but they were resuscitated and new ones formed at Birmingham and Liverpool in 1847.

In view of promoting the Bill of 1852, the Pharmaceutical Council proposed to abandon their examining functions rather than sacrifice their educating powers. However, they were allowed to retain both, and the first Pharmacy Act became law. Thereby it was enacted that "whereas it is expedient to prevent ignorant and incompetent persons from assuming the title or pretending to be pharmaceutical chemists," no person should use that title unless he had been granted a certificate by the examiners of the Pharmaceutical Society. This Act did not stimulate education as much as was hoped, and during the following sixteen years the provincial schools of pharmacy met with small success. All but the Liverpool school were given up, and though some were again revived it was but again to sink into insignificance.

The second Pharmacy Act was passed in 1868, and it was enacted that no person should sell certain poisons, or call himself a chemist and druggist, or pharmacist or dispensing chemist or druggist, unless he had obtained from the Pharmaceutical Society's examiners a certificate of "competent skill and knowledge and qualification." Thus, at length, examination, and as the Council then thought, education was made compulsory.

Thus, we find that the great object of the Pharmaceutical Society since its formation has been education. For that purpose schools have been founded, libraries and museums opened, a journal issued, and examinations instituted. I shall take it for granted that we all sympathize with this great object; that we all venerate the names of Jacob Bell and those other heroes of a generation almost gone, who sacrificed time and money in this cause; that we all have the ambition to leave behind that part of our calling which is pettifogging, and to become looked up to by our neighbours as men of superior stamp and education, and so trusted by the members of the medical profession that they find they may safely leave to us that which we consider ours by right—dispensing.

But do we all realize what education is? The great end of education is progress. To progress we must realize what we do not know; to realize what we do not know we must realize what we know. This process of realization needs thought. We shall have to dive into the secrets of nature, to learn from her the laws by which she works, and then to own our ignorance and weakness, as we find ourselves unable to comprehend the why and the wherefore of those laws; to apply the knowledge which we have gained from her to the conduct of our profession; to become shrewd as she is shrewd, persevering as she is persevering, just as she is just.

But the mere knowledge of a mass of facts will not give us this insight. A month's cramming will not do. It must be the steady work of months, the microscopic examination of plants, the study of the growth of plants, the practical formation of crystals, the demonstration of the theories of matter and force. Cram means to thrust in, education means to bring out. Cram temporarily loads the memory, education develops the powers of the mind.

But what means is there of finding out that the young pharmacist has been educated in the true sense of the word? Those who passed the Pharmacy Acts of 1852 and 1868 naturally supposed that examination, "the great merit of which is impartiality," would be a trustworthy test for education; and they did not foresee the great difficulty which has arisen. Examination worked well for the Act of 1852, because that Act did not prevent anybody from practising the art of pharmacy, and it was only those who wished for education that went in for the examination. But the Pharmacy Act of 1868, the object of which was that only those who were properly educated should sell or dispense poisons, rendered it necessary that all who wished to follow the calling of pharmacy should pass an examination. To pass an examination, not to obtain education, thus became the goal of the would-be chemist and druggist, and he cannot be blamed if he takes the shortest, and perhaps the safest way to attain this goal. But what is the result? The teacher finds that the sole object of the student being to pass the examination he strives for the least possible amount of knowledge that is sufficient to carry him through, for he regards anything more as uselessly, and for his purpose detrimentally, loading the mind, and cares nothing for really mastering the sciences taught. "The examiner finds that it is impossible to estimate properly the value of what an examinee appears to know, due to complete ignorance of

his previous training, and he therefore doubts whether the answers given be a mere effort of memory or the expression of a mind that has really grasped its subject"; for not only is there much that a candidate ought to know that is most "difficult to formulate into question and answer,"—and it is just this, broad principles rather than mere facts, that are most important,—but success or failure depends to a large extent on the nerve of the candidate, and this very quality, which, if lacking, so frequently is fatal, often indicates a finely and delicately wrought mind.

Where is the fault? What is the remedy? Teachers cannot educate, students don't care to be educated, examiners cannot find out whether the candidates are educated.

According to the present system, examination is the great end, not education. Education is made to harmonize with examination; not examination with education. Thus education is forced into narrow grooves, and the best teacher is not he who can best impart sound knowledge and enlarge the mind, but he who can cram the mind with certain facts the most successfully; not he who can make a man think, but he who can make a man remember. "Candidates," says Professor Huxley, "work to pass not to know, and outraged nature takes her revenge; they do pass and they don't know." The system of examination is wrong, and the great majority of learned men have seen that it is so and spoken or written against it. Bishop Temple's address to the College of Preceptors in 1874 on this subject is the masterpiece, and every word is worth remembering.

Can any of us support a system that makes pharmacists of ignoramusses whom the medical men will not trust to dispense their prescriptions and who thus throw discredit on the whole body?

Very soon after the Pharmacy Act of 1868 became law, it was found that the results were very disappointing. Both Mr. Reynolds and Mr. Schacht formulated plans for the re-establishment of provincial schools of pharmacy, for they supposed that by reducing the fees to a minimum, men would be induced to patronize them, though we have had experience that this is not the case. It was Professor Attfield that solved the difficulty—at the British Pharmaceutical Conference at Brighton in 1872. He proposed that we should follow in the steps of Germany, Prussia, Austria, Russia, Poland, Spain, Portugal, Chili, Canada, and the United States of America; in the steps of the Royal College of Physicians, the Royal College of Surgeons, and the Apothecaries' Hall, and introduce a compulsory course of study. *Then* everybody opposed it—Mr. Reynolds, Mr. Schacht, Mr. Carteighe, Mr. Haselden, Mr. Stoddart; and *now*, almost without exception, those who are living have come round to his view, and the Council of the Pharmaceutical Society has adopted a scheme based on his suggestions. The main points in the scheme of the Pharmaceutical Council are the following:—The candidate must first pass a preliminary examination. He then enters on three years' apprenticeship, at the end of which time he must pass a written examination held at various centres throughout the kingdom, in pharmacy, the reading of prescriptions, and theoretical chemistry. Twelve months must now elapse during which he has to take a five months' course of study in physics, chemistry, botany, materia medica, and practical chemistry, almost identical with that taught at Bloomsbury Square now. He must have attended four-fifths of the lectures and laboratory practice, and the periodical examinations. When twenty-one, he may enter for the final and *vivâ-voce* examination, held only in London and Edinburgh, in chemistry, botany, materia medica, practical chemistry, and practical dispensing. Now all this is supremely straightforward. The great point is that the examination is *en rapport* with the educational course. There is no difficulty in knowing what to learn or what not to learn, and you know that you will not be asked questions outside the subjects mentioned in the syllabus.

As to the expense of the curriculum, will it be greater than the cost of the education and examination is now? It is true that a minimum of five months' study is required, but then the proportion of candidates passed will be far greater, and it must be his own fault if one has to go in a second and third time. At present two-thirds of the number of candidates fail, and of these twice as many fail in the general as in the technical subjects.

An argument used against the curriculum is that when times are so bad in our calling, entrance should be made cheap and easy; but surely, is it not greatly to the advantage of all those in the trade that when the trade is bad, the inducements to enter it should be made less rather than greater?

There are some men who pass the examination by private study. To those very industrious beings a compulsory curriculum does seem hard, but we must remember it is just such men that need bringing out into the world. A compulsory course of lectures and compulsory mixing with their fellow-students would expand their minds and enlarge their circle of acquaintance, and save them from the narrowness of intellectual horizon to which such a course of private study can only conduce.

Another point to be considered, is the effect of these changes on the excellent institutions already in operation in London. They will of course be compelled to modify their course of study in accordance with the requirements of the curriculum. But it must be remembered that there will be the same number of men to teach, and even if a school cannot continue to exist, the teachers in it will find employment of, surely, a far more congenial kind in the authorized schools that will be again opened throughout the country.

Mr. Luff agrees with this system of education, but goes further, and thinks that a certificate of success at the class examinations is necessary, for he does not think that a certificate of attendance at a course of lectures is sufficient guarantee that the student has profited by them. The objection to this is that to some extent the success of the candidate is in the hands of the teacher, and thus there is room for favouritism. The Pharmaceutical Council's plan is not an absolute test of qualification, but at any rate it is free from this fault.

In considering this subject five years ago, the Chemists' Assistants' Association was equally divided in opinion between a compulsory curriculum and a lengthened examination. Allow me to point out to the gentlemen who still hold the latter view, that even if this were a satisfactory test of qualification—and that it is not is shown by the examinations of the University of London—the expense of a long examination would be too great. The difficulty even now is to get efficient examiners for the low stipend given, and certainly if the examination were made three days instead of three hours, the difficulty would become an impossibility, unless indeed the candidates were willing to pay in proportion, which they certainly would not be willing to do.

Mr. Greenish, at the recent Pharmaceutical Conference at Birmingham, has proposed a scheme of provincial education by which the country is arbitrarily divided into areas, in each of which is an educating centre, and by which the control of the education of each area is to be in the hands of the Local Secretaries of that area. It appears to me that the educating centre should be wherever the need is for it, not in accordance with an arbitrary plan; that it is very doubtful whether a committee of the Local Secretaries would be a good committee of education. Mr. Greenish seems to have forgotten that there is no demand for such a system. Make education compulsory first, then consider the details of a scheme when there is the need for it.

Gentlemen, I have done, and I leave it to you to consider whether the educational system of the Pharmaceutical Society is to be allowed to decay: that system which

has turned out so many good men and true: that system which has made the Pharmaceutical Society so respected at home and abroad: that system by which the Society obtained its Charter, its Pharmacy Act of 1852, and its Poisons Bill of 1868. Never for years has the attendance at the lectures been so poor. There is one thing can save it, namely, to make its system of education compulsory, to establish a curriculum. Heaven-sent curriculum!—that will make it easy for the teacher to teach, the examiner to examine, the candidate to qualify; that will bring to pharmacy those palmy days when she will become the indispensable handmaid of medicine, and the honoured servant of the public; that will make the body of pharmacists looked up to as a body of men of superior position and education, men leading in the van of progress, men unselfishly searching after that truth which is to transform this earth into paradise regained.

Mr. Chairman, I wish to propose a motion; I wish to move—

> "That this meeting is of opinion that examination *en rapport* with a compulsory course of education is a trustworthy test of qualification."

The eyes of the Pharmaceutical Council are on us to-night, gentlemen, for, unable to move forward by the action of the Privy Council, it feels that it wants the support of us young men. The professors and teachers naturally want to fill their classes, the existing chemists want to exclude fresh comers from the trade, the Council wants to improve the status of the Society; it is for us who are being educated to give an unbiassed opinion. Let us then cry to them—Forward and fear not, we will support, we, now chemists' assistants, soon to be the pharmacists of England.

Mr. J. F. Burnett (Vice-President), who seconded the resolution, complimented Mr. Dymond on the manner in which he had treated the subject, and hoped that the discussion would be well sustained, as it was one which affected assistants more than any other class. His opinions, he stated, were heartily in accord with those of Mr. Dymond. His experience as a teacher was that students generally made a false start in commencing their studies; they cared little or nothing for education so long as they could get through the examination. He often noticed when lecturing that a piece of information which might be very useful in after years was only noted by a few students, whilst in the same lecture something was stated which might crop up in the examination; this would be immediately jotted down by nearly all. With regard to the Minor examination he considered that it was too short in the practical portions—dispensing and chemistry. In Edinburgh candidates have longer at the dispensing counter, and having more work than is given in London, have a better chance of showing what they can do. Again, in chemistry, where a man presenting himself for examination in London has generally but one substance to test, in Edinburgh he would have several, and the examiner therefore was better qualified to judge of the student's merits or otherwise. He compared the Major with the Minor in this respect, and stated that whilst good men were seldom plucked for practical work the bad ones were unable to stand the searching test of a day's practical work. Speaking of education, Mr. Burnett deprecated cramming and advocated a wider range of study as a means of enlarging the ideas of the student. He considered that the Preliminary examination should be passed before apprenticeship commenced, and that chemists should not ignore the responsibility they incurred in taking apprentices, but should teach them and engraft a system of study on them. For provincial students Mr. Burnett would advocate the classes in connection with the South Kensington Science and Art School, as they gave a good foundation to the student and afterwards enabled him to have a better grasp of his pharmaceutical subjects. Mr. Burnett also considered that students should read the *Pharmaceutical Journal*, which they could obtain for the trifling subscription of 10*s.* 6*d.* and which was always useful for reference.

Mr. Blackham, after complimenting Mr. Dymond on the able manner in which he had introduced the discussion, proceeded to differ on certain points from both him and Mr. Burnett. Many of Mr. Dymond's views showed him to be rather a theorist than a practical man. He expected to hear the Pharmaceutical Society extolled, but would remind the members that it was not dignified on the part of the Association to play the part of the gallery gods in praising all it did. It was like a dog wagging his tail at all his master did. It was the duty of the Association not to praise only, but to play the part of an intelligent spectator who knows how to express dissent if necessary. As to compulsory education he applauded the action of the Privy Council in rejecting the scheme formulated by the Pharmaceutical Society, which he said was of a suicidal nature. With regard to the continental plan, he argued that Mr. Dymond did not fully consider all the facts of the case. In France, for instance, pharmacy had a political existence of two and a half centuries, and pharmacists were protected by the state. Our own Society was of a recent date, and we were not protected as they were. If we in England wish to have compulsory education, we must also have protection. The present Pharmacy Act was practically a dead letter, he said, and was all this education to be forced on the poor chemist? Would it shorten his long hours, or increase his remuneration? Even supposing that it might have that effect, they were pursuing a very roundabout method to attain their end; like going to France by way of the North Pole and back by the Mediterranean, he thought. In conclusion, he moved, as an amendment—

> "That any proposed change in pharmaceutical education and examination which does not include protection is undesirable."

Mr. T. A. Ellwood, who next carried on the discussion, supported the original resolution, and warmly combated most of what Mr. Blackham had said. If the Association represented the dog's tail and wagged, then he supposed Mr. Blackham's part was that of the end of the terrier's tail which had been cut off. If they did pursue a roundabout way to their end, they would certainly acquire much knowledge and experience on their way. He then turned to the legitimate portion of the discussion, and advocated an extension of the "Preliminary" examination, which he thought should include geography, and perhaps Euclid; the former subject was certainly much neglected by students, who frequently showed great ignorance when asked the position of certain places from whence drugs are obtained.

The Chairman now asked if there were no gentlemen present who were still students, as he should wish to hear some of them express their views. In response to the invitation,

Mr. A. C. Vallance said a few words, pleading an extension of the time in the examination. As a student he would cordially support the motion.

Mr. A. J. Phillips, in a telling speech, called attention more especially to the preliminary education of youths who intended to enter the body. He considered that the Preliminary examination should be made to include more subjects, and that it should be made compulsory to pass it before commencing pupilage.

Mr. E. S. Taylor continued in the same strain, and said that his early education was received in a grammar school, and that though classics, etc., were well taught, geography and history were almost ignored as *infra dig.* Simple arithmetic also was much neglected. After some remarks bearing on the examinations, he concluded by giving his support to the original motion.

The President, having thanked members who had taken part in the discussion, proceeded to make comments on some of the remarks, more especially of Mr. Blackham, and supported the motion.

Mr. Dymond then rose to reply to the discussion so far as it affected his previous remarks.

The amendment, being put to the meeting, was not supported, whilst eighteen members voted against it. On the other hand, the original resolution was supported by twenty-nine members, Mr. Blackham being alone in his opposition.

It was then proposed by Mr. J. E. Saul, seconded by Mr. A. J. Phillips, and carried unanimously, that the Secretaries be requested to send a copy of the resolution to the Council of the Pharmaceutical Society.

The proceedings then terminated.

Provincial Transactions.

LEEDS CHEMISTS' ASSOCIATION.

The Annual Meeting of the above Association was held on Friday, October 1; Mr. George Ward, President, in the chair.

The annual report and balance sheet were unanimously adopted on the proposal of the Chairman. The following is an abstract :—The Committee, in presenting the annual report, was gratified to be able to state that, through the liberality of the Council of the Pharmaceutical Society, the sum of £25 had been granted in aid of the library fund, the expenditure of which sum had added about fifty volumes to the library during the year. Reference was also made to the classes in technical subjects, which have been conducted by Mr. W. Elborne during the past two sessions, and which have been well attended. The prizes for the session (Attfield's 'Chemistry' and Miller's 'Chemical Physics') had been awarded to Messrs. L. Brown and F. W. Wooler respectively. The report stated further that the membership for the year was slightly in excess of the previous session, and that the receipts had amounted to £57 3*s.*, the expenditure being £51 18*s.* 3*d.* The Council, mindful of the fact that at present the demand for systematic instruction in pharmacy and allied subjects is not adequate to support annual lectures, has decided to recommend to associates a three years' course of study, the following division of subjects being advised :—

1st Session. — Elementary Chemistry (Inorganic); Botany; Practical Physics.*

2nd Session. — Advanced Chemistry (Inorganic); Organic Chemistry; Practical Chemistry.

3rd Session.—Pharmaceutical Chemistry; Materia Medica and Pharmacy.

As day and evening classes at the Yorkshire College and the Leeds Mechanics' Institution and Literary Society will supply the requirements of pharmaceutical students for science subjects, the Council trusts that full advantage will be taken of such excellent opportunities, in order that efficient preparation may be made for the lectures of the Third Session.

On a ballot being taken for the election of Council, the following were elected :—

President, Mr. William Smeeton; Vice-President, Mr. James Abbott; Hon. Treasurer, Mr. James Hirst; Hon. Secretary, Mr. F. W. Branson; Messrs. E. O. Brown, John Boocock, John Exley, P. Jefferson, S. Taylor and E. Yewdall; Auditors, Messrs. William Powell and E. Brown.

A vote of thanks to the President and Secretary, on the proposal of Mr. E. Brown, concluded the proceedings.

* Evening students for this course work independently, according to their requirements, under the direction of Professor Stroud, at the Yorkshire College.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The opening meeting of the ninth session was held in the Pharmaceutical Society's House, 36, York Place, Edinburgh, on the evening of Tuesday, 26th inst., at 9.15, Mr. Wm. Duncan, President, in the chair. There was a large attendance of members.

The minutes of the last meeting having been read and confirmed, Mr. Duncan delivered the

Inaugural Address.

Having referred to his high appreciation of their action in appointing him to the honourable and responsible position of President of the Association, Mr Duncan proceeded to say:—We have certainly much reason for congratulation regarding the past work of our Association, which eight years ago, like many other kindred ones, began in a very small way, but year by year has steadily increased, till now it has almost tripled its numbers. This large increase in members and regularity of attendance at the various meetings indicates a growing interest on the part of assistants and apprentices in the objects of the Association, which has already established a character for confining itself to its own proper business, that of advancing students in their knowledge of pharmacy. No town in the Kingdom possesses so many facilities as Edinburgh for the acquirement of knowledge, and no town in the Kingdom possesses a chemists' assistants' association in such a vigorous state, or one which has had more influence for good on the youth of our profession. But while we congratulate ourselves on the success which has thus far attended us we must not relax our efforts or lose that enthusiasm which is so essential to our well-being. There is a tendency in all associations such as ours to fag, and on the loss of one or two energetic spirits to lose heart, and this must be battled against, remembering always that the most effectual method we can adopt in advancing our professional standing consists in the steady and persevering attention to intellectual improvement, each of us striving to rise above mediocrity.

On all sides at the present moment we hear the sad tale that pharmacy is going to the dogs, and that the sweets of our profession are not worth the energy expended in qualifying us. Our duties are far from light, and frequently as far from agreeable; but dark and gloomy though the outlook may be, with nothing but stores and reduced prices surrounding us, we must not lose heart, for some day, sooner or later, a change will come, and the future pharmacist shall yet attain his rightful position. But before this can come about more evidence of pharmaceutical knowledge must be shown among pharmacists. The public are not so unreasonable as to expect this without giving a just remuneration where they see scientific ability displayed in doing scientific work. People value us much after our own estimation, and pay us accordingly. How often do we see young men no sooner passed the Minor examination—nay, some even think this superfluous, and, taking time by the forelock, are off opening a shop on their own account. Their books are pitched aside, as they consider that after the Minor all study ends, forgetting that to be in reality a good pharmacist much more work must be done, and much more knowledge attained than what is absolutely required for this very meagre examination. For, after all, you must admit that you have only skimmed the surface of the subjects in preparing for it. Of course, the small remuneration we receive as assistants is very much to blame for the multiplication of pharmacies, and drives many a one to open a shop, who, if salaries had been more liberal, would most probably have remained a subordinate a little longer, and gained a little more of that experience which is essential in the successful conducting of a pharmacy. Very few, I think, feel that they are qualified by the possession of the bare amount of knowledge required for the Minor; but, on

the contrary, feel that they must dabble a little deeper in the subjects if they are to keep abreast with the times.

All would call the merchant a fool who buys his spirit on trust, and never satisfies himself as to the purity of the article, or the percentage of alcohol it contains. Yet who of us ever dreams of estimating his citrate of iron and quinine, or proving that his scammony really answers the tests of the Pharmacopœia; unless when he is writing a paper to be read before an association such as ours. Again, you get in a prescription containing, among other ingredients, dilute hydrocyanic acid. The prescriber and your customer expect to get it accurately dispensed; nay, you will boast of the care you take in preparing it; but do you ever satisfy yourself that your sample really contains 2 per cent. of HCN? You may say we buy from a respectable house, whose preparations we can depend on. Very good, but they are just as liable to be careless as yourself, and it is gross carelessness on your part not to prove the purity or otherwise of the materials you dispense. Now those who have studied for the Major examination are capable of satisfying themselves regarding the purity of their drugs; while at the same time they possess a feeling of satisfaction that they have gained a little more knowledge than is absolutely necessary for legal qualification. I cannot help thinking that the Pharmaceutical Society made a great mistake in not making the Minor the qualifying examination for assistants only, and the Major the qualification for opening shop. Pharmacists would have been much better to-day both in social position and in knowledge if uch had been the case. But as the more honour attaches to those who gain this qualification, while, as yet, it is not compulsory, let me impress upon you the necessity of striving to obtain it. The necessary study is a pleasure, giving you a sufficient knowledge of the sciences to understand them intelligently, which alone will repay your trouble a hundredfold, while the mental discipline is invaluable, and should you aint by way, the remembrance of the fact that the man who possesses learning and knowledge defies competition will stimulate you to fresh endeavours, and no doubt success will eventually crown your efforts. It is an examination much more preferable in every way to the Minor. No green extract suppositories or refractory pill masses hover round to trip up the candidate who aspires to the honour, sending him back to his books for another three months; and the absence of these trifles Minor men can appreciate.

And a word to those who get over it. Most likely you will find that the study of one of the subjects is more agreeable to you, and that you are not so readily tired by it, as by the others. Now strike the iron while it is hot, and make a hobby of this subject, for specialization is the order of the day. It is utterly impossible for any one man to excel in all, but every one can follow up the subject that interests him most, and he will find in it a never-failing source of pleasure which he can turn to in his spare moments, which would possibly be otherwise frittered away in less elevating pursuits.

Allow me for one moment to refer to a subject which is also too much neglected by the bulk of our members, much to their own loss. That is microscopy. No doubt this neglect is due very much to the mistaken idea which prevails amongst us, that an expensive instrument is necessary for the prosecution of the subject. Now, this is ridiculous and should be expelled from your minds at once, for a very large proportion of the great achievements of microscopical research have been made by instruments which would nowadays be condemned for scientific work. No one can study botany thoroughly who does not possess a microscope, which does not necessarily mean an expensive one. A cheap instrument and a sharp knife will do more towards helping a student of botany in acquiring a knowledge of the science than ten times the time expended on the reading of books. He must also not forget the great assistance the instrument is in the detection of adulteration in drugs, and that work with it is also one of the best means of preparing the mind for the exercise of its powers in any direction whatever. In order to stimulate members of our Association to do some work in this subject, I think we could not do better than devote some of our surplus funds for a prize to be awarded to the member who presents the best mounted specimens of official drugs at the end of the session.

Apprentices have been well looked after by our Association, possibly to the detriment of assistant members, and I would suggest that the idea be discussed to-night.

Before closing, allow me to refer to the work of our session. First, there is the prize scheme of the Association, which has been a source of great benefit to apprentice members. It is hoped that apprentices will show their appreciation of these efforts of the Association on their behalf by coming forward for examination, remembering that though all cannot gain the prize they gain much that will be of use to them in their future career as pharmacists. I may mention for their encouragement to redouble their efforts, that two former prizemen have just attained the top of the pharmaceutical tree, namely, Messrs. Coull and Stephenson.

The botanical excursions which were instituted this summer, it is hoped, will be continued next season, and be attended with more success, although there was much to encourage the Association in continuing the experiment for another year. Still the number of members who availed themselves of the opportunity was far from satisfactory, doubtless partly owing to the difficulty they encountered getting up at a sufficiently carly hour to catch the train. Those who did manage to attend, however, can testify to the pleasure and profit derived from the excursions, and an earnest effort should be made by all to take part in them. Field work is by far the most satisfactory method of gaining a useful practical knowledge of botany, and a practical knowledge of botany makes the study of the science a constant source of pleasure.

At the time the Committee had under its consideration the desirability of botanical excursions it was suggested that an herbarium should be started, which it was thought would prove useful to members preparing for examination. A nucleus for this has now been formed by the donation of a large number of specimens by Mr. Bowie. Members who have the opportunity will kindly keep it in mind and collect duplicates for it in their rambles.

Having referred to the open meetings and the evenings for "Notes and Queries," and urged all to endeavour to make these evenings as interesting and successful as possible, Mr. Duncan concluded as follows:—Just one word and I am done. Let me impress upon you all that the success of the session which we are just commencing does not depend on your President, nor even upon your Executive. They can do much certainly and will do much I trust, but success will be secured only by the cordial interest and co-operation of each individual member, and I would earnestly entreat you all to rally round those whom you have appointed as office-bearers of this Association, and thereby make this, the ninth session, a worthy follower of those which have gone before, and one worthy of the premier Association of the United Kingdom.

On the motion of Mr. Ainslie, Vice-President, a cordial vote of thanks was awarded to Mr. Duncan with acclamation.

Mr. Gilmour expressed his great pleasure at being present, and the deep interest which he felt in the proceedings and welfare of the Association. He had listened with much satisfaction to the able address of Mr. Duncan, and commended the high standard of knowledge which he had set before them. The address contained many points which the members would do well to ponder deeply. He was pleased to hear Mr. Duncan point out the importance of cultivating the habit of careful obser-

vation. As an examiner, he was often filled with regret and disappointment to find many of the young men who came before him make a poor appearance because they had failed to acquire this valuable habit.

The discussion was continued by Messrs. Boa, Coull, Dunlop, Henry, Hill, Jack, Lunan, Macdonald, Stephenson and Turnbull, and it was remitted to the Committee to consider and report upon the proposed microscopical prize.

Some notices of motions for next meeting having been given, the meeting was closed.

Obituary.

PROFESSOR DYCE DAVIDSON.

We regret to have to record the death of Dr. Alexander Dyce Davidson, Professor of Materia Medica in the University of Aberdeen, which took place suddenly on Friday, the 22nd inst. Professor Davidson was engaged in lecturing to his class on Friday afternoon, when he was suddenly seized with faintness, and died in the class room shortly afterwards at the age of 41.

Dr. Davidson commenced business life in the pharmacy of his father, now belonging to the firm of Davidson and Kay, in Aberdeen, but afterwards decided to study with a view to enter the medical profession. He took his degree of M.A. at the University of Aberdeen in 1863, and the medical degrees of M.B., C.M. (both with the highest honours) in 1866, whilst still under age. Four years afterwards he took the degree of M.D. He subsequently received several public appointments, and in 1874 was appointed Professor of Materia Medica in Aberdeen University, and also Lecturer on Ophthalmic Surgery.

Dr. Davidson always maintained the most pleasant associations with the chemists and druggists of the city. At a meeting of the Aberdeen and North of Scotland Society of Chemists and Druggists on Friday his death was referred to. Dr. Gordon, who was in the chair, said the deceased had always taken an active interest in the work of the Society, and at all times had willingly placed at the disposal of those connected with it all the means that were in his possession to help them on in their studies. His rooms and his laboratories had been always open to them, and his large and valuable information had been ever at their service. He spared neither time nor trouble to treat the subject of materia medica in such way as to command their approbation; and, before the Society was possessed of the rooms it now occupied, nothing gave him greater pleasure than to lecture to the members in his own rooms or elsewhere.

☞ Notice has also been received of the death of the following :—

On the 28th of March, Mr. Samuel Barratt, Chemist and Druggist, Corby. Aged 80 years.

On the 16th of September, Mr. Joseph Edward Malings, Chemist and Druggist, Deddington. Aged 50 years.

On the 16th of October, Mr. George Taylor North, Pharmaceutical Chemist, Ponders End. Aged 52 years. Mr. North had been a member of the Pharmaceutical Society since 1870.

On the 17th of October, Mr. George Tattersall Aspinall, Chemist and Druggist, Manningham. Aged 57 years.

Erratum.—In the note on Saccharin that appeared in the Journal for last week, on p. 335, Mr. C. J. S. Thompson is erroneously referred to as of "Manchester," instead of Liverpool.

Pictor.—The degree of Ph.D. is granted by Colleges of Pharmacy in the United States upon the result of an examination at the close of a definite course of study.

"*Linum.*"—Bentley and Trimen's 'Medicinal Plants,' vol. i., plate 39.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

The Unofficial Formulary Committee.

Sir,—As yet no official intimation of the views entertained by this Committee as to the scope or limits of its proposed labours has been announced, and we are perhaps discussing or condemning lines of action which may never be contemplated. The letter of Mr. Reynolds's resolution is, however, open to various interpretation, and its spirit is broad. Some general expression of opinion, therefore, as to the direction in which the efforts of the Committee may be best directed, is perhaps desirable.

I believe that not only those interested in the manufacture of special preparations, but the medical profession and the majority of pharmacists will agree with those of your correspondents who deprecate any attempt to imitate existing "non-official remedies."

Obviously, it would be as dishonourable and contemptible for a committee, as for any individual member of it, to endeavour to devise substitutes for recognized preparations whose only fault is that they are "proprietary."

Imitation is already a too popular form of flattery; but I am unwilling to believe that an attempt is about to be made to raise it to the dignity of a branch of original research. Apart from ethical considerations it is absurd to suppose that that "factory-made" preparations are necessarily inferior to those made on a smaller scale. Abundant evidence to the contrary could be adduced, and numerous instances must occur to your readers in which it would be simply impossible to produce a satisfactory preparation at all except in a well-appointed factory.

Individual pharmacists will doubtless—the Conference Committee notwithstanding—still endeavour to stamp their individuality on certain of their preparations, and, unless improvements—not mere imitations or substitutes—can be suggested, those physicians who have confidence in the particular manufacturer, or know by experience the value of his productions, will continue to prescribe them, and honourable pharmacists to dispense them.

The Committee should originate, not imitate. Several of your correspondents have already indicated abundant work of this kind which it may most usefully undertake.

7, *Exchange Street, Manchester.* F. Baden Benger.

G. F. Mann.—Application should be made to the Controller, Trade Marks Registry Office, 25, Southampton Buildings, London, W.C. A summary of the Trade Marks Act and the Rules is given in the Society's Calendar.

P. H. Marsden.—(1) *Stellaria Holostea.* (2) *Stellaria media.* (3) *Arenaria Trinervia.* (4) *Geranium Robertianum.* (5) *Alchemilla vulgaris* (6) *Galium verum.* (7) *Erodium cicutarium.* (8) *Sisymbrium Sophia.* (9) *Sisymbrium officinale.* (10) Apparently the leaf of *Leontodon autumnale* and the flowers of *Crepis biennis.* Read, if possible, the article "Herbarium" in the 'Encyclopædia Britannica.' Affix the plants with a mucilage of gum arabic and tragacanth, to which a little tincture of guaiacum has been added.

"*Tarax.*"—Assuming that the intention of the prescriber cannot be ascertained the present Pharmacopœia preparation would probably be the most proper to use. The date at which the prescription was written would also be a circumstance to take into consideration.

"*Minor Qualification.*"—Calamine Lotion (Startin).—The following is the formula:—Calamine, 1½ dr.; Oxide of Zinc, 1½ dr.; Glycerine, 2 dr.; Rose Water, to 4 ounces.

"*Beta.*"—Tapioca is an agglomerated product of the cassava starch, which is muller-shaped and has no concentric rings perceptible. Sago starch is of a different type, with concentric rings and truncated at one end. In the mass sago is darker than tapioca, but this is not appreciable under the microscope. We are not acquainted with the article mentioned, but would be pleased to receive a sample for microscopical examination.

Communications, Letters, etc., have been received from Messrs. Ewell, Saul, Symes, Robinson, Wischeroff, Prosser, Powell, Ellinor, Frost.

PETROLEUM PRODUCTS
AT THE
LIVERPOOL INTERNATIONAL EXHIBITION.

Although in the collection there are few specimens of the substances used in pharmacy, such as paraffinum molle and paraffinum durum of the British Pharmacopœia, there is a great variety of products which possess points of interest, and there can be no doubt that pharmacists (especially those in manufacturing and agricultural districts) would do well to make themselves familiar with the various forms of petroleum, their respective properties, characters and commercial uses.

As is well known, much attention has been given to coal tar, and from it substances have been obtained whose name is legion; but, on the other hand, crude petroleum, which offers a fruitful field for investigation, has been much neglected. On the very threshold of an experimental inquiry we meet with curious phenomena.

Taking a typical specimen of crude petroleum and submitting it to distillation, there is obtained first the light benzoline or petroleum ether; next burning oils of various gravities, with low and high flash point; then, at a much higher temperature, lubricating oils. The residue is highly coloured, and consists of a soft mass from which the well-known petroleum jelly and hard paraffin may be obtained. These products all agree in one negative quality, viz., that of not combining readily with any other substance; but there appears to exist some attractive force between the respective liquids so obtained. If, for example, two of the burning oils be mixed together in equal proportions, it may be found that the resulting fluid does not possess the mean specific gravity or flash point. By "blending," too, capillarity, which is of considerable importance in oils for lighting purposes, may be materially increased, and advantage is taken of this fact in the production of some of the best brands.

There are imported into Liverpool annually not less than 300,000 barrels of petroleum, and it might therefore have been expected that the exhibit would be a good representative one. In this anticipation one is not disappointed, although there is necessarily some amount of repetition by the different exhibitors.

The position is very appropriate, being a portion of the place allotted to machinery in motion, the oils shown being chiefly lubricants. It is claimed for these, that being free from fatty acids they are far superior to vegetable or animal oils for lubricating purposes.

Messrs. Samuel Banner and Co., of Fazakerley Street, Liverpool, and Corporation Street, Manchester, show the Polar Company's products, consisting of fine pale and cylinder oils, and in fact American oils of almost every description. They appear to be well finished and to possess what are regarded as the highest attributes, viz., great viscosity, high fire and low cold tests. In other words, whilst flowing sufficiently to lubricate the joints, etc., to which they are applied, they do not readily pass away; they do not give off inflammable vapour, except at a very high temperature, and in cold weather no crystalline paraffin separates out.

The company's works are quite new and are fitted most elaborately with all modern appliances; two large photographs give a good idea of this and of their extent, which appears to be not less than thirty acres.

The specimens are shown in glass cylinders about three feet high, with handsome cut stoppers. Russian lubricating oils of various grades are also exhibited.

A burning oil, known as the "Jessamine Brand," is a useful application of the peculiar results obtainable by blending, or in the words of the patentees, "by rearranging the groups of fractions."

The capillarity attained is such that in some experiments made by Mr. A. Norman Tate, F.I.C., it was found that this oil burned for twenty-six hours in an ordinary railway signal lamp, until the reservoir was empty, without the least diminution of flame.

A cheap substitute for oil of turpentine is shown as "Patent Turpentine." This is said to be produced by a re-grouping of fractions also, but there is evidently some turpentine used in its manufacture. It is alleged that it is "an efficient substitute for the original article," and some specimens of painting in which it had been used quite support this statement.

Messrs. Mead, King and Robinson, of Liverpool, as agents for Messrs Crewe, Leucke and Co., of New York, exhibit this firm's goods. Pale oils and cylinder oil of various gravities, the latter known as "Perfection Brand," being their specialty, and the grades are discriminated by letters. It is claimed that these oils have special "wearing properties," and that they are as near perfection as it is possible to produce them. This firm also exhibits petrolatum (paraffinum molle) of excellent quality, having a melting point of 110° F. It is a perfect jelly, free from all crystalline character, and has a somewhat firmer consistence than the popular article used in this country. Winter and summer oils are also a feature in this exhibit.

The Ragosine Oil Company, of Moscow, and 7, Idol Lane London, makes an exhaustive display of Russian oils, chiefly of the heavier or lubricating class. The whole of the samples shown clearly indicate that great care has been bestowed on their preparation. Russian crude oil contains about three times as much lubricating oil as the American; it possesses at low temperatures great viscosity without chilling and naturally possesses but little odour. The corrosive effect of fixed oils on metals is shown here; also Redwood's new viscometer.

Price's Patent Candle Company shows a number of lubricating oils which are obtained as secondary products in the manufactures for which this firm has attained great celebrity.

Messrs. W. H. Samuel and Co., the Temple, Dale Street, Liverpool, have a handsome case of exhibits, in which lubricating oils predominate, each of them appearing to be adapted for some special purpose; for instance, there are spindle, loom, shafting, engine, valve, cylinder, as well as summer and winter oils, etc. There is also a sample of the "Wheel Brand" burning oil.

The Vacuum Oil Company, Rochester, New York, and The Albany, Liverpool, also shows spindle, loom, engine, cylinder and other oils. The company's specialty appears to be "stainless oil." This name has been taken on its own merits, in preference to testing it on wearing apparel; no doubt it has a meaning, and the Company issues a pamphlet containing many certificates.

Messrs. J. Mathew and Son, Messrs. W. R. Taylor and Co., and Messrs. J. and H. Johnson, show a similar class of oils.

The Dee Oil Company exhibits a well-arranged and very complete lot of samples of fine quality oils for lubricating purposes.

Other exhibits, each possessing some peculiar and distinctive character or merit, are made by Messrs. James Light and Son, and Messrs. Williams and Co., of Liverpool, Messrs. J. Reil and Son, of London, and Mr. E. H. Kellog, of New York.

EVAPORATION OF PERCOLATES.*

BY PROFESSOR J. U. LLOYD.

In a series of papers preceding this one, I have referred to certain conditions that influence favourably or unfavourably the act of percolation. Passing now to the percolate, which we usually have to concentrate, in whole or in part, by evaporation in making the various pharmaceutical preparations, I will introduce a subject that we also must take into consideration in order to produce uniform results at different times and when working varying quantities.

In making fluid extracts and many other preparations, we have to evaporate reserved percolates, or entire percolates. It is generally accepted that a protracted application of heat to liquid preparations of vegetable origin is to be avoided, and in many instances it is certainly necessary to employ but little, and often to avoid any heat. In this paper, I shall not consider the effect of the use of heat in individual percolates, but shall call attention to a feature of general application, and which is scarcely, if at all, considered by pharmacists. It involves the preparation of many substances, and may prove of interest to pharmacists who have overlooked this phase of the subject.

In making the officinal amounts of fluid extracts, we usually have varying, but small bulks of percolates to concentrate to a certain amount. Many of us have reason to increase the officinal quantities, and perhaps few pharmacists conform literally to the amount of drug specified in the pharmacopœia. The problem I bring forward is, can an increase or decrease of the amount of material cause a variation in the product, provided the proportions of all substances are maintained? For the sake of argument, we will admit that in all operations the act of percolation is complete and uniform.

That an increase of proportions may make a difference in the product is evident to all who have reason to increase amounts from time to time. Often many times the quantities in the original formula is employed, and that such an increase will make a variation in the quality of the evaporated product, from the application of excesssive heat alone, can, I think, be conclusively demonstrated.

I will take, as an example, a substance in which the variation can be made apparent to the eye.

If 15 fluid ounces of vinegar of squill be evaporated to 1 fluid ounce, does it follow that this product is identical with like amounts of the product that results from the evaporation of 30 fluid ounces to two fluid ounces, the same temperature being maintained in each instance? Continuing, will the resulting liquid remain uniform, when batch after batch is doubled, provided that the product is also each time doubled, thus maintaining the proportion? In reply, I submit as samples, in vials of uniform diameter :—

No. 1. From 7 and 1½ fluid ounces of vinegar of squill evaporated to 1½ fluid ounce.

No. 2. From 15 fluid ounces evaporated to 1 fluid ounce.

No. 3. From 30 fluid ounces evaporated to 2 fluid ounces.

No. 4. From 60 fluid ounces evaporated to 4 fluid ounces.

No. 5. From 120 fluid ounces evaporated to 8 fluid ounces.

The evaporation was conducted in porcelain dishes of the usual dimensions. The temperature varied but little from 175° F. to 180° F.

It will be seen that the specimen that I submit, representing the smallest amount of drug, is a light amber colour, but darker than the vinegar of squill used in making it, and that each successive batch increases in colour with the increase of material, until a dark brown-red is produced. It will also be found that the odour varies from a pleasant dilute acetic acid in the small amount to that of a burnt cracker in the larger, and it is also true that the flavour of successive batches becomes more foreign to prime squill as there is an increase of material worked. Thus it is evident that there is a variation in product with each increase of batch, even though in all instances the same formula is followed, for, in all these experiments, filtered vinegar of squill from one batch was employed.

In explanation of the apparent inconsistency, a little thought will show us that the conditions were changed in each experiment, although the same process was followed, and that no two batches were submitted to the same application of heat.

	Time required.	Size of dish.	Surface of liquid before evaporation	Surface of liquid after evaporation.
No. 1	160 min.	12 oz.	5 in. in diam.	3¼ in. in diam.
No. 2	180 „	32 „	6¾ „ „	3½ „ „
No. 3	400 „	32 „	7½ „ „	5 „ „
No. 4	470 „	128 „	9½ „ „	6 „ „
No. 5	745 „	128 „	11½ „ „	7½ „ „

The increase of evaporating surface in the usual evaporating basins, as we pass to larger dimensions, is not sufficient to produce a uniform product when proportions are increased accordingly. Therefore it follows that, with substances injured by a continued application of heat, we must take into consideration the fact—for it is undeniable—that a conformity to the officinal process may be only apparent and not practical. I have selected as an illustration a substance in which a change produced by heat is perceptible to the eye. It is not more clearly defined, however, than is the case in many other bodies that have come under my consideration, where I have been forced to increase batches, often to a thousand pounds or more, and I am not as enthusiastic as some persons are regarding the injury following the application of a moderate heat to the majority of products from dried plants. There is no doubt, however, that in many cases a continued application of heat (simply from an increase of quantity, and where the operator really thinks he will make a substance to conform with the pharmacopœial requirements) may result in a product that, in many respects, would be entirely different from that made if the officinal amounts were followed. The application of this rule is general, and, when the conditions of the apparatus are similar, favours the pharmacist who follows the United States Pharmacopœia amount rather than the manufacturer who uses the United States Pharmacopœia process, and applies it to large quantities. Doubtless, all of us have been confronted with this problem by an observance of the change following the variation in batches, but, perhaps, we pass it by as unimportant, or argued that a like process must produce like results. Many arguments have been advanced as to the advantages or disadvantages of operators on a large or small scale, but as yet I have to find the first claim by the pharmacist who works in pharmacopœial amounts of the advantage he has as introduced in this paper.

In another paper I speak of a fluid extract of squill, and say that the product "ranges from light amber to dark brown-red in accordance with conditions of the evaporation." Herein I have shown that the larger the amount employed, the more objectionable the product. By the usual methods of evaporation, the formula is only applicable to small amounts, and cannot be employed in making large batches.

* Paper read at the meeting of the American Pharmaceutical Association, at Providence, R.I.

The Pharmaceutical Journal.

SATURDAY, NOVEMBER 6, 1886.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

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THE FUTURE OF EDUCATIONAL REFORM.

FROM the result of the motion brought forward by Mr. SCHACHT at the last Council meeting the subject of pharmaceutical education may be regarded as having entered upon a new phase. The vote of the Council in support of the motion may be taken as endorsing Mr. SCHACHT's contention that the course proposed by him is but a natural consequence of the work it has already done. The only grounds upon which any opposition was offered to the motion were of an extraneous nature, relating more to considerations as to the expediency of immediate action, and to the desirability of associating other matters with the endeavour to establish an adequate system of education, than to any dissent from the view that such a system is imperatively requisite. Since the time when the Council gave an unanimous expression of opinion in favour of a scheme of compulsory technical training, nothing has occurred to alter the position of this matter. There has been a very general expression of opinion in favour of the proposed measure from various associations throughout the country, and from many individual authorities whose views are entitled to consideration. This has also been the case with associations of the younger members of the body, as was shown by the proceedings at the meetings reported in last week's Journal. Even the failure of the last attempt to carry out the chief aim of the Society by means of a modification of the Bye-laws, though disappointing, is by no means a discouragement from further efforts. It would be a total mistake to suppose that the Privy Council, in withholding its approval of the amended Bye-laws, was to be understood as disputing the desirability of an improved system of pharmaceutical education, for, as both the President and Mr. SCHACHT pointed out, that was not a matter in question. It may be taken that this point has been decided, and decided by the body most competent to do so. It was merely the form in which the Council sought to carry out its decision that was objected to by the Privy Council, the objection being based on the view that the Council had exceeded its powers in framing the amended Bye-laws. A sufficient reason was thus furnished for the Council to seek for such an extension of its powers as would admit of improvement in the system of pharmaceutical education consistently with actual requirements. From this point of view it would certainly seem desirable that any attempt to obtain the power desired should be made independently of other matters that would afford opportunity for opposition on the ground of interference with interests of various kinds outside the pharmaceutical body. By thus limiting the provisions of a bill, so as to affect directly only members of the body introducing it, there would be greater prospect of a successful issue, and matters of minor importance might well be left to a future occasion.

But even with such a limitation of an appeal to Parliament, the fact must not be overlooked that there is a certain amount of dissent from the views entertained by the Council and by the great majority of pharmacists in regard to the need for a compulsory system of pharmaceutical education. At the late meeting of the Chemists' Assistants' Association, this feeling of opposition on the part of members of the pharmaceutical body found expression, and in the present number of the Journal will be found a letter in which the same feeling is displayed. It is with reluctance that we publish this letter as coming from a pharmaceutical chemist, but as it represents a fact that Mr. SCHACHT does not appear to have taken into account, when arguing that a measure for establishing compulsory education would meet with no opposition from within the body to which it applied, this circumstance must be regarded as a sufficient reason for doing so. In a general way Mr. FEAVER'S letter, like Mr. BLACKHAM'S speech at the meeting of the Chemists' Assistants' Association, carries with it internal evidence of irrationality. The assumption that education is advocated solely as being valuable for itself is in direct opposition to the arguments which have always been urged on its behalf. So far from that being the case in regard to pharmaceutical qualification, it has always been contended that a higher standard of education than is commonly met with is absolutely indispensable to make the pharmacist fit for the performance of the duties appertaining to his business and equal to the task of earning his daily bread with credit. The idea that the Privy Council has rejected the Bye-laws because it did not recognize the necessity for improvement in pharmaceutical education is another grave mistake, which indicates imperfect acquaintance with the facts of the case, and the assertion that compulsory education has ignominiously failed to protect the public or to benefit those engaged in the distribution of drugs for medicinal purposes is too absurd to need contradiction. In other respects we prefer to leave Mr. FEAVER'S letter to speak for itself, feeling assured that the total absence of any reasonable argument for the views it expresses will ensure for it the same appreciation as the speech of Mr. BLACKHAM.

We have referred to this unreasoning feeling of opposition to educational improvement, not only because it requires condemnation in itself, but also because it constitutes a difficulty that would require to be overcome before any scheme for establishing a better state of things can be successfully carried out. Little as that is entitled to consideration, it constitutes some reason for hesitation, or even procrastination, in entering upon the prosecution of such a scheme, and it goes far to justify the remark made by Mr. ATKINS as to the prospect of a consensus of opinion in favour of the proposal made by Mr. SCHACHT. This is in fact the strongest argument in support of the opinion that the motion was premature and that a better chance of success would be secured by waiting a little longer. The conditions under which the business of the pharmacist is carried on in this country are so varied and so heterogeneous, and, in many instances, so inconsistent with the proper nature of the business, that it is necessary to make great allowances for the views entertained in some quarters as to what is the proper means of removing the hardships which press severely on individuals. To a very great extent the pharmacist is shut out from the exercise of the most important function of his business, the dispensing of medicine, and where this is the case the necessities of existence are a reasonable justification for engaging in branches of trade that have no proper connection with pharmacy. To such an extent does this state of things prevail that it would seem almost unavoidable in making the attempt to establish a better system of education to adopt some means by which a sharp line of demarcation may be drawn between pharmacists who desire to confine themselves to the legitimate and natural exercise of their business and those who now, while claiming to belong to the same body, carry on a business that is little, if at all, above the level of the grocer or the drysalter. That men in the latter position should declaim against compulsory education as unnecessary in its application to themselves is not unnatural, and this difficulty is one that we believe will have to be dealt with efficiently before any measure can be carried through for meeting the wants of pharmacists proper. If any useful lesson at all is to be drawn from the views expressed by Mr. FEAVER and Mr. BLACKHAM it is this.

At the next evening meeting of the Society a paper will be read by the Curator of the Museum, Mr. Holmes, on "Some of the Drug Exhibits at the Colonial and Indian Exhibition." Mr. Martindale will also read a note on "Tincture of Strophanthus." In the ordinary course this meeting would have taken place on the tenth of the month, but as it has been ascertained that several of the executive commissioners of the Colonial and Indian Exhibition would be unable to attend on that evening it has been decided to postpone the meeting until the following week in order to afford them an opportunity of being present. Both of the subjects that will be brought forward are of considerable importance, and it may be expected that there will be an exceptionally good meeting, not only on that account, but also because a number of specimens presented by several of the executive commissioners, as well as others that will be lent for the occasion, will be placed on the table for examination before the meeting, and they will probably give rise to some interesting discussion.

* * *

The General Austrian Pharmaceutical Association, which was established in 1861, celebrated on the 10th ult. the completion of its twenty-fifth year. On the same occasion the completion of the fortieth year of pharmaceutical life by its Vice-President, Herr Anton von Waldheim, was made the occasion of a special recognition of the services rendered by him to the Association and to pharmacy generally, which took the form of a banquet and the unveiling of a portrait of him which is to be hung in the Society's house. Several other Austrian societies took part in the ceremonies, and a number of congratulatory telegrams from societies and individuals in foreign countries were received.

* * *

The Mojave Desert, south of California, appears to be a very Paradise for yucca plants, Nature seeming almost to exhaust herself there in devising weird growths and reptile-like forms springing from sand as dry as the utter absence of moisture can make it. A writer in the *Scientific American* says that, unpromising as this desert land would seem, it has been bought by various companies, mostly English, for the sake of its unique vegetation, the yuccas affording a valuable pulp for paper, supplying indeed the material for the paper upon which at least one important London daily is printed. As an instance of the enormous size and grotesque shapes assumed by the yuccas, he figures one, the top of which being too heavy for the trunk has bent over until it touches the earth again, forming an arch under which four or five horses could pass abreast; from the crown of the arch, about fifteen feet from the ground, a fresh limb springs upwards almost vertically.

* * *

The opening meeting of the School of Pharmacy Students' Association will take place on Thursday, November 11, at 7 p.m. Professor Attfield, F.R.S., will take the chair, and an introductory Address will be delivered by Mr. S. R. Atkins.

* * *

The next meeting of the Edinburgh Chemists' Assistants and Apprentices' Association will be held in the House of the Pharmaceutical Society, 36, York Place, on Wednesday evening, the 10th inst., at 9.15. On this occasion the Prize Committee will report on the Association Prizes Competition and the prizes will be presented. The botanical excursions will also be reported on by Messrs. Hill and Stephenson, and the Association Herbarium of indigenous plants will be on view. In addition, a paper on "Drugs as Imported," by Mr. Peter MacEwan, will be read. We have been requested to say that this being what is known as an "open meeting" all persons connected with pharmacy are cordially invited to be present.

* * *

On Thursday evening next the Chemists' Assistants' Association will hold a Musical and Social evening.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, November 3, 1886.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT.

MR. THOMAS PRESTON GOSTLING, VICE-PRESIDENT.

Messrs. Allen, Atkins, Baildon, Borland, Bottle, Butt, Cross, Greenish, Hampson, Hills, Radley, Richardson, Robbins, Savage, Schacht, Southall, Symes, Williams and Woolley.

The minutes of the previous meeting were read and confirmed.

Diplomas.

The following, being duly registered as pharmaceutical chemists, were respectively granted a diploma stamped with the seal of the Society :—

Coull, George.
Davidson, Peter.
Everard, Arthur George.
Hargrave, Matthew.
Hilton, Ivor Ajax Robinson.
Lewis, Arthur John.
Martin, William.
Richards, Thomas Coombs.
Rye, Frank.
Smee, Walter Wallis.
Stephenson, Thomas.
Wright, Herbert Cassin.

Elections.

MEMBERS.

Pharmaceutical Chemist.

Matthew Hargrave, of Sydney, N.S.W., having passed the Major examination and tendered his subscription for the current year, was elected a "Member" of the Society.

Chemist and Druggist.

Thomas Prideaux Saunders, of West Cowes, Isle of Wight, who was registered as being in business before August 1, 1868, having tendered his subscription for the current year, was elected a "Member" of the Society.

ASSOCIATE IN BUSINESS.

John Beaumont Broadbent, of Honley, having passed the Minor examination, being in business on his own account, and having tendered his subscription for the current year, was elected an "Associate in Business" of the Society.

ASSOCIATES.

The following, having passed the Minor examination and tendered (or paid as "Apprentices or Students") their subscriptions for the current year, were elected "Associates" of the Society :—

Atterbury, Clive .....Burton-on-Trent.
Baker, William James .....Bradford.
Birkett, John .....Stockport.
Blankley, Thomas Ernest B. .. Sleaford.
Buchanan, Margaret Elizabeth.London.
Carter, Joseph Montague .....Manchester.
Church, Albert Victor John ...Norwich.
Clark, Henry Sowerby.....Barton-on-Humber.
Clark, Robinson Urwin .....Jarrow.
Coleman, Frank Henry .....Chapel Brampton.
Colman, Alfred Ernest .....Newport, I.W.
Curtis, Harry Edwin .....Watford.
Davies, John.....Llandovery.
Davis, George Albert .....Cheltenham.
Duggleby, Septimus.....Hull.
Edwards, Alfred Egbert.....London.
Evans, Alfred Philip .....London.
Garibaldi, Joachim Angel .....London.
Gibbs, Sydney .....Eastbourne.
Gibson, John William.....Richmond.
Govan, John Wallace .....St. Andrews.
Green, Edmund Clement F. ...Dover.
Griffiths, Richard Lloyd.....Llanidloes.
Harrison, Richard C. Clark ...Birmingham.
Hewitt, Joseph.....York.
Hill, Major .....Sleaford.
Lewis, John Lloyd .....Llandyssul.
Miller, Thomas.....Leith.
Palmer, Frank Thomas .....Cheltenham.
Pratt, Alfred James .....Chichester.
Ridley, Albert Paul.....Ipswich.
Riley, Alfred Thomas.....London.
Sweetapple, Thomas Pyke .....Taunton.
Sykes, John .....Heaton Chapel.
Tighe, John Wynne.....Exeter.
Vallance, Arthur Clayton .....Mansfield.
Woods, Joseph James Birkett..Tunstall.

Several persons were restored to their former status in the Society upon payment of the current year's subscription and a fine.

Restorations to the Register.

The names of the following persons, who have severally made the required declarations and paid a fine of one guinea, were restored to the "Register of Chemists and Druggists" :—

John Richards Davies, 20, Country Mansell, Guernsey.
Albert Hendy, 98, Thorpedale Road, Finsbury Park, London, N.

Reports of Committees.

FINANCE.

The report and recommendations of this Committee were adopted on the motion of the President, and various accounts were ordered to be paid.

BENEVOLENT FUND.

The report of this Committee included a recommendation of the following grants :—

£10 to the widow (aged 59) of a member from 1841 to 1858. Applicant has had two previous grants of £10 each. (Middlesex.)

£10 to the widow (aged 57) of a member from 1870 to 1880. Has had two previous grants of like amount. Suffers from failing eyesight and is unable to earn much. (Surrey.)

£5 to a member (aged 53) from 1854 to 1859, formerly in business, but who has been for some time dependent on his friends and has also been suffering from the effects of an accident. (Middlesex.)

£10 to the widow (aged 54) of a registered chemist and druggist. Applicant has had two previous grants, has had eleven children, of whom six are living, three being dependent on her. (Surrey.)

£10 to the widow (aged 53) of a registered chemist and druggist, who has had three previous grants. (Huntingdon.)

£10 to the widow (aged 51) of a registered chemist and druggist. She has had three previous grants, with one of which she purchased a sewing machine, but her eyesight having been affected by night work, she has had to discontinue it for a time. (Middlesex.)

£10 to the widow (aged 59) of a registered chemist and druggist, in weak health, and having but very slender means of support. (Wilts.)

£5 to the widow (aged 43) of a registered chemist and druggist. Applicant has had previous grants amounting to £51, the last in March, 1885. Has two children, girls, aged 14 and 16, the eldest of whom is about to take a situation. (Warwickshire.)

One other case had been deferred for further inquiries.

The Vice-President moved the adoption of the report and recommendations, which was unanimously agreed to.

LIBRARY, MUSEUM, LABORATORY AND HOUSE COMMITTEE.

Library.

The report of the Librarian had been received, including the following particulars :—

Attendance.		Total.	Highest	Lowest.	Average.
July	Day . .	456	30	4	17
	Evening .	161	15	1	7
August.	Day .	91	7	1	3
September.	Day.	113	13	3	8

Circulation of books.	Town.	Country.	Total.	Carriage paid.
July . . .	96	105	201	£1 12 3
August . .	54	51	105	0 12 8
September .	53	107	160	1 10 9½

The undermentioned donations to the Library had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors :—

For the Library in London—

Sixième Congrès Internationale Pharmaceutique, 1885, Compte rendu, 1886.
From M. E. Van de Vyvere, Secrétaire-Général.

Madsen (H. P.), Faut-il restreindre la vente de la morphine par la pharmacien ? 1885.
From the Author.

Shenstone (W. A.), The Methods of Glass Blowing. 1886. From the Author.

Auché (A.), Le Curare, 1886.
From Professor Soubeiran.

Tolstoi (Léon), What I believe, 1885.
From the Publisher.

Dragendorff (G.), Beiträge zur gerichtlichen Chemie, 1886.

Schomacker (J.), Beitrag zum forensisch-chemischen Nachweise des Resorcin und Brenzcatechin im Thierkörper, 1886.

Waeber (N.), Untersuchung einiger aetherische Oele, 1886.

Ueber einige ostindische Volksheilmittel, 1886.
From Professor Dragendorff.

Alumni Association of the Philadelphia College of Pharmacy, Annual report, 1886.
From the Association.

University of Wisconsin, Contributions from the Department of Pharmacy, No. 2, 1886.
From the University.

For the Library in Edinburgh—

British Pharmaceutical Conference, Proceedings, 1866, 1867, 1869. From the Conference.

Alumni Association of the Philadelphia College of Pharmacy, Annual Report, 1886.
From the Association.

University of Wisconsin, Contributions from the Department of Pharmacy, No. 2, 1886.
From the University.

The Committee recommended the purchase of the undermentioned works :—

For the Library in London—

Winkler (C.), Handbook of Technical Gas Analysis.
Wanklyn (J. A.), Gas-Engineer's Chemical Manual.
Reynolds (J. E.), Experimental Chemistry.
Waring) E. J.), Bazaar Medicines, 4th ed.
McAlpine (D.), Life Histories of Plants.
Bagnall (J. E.), Handbook of Mosses, 2nd ed., 1886.
Allan (J. H.), Materia Medica Tables and Notes on Dispensing, 1886.
Brunton (T. L.), Disorders of Digestion, 1886.
Wilson (G.), Handbook of Hygiene, 6th ed., 1886.
Klein (E.), Micro-Organisms and Disease, 3rd ed., 1886.
Fothergill (J. M.), Food for the Invalid, 2nd ed., 1884.
Griffiths (W. H.), Lessons on Prescriptions and the Art of Prescribing, new ed., 1885.
Owen (I.), Materia Medica, 2nd ed., 1886.
De Verteuil (L. A. A.), Trinidad, 2nd ed., 1884.
Aublet (F.), Plantes de la Guiane Françoise, 1775.
Stewart (B.), Elementary Physics, new ed.
Roscoe (H. E.), Elementary Chemistry, new ed.
Roberts (W.), Food Accessories.

For the Library in Edinburgh—

Roscoe (H. E), Elementary Chemistry, new ed.
Stewart (B.), Elementary Physics, new ed.
Edinburgh University Calendar.

The following books were reported to be missing from the London Library at the annual revision :—

Art of Dispensing, The, 1885.
Attfield, Water and Water Supplies, 1884.
Bentley, Student's Guide to Structural Botany, 1883.
Martindale and Westcott, Extra Pharmacopœia, 2nd ed., 1884.
Remsen, Principles of Theoretical Chemistry, 2nd ed., 1884.

The Librarian also presented his Report on the Annual Meeting of the Library Association held in September.

Museum.

The Curator's report had been received, and included the following particulars :—

Attendance during July.	Total.	Highest.	Lowest.	Average.
Morning .	431	35	1	15
Evening .	74	9	1	3

The attendance during August had been 46, and during September 169.

The following donations had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors :—

Specimens of a new form of *Ægle Marmelos.*
From Mr. T. D. Phillips.

Two specimens of the fresh fruit of *Ægle Marmelos.*
From Messrs. Corbyn, Stacey and Co.

Specimen of Nicotine.
From Messrs. T. Christy and Co.

Specimens of three varieties of Aloes Wood, and a large package of African Ammoniacum.
From the Director, Royal Gardens, Kew.

Specimens of the fixed and volatile oils of *Daphnidium Cubeba.*
From Messrs. Wright, Layman and Umney.

Specimen of Sulphur deposited from thermal baths.
From Dr. Leon Soubeiran.

Microscopic slide of the Tubercle Bacillus.
From Mr. J. F. Burnett.

Crystals of Sodium Chlorate and Ferrocyanate, and Sulphomolybdate of Ammonium.
From Messrs. Hopkin and Williams.

Specimens of several commercial varieties of Gum Arabic. From Messrs. Hale and Son.

Specimen of *Tephrosia toxicaria* collected in Hawaii.
From Dr. G. Parker.

Fine specimen of the bark of *Andira inermis.*
From Messrs. Hearon, Squire and Francis.

Specimen of Spurious Beeswax.
From Messrs. Symes and Hallawell.

Specimens of Menthol, Oil of Peppermint, and the Japanese Peppermint Plant.
From Messrs. Cocking and Co., Japan.

Specimen of Cotton-seed Cake.
From Professor Attfield.

Specimen of the essential oils of *Eucalyptus Baileyana, E. dealbata, E. hæmastoma, E. Planchoniana,* and *Melaleuca Leucadendron,* var. *lancifolium.*
From the Executive Commi-sioners, Queensland.

Specimen of chemically pure Sulphate of Quinine.
From Dr. J. E. de Vry.

Specimen of Adulterated Cubebs.
From Messrs. Harker, Stagg and Moss.

The Secretary had reported that four framed photographs of the College of Pharmacy, Melbourne, had been presented by Mr. Bowen, President of the Pharmaceutical

Society of Australasia, on behalf of that Society, and it was recommended that a letter of thanks for the gift be sent.

It was also recommended that the special number of the Journal to be issued on February 26, 1887, containing a list of subscribers, etc., to the Benevolent Fund, be sent to every one on the Register of Chemists and Druggists.

The system of appointment of Local Secretaries and Superintendents of Written Examinations had been discussed, and the further consideration adjourned.

The PRESIDENT, in moving the adoption of the report, drew attention to the photographs of the School of Pharmacy in Melbourne, presented by Mr. Bowen, President of the Pharmaceutical Society of Australasia. It was very gratifying to find that their friends in Australia were able to persuade the Government to provide them with such a handsome structure. He also referred to the books missing from the Library, some of which he hoped might be recovered.

Mr. WILLIAMS thought there was an omission in the report, or rather on the part of the Committee, with regard to the examination and preparation of plans for the new buildings, which he understood had been referred to this Committee by the Council some time ago. He had not been present at all the meetings, but he did not remember that this most important duty had been attended to.

The PRESIDENT read an extract from the minutes of July 14, when a sketch plan was submitted, and the recommendation of the Committee that a Sub-Committee be empowered to take such steps as might be necessary to carry out this sketch plan was approved by the Council. That Sub-Committee had made a report, which would presently be read.

Mr. WILLIAMS thought a Sub-Committee had no power to report direct to the Council; it should report to the Committee first.

Mr. RICHARDSON expressed his surprise that plans had not been submitted to the Council.

The PRESIDENT said the sketch plans were submitted, passed round, and approved. This Sub-Committee had simply been elaborating and carrying out the details. The Sub-Committee had a meeting on October 21, the report of which would be presently read. He suggested that the present discussion should stand over until the report was brought forward.

Mr. WILLIAMS again objected that a Sub-Committee ought not to report directly to the Council.

The PRESIDENT said he had considered, after the former resolution of the Council, that the Sub-Committee was really constituted a special Committee.

After some further discussion on this point, the motion adopting the report and recommendations of the Committee was carried unanimously.

Mr. BOTTLE then suggested that before the report of the Sub-Committee was read it might be as well to pass a resolution appointing the Sub-Committee a special Committee, so as to avoid any possible technical irregularity.

In reply to an inquiry,

The SECRETARY read the names of the Sub-Committee, viz., the President, Vice-President, Treasurer, with Messrs. Allen, Butt, and Hills.

The PRESIDENT said they would be very glad of the assistance of any other member who would join the Sub-Committee.

Mr. BOTTLE moved:—

"That the Sub-Committee appointed by the Library, Museum, Laboratory and House Committee for building purposes be constituted a special Committee for the purpose of providing detailed plans of the proposed new buildings to present to the Council for its consideration."

The motion was seconded by Mr. SAVAGE, and unanimously agreed to.

The report was then read, stating that plans for the proposed new buildings in Pied Bull Yard and on the gardens at the backs of Nos. 15 and 16, Bloomsbury Square had been considered, and the architect reported that possession of these premises could be taken immediately.

The PRESIDENT moved that the report and recommendations be received and adopted. The Council went into committee whilst he gave more detailed information on the matter, and on resuming,

The motion was unanimously agreed to.

A resolution was also passed authorizing the seal of the Society to be affixed to an agreement which had been come to with Lord Northwick, authorizing openings to be made in the party wall, so as to afford a communication with the new premises.

GENERAL PURPOSES.

The report of this Committee included the usual letter from the Solicitor, stating the progress made with cases placed in his hands.

F. Shepperley, 70, Prescot Road, Liverpool,

had paid the penalties sued for and costs into court before the hearing.

The Society's Affairs in Scotland.

The memorial presented by the deputation from Scotland had been further considered, and the following recommendations with regard thereto had been agreed to:—

1. That with a view to define the significance, application, and use of the term North British Branch, it is desirable to place on record that the use of the term shall be understood to apply to the Board of Examiners in Scotland; to the Executive referred to in Clause 2; to persons appointed to hold any honorary office by the Council and acting in Scotland in its behalf; and to the House and all other property of the Society in Edinburgh.

2. In order to assist the Council in its management of the Branch an Executive of not more than twenty-one members shall be formed, to be called the Executive of the North British Branch of the Pharmaceutical Society of Great Britain.

3. The President and Vice-President of the Society and such members of Council as may be resident in Scotland shall be *ex-officio* members of the Executive. The others, to make up a number not exceeding twenty-one, shall be elected annually by the members and associates in business resident in Scotland. (Travelling expenses of members of the Executive living outside Edinburgh to be paid.)

4. The Executive shall elect a Chairman and Vice-Chairman from among their number, one of whom shall preside in the absence of the President or Vice-President of the Society.

5. The Chairman shall have charge of the funds voted for the use of the Branch.

6. It shall be the duty of the Executive to nominate persons for appointment as members of the Board of Examiners in Scotland.

7. The Executive shall report to the Council [*and forward vouchers for money expended*]* annually or more frequently if required so to do.

The Council went into Committee to consider some of the cases of alleged infringement of the law. This part of the Report having been discussed and agreed to,

The Council resumed, and the recommendations of the Committee with regard to the North British Branch were discussed.

The PRESIDENT said it would be remembered that the Council had decided some months ago that the position of the Society's affairs in Scotland, as then carried out, was unsatisfactory, and that it was desirable that after a certain time the use of the term North British Branch should be discontinued, and that a Committee to be called

* The words between brackets were inserted by the Council.

the Executive Committee in Scotland of the Pharmaceutical Society of Great Britain should be appointed to carry on the business in Scotland. With the view of carrying out that proposal certain propositions were made for the modification of one of the Bye-laws, and the members in Scotland objected to the general power involved in that amended Bye-law, which would have simply enacted that the Council might appoint for special purposes Committees consisting of other persons than members of the Council. The amended Bye-laws, as a whole, were not accepted by the Privy Council, and consequently that power had not been obtained. Their Scotch friends claimed that the Council had no power under the existing Bye-laws to appoint any such Committee as was then contemplated. Three months ago, on the report of the Law and Parliamentary Committee, it was decided that it was desirable to go on with the Bye-laws in so far as they related to obtaining the necessary powers for appointing non-councillors on Committees, and with that portion of the Bye-laws which had to do with honorary and corresponding members. In the memorial from Scotland strong expressions were made use of with regard to this subject, and the position ended very much as was stated in one passage of the memorial to this effect:—"For these reasons the Scottish members cannot agree to the proposed alteration in the Bye-laws asking general powers, and would not be contented with less than a specific Bye-law entrusting the management of the Society's affairs in Scotland to an Executive nominated and elected by members resident there, but subject to the approval of the Council." They all knew that what would satisfy their Scotch friends was practically impossible under the present Act. Such a Bye-law was outside the Charter and the Act of 1852, and would be struck out at once by the draughtsman at any Government office to which it was submitted. The Charter did not contemplate a society in Scotland, but the Act of 1852 did, and they knew by the Act of 1852 the obvious intention, as expressed in words of the Legislature—and, therefore, he presumed of the promoters of the Bill, including their Scotch friends, who were consulted with regard to it—was that there should be one Pharmaceutical Society for the United Kingdom, with two examining Boards, and that the Society should be controlled and governed by a Council elected by members resident either in Scotland or in England, and that for all practical purposes it should be the Pharmaceutical Society of Scotland as well as of England. That being so, the Council was driven by the action of the Scottish friends into the position of not being able to move on ordinary lines. It had endeavoured to get a special Bye-law such as was required, and they would not consent to it proceeding with a Bye-law for general powers. It then became a question what was the best way of dealing with the subject. The principle enunciated at the time the original recommendation of the special Committee was made, about eighteen months ago, was that there should be an Executive Committee in Scotland, and that principle he thought was thoroughly sound and indisputable. On the other hand, Scotch friends thought that, though the legitimate powers had or might have been rather exceeded, some consideration should be shown for what had been done. There was a great difficulty about this, and the difficulty that presented itself to his mind at first, and which had not been very much relieved by anything said since, was that the Scotch friends all along imagined that the Council was responsible for all that occurred, which it was not. The relation that had been growing up between them had been largely due to negligence on both sides. Reports had occasionally been allowed to slip into the Journal, and expressions allowed to be used, which implied that certain powers existed which did not technically exist. So far as he knew, the Scotch friends had not either by deputation, or in any way, exhibited any great regret at the fact that there had been difficulties. They were conscious, as appeared by the memorial, that there were difficulties, and suggested as a solution, that although it would be irregular to do certain things, yet if an Executive Committee were appointed under the conditions mentioned in the memorial, they would not object to the appointment. That could not be acceded to, for, as Mr. Symes had once put it, a proposition which would meet the views of the deputation would not make the position any more lawful or logical. The question which presented itself to the minds of the General Purposes Committee had been how the subject could be dealt with without obtaining further powers, and the proposition now brought forward was an attempt on the part of the Committee to deal with it in that way. It proposed to create a branch *de novo* of the Pharmaceutical Society, and to define what it was. That he thought showed at once a great desire on the part of the Committee to be as considerate as possible to the members and associates residing on the other side of the Tweed. He confessed it was altogether illogical for him to present such a recommendation; he knew the acuteness of his Scotch friends, who would say at once what a weak mortal he was; but, nevertheless, he was bound to say that he thought they ought to regard more or less old associations in Scotland. This view was pressed upon him by a good many of his colleagues, and as the result of their deliberations these propositions were submitted. The first one was the creation of a business branch. He knew he should be told that it was an illogical position, and that a branch ought to consist of members; but it seemed to him a branch might consist of anything they chose to make it. In a business transaction a branch was merely a place of business, and nothing more. He need not refer to the exact wording of the Report, which had been discussed at length. He admitted that it was difficult to be perfectly logical, and when dealing with men it was often almost impossible. If any excuse were required for the present purpose it must be looked at in the light of an attempt to reconcile with the Society, as a whole, a body partly outside, and give it certain powers which were strictly not provided for in the Charter and the Acts. This recommendation, therefore, proposed by resolution to give certain powers to a body in Scotland, called the Executive, and corresponded very much with the request of the deputation. That deputation asked for three things—for the word "branch" to be retained; that there should be an Executive, and that the Executive should nominate the Examiners; and so on. Those three things were substantially granted. Whether they were presented precisely in the way in which the deputation would expect, he could not say. It was proposed to allow the Scotch members and associates to elect once a year a body of men' the number of which might vary from year to year, but who in the present composition of the Council would consist of seventeen persons. These, with the President and Vice-President of the Society, and the two members of the Council resident in Scotland, who would be *ex officio* members, would make twenty-one in all. It was not proposed that these gentlemen should be appointed by the Council in the ordinary way that Committees were. This course was taken to obviate one of the difficulties in which the Council was placed. The request made by the deputation with regard to the details, the Committee had not seen its way to adopt. It was necessary to protect the interests of the Corporate body in every sense, and from that view and for other reasons it was essential that the President and Vice-President should be members of the Executive of the Branch, and it was quite impossible to have two Presidents and Vice-Presidents members of a body of that sort without leading to many of the evils which it was desired to avoid. It had required on his part a great effort to accept the notion of having a branch at all in Scotland; but having accepted that he hoped it was not to be supposed that he himself would consider any further move in that direc-

tion practicable. With regard to the title of the chief officer of the Executive, who should take the chair in the absence of the President or Vice-President, it was proposed that he should be Chairman, and, to increase his importance as far as possible, that he should have charge of the funds voted for the use of the Branch, and be made actual and direct superintendent of all local affairs, and be, if necessary, in communication with the Council on matters affecting the financial, as well as the general interests of the Branch. Of course it would be said that in an important city like Edinburgh there should be someone with a more highly-sounding title to represent the members in Scotland on certain occasions in their relations with scientific societies ; but the answer to that was that there were men in Edinburgh whose individuality alone was quite sufficient to make the position of Chairman of the Executive sufficiently important to merit the recognition of all the learned bodies in Edinburgh or elsewhere. The Council could not give the exact title which was required, but it could ask the Scotch members to make the position as important as they wished by their personal qualities. Taking the subject all round and having regard to the fact of their own desire to be associated with the Pharmaceutical Society and yet have a separate organization, he did appeal to his friends north of the Tweed to accept this report in the spirit in which it was made. He, therefore, moved that the report be received and adopted.

Mr. ROBBINS seconded the motion.

Mr. SCHACHT said he was afraid he was almost the only man who opposed this proposition, and therefore he rose at once to say a few words in opposition to it. He was aware that he stood in the unfortunate position of being in a hopeless minority, but at the same time it was his duty to point out as plainly and simply as possible the reasons which weighed with him. First of all he would remind the Council that a record stood on the report of its proceedings that it was agreed to accept the recommendation of a previous Committee, that the North British Branch should cease to exist. The proposition was now that the North British Branch should be re-established. This was absolutely in contradiction to the previous resolution arrived at, after mature and careful consideration, a year and a half ago. At that time it was thought that convenience and right required the Council to abrogate that title and discontinue its use. It appeared to him that the feeling of the Committee as now recorded was that that was a mistake ; but he contended that since that time no sufficient cause had been shown to produce that absolute contradiction. It seemed to him to be an incongruity to recommend the re-establishment of a North British Branch. Then when the resolution went on to define what the Branch should consist of, he found in the first place the strange abstract contradiction of a Branch being proposed to differ from the original thing from which it sprang. The Pharmaceutical Society of Great Britain consisted essentially of living persons and nothing else, but it was proposed that this Branch should consist of living persons and dead things. Then when one came to analyse what the living persons in this Branch should consist of, it was declared to be of three sets of individuals : a set of eight individuals, who constituted the examining body of Scotland ; a second body not yet constituted at all ; and a third body not yet constituted, but indicated in one case to be somebody to be elected in the future—twenty-one members, or seventeen to be elected for that body—and to consist of certain honorary officers to be appointed in the future. It was to consist also of the elements called the House and Property of the Society ; and these entities were to constitute the Branch. Until that Executive was collected together, the Branch was to consist of eight or nine members and some property. When these twenty-one gentlemen were constituted they were to form a portion of the body which the Committee was to govern. The Committee was to arrange and control the affairs of the Branch. These twenty-one persons to be added were to be called together by what authority ? It had been affirmed definitely and emphatically that the Council of the Pharmaceutical Society had no power to appoint a Committee outside its own body ; but it was here declared that it had the power to call upon somebody else to appoint such a Committee, which was an absolute contradiction in terms. If the Council had no power to appoint that Committee, it had no power to appoint three hundred members in Scotland to appoint such a Committee ; and yet this was the point upon which the Scotch members had been most emphatic in declaring before the Privy Council that there was no right to ask for a Bye-law founded on such a wrong interpretation of the Act of Parliament. Again, this seemed an additional incongruity to the whole arrangement. Once more, with regard to this Committee, the Council was not asked or required to approve of the men when appointed and elected. Those seventeen out of twenty-one were to be men it knew nothing whatever about, and it was declared that they would have the right of electing a Chairman. The Council also made that Chairman controller over the Executive, and into his hands was to be placed the money that should be parted with for the Society. He might be a person the Council had never seen or heard of, and yet to his hands were to be committed the keeping of the funds which were to be from time to time handed to the North British Branch for the purposes of the Society in Scotland. That was an absolute contradiction of every arrangement which the Society had thought right to make with regard to the management of its money in the past. These points showed the absolute hopelessness of anything like a consistent arrangement which should involve a compromise such as was supposed to be required in the present case. No compromise could be effectually carried out, since the Scotch gentlemen refused to help the Council to get a Committee legally appointed for the conduct of the affairs in the North. He threw the whole blame practically of that failure on the Scotch in opposing the modification of the Bye-laws. Of course he should expect to hear that position contested ; but nevertheless he held to his expressed opinion that it was mainly, if not exclusively, due to the opposition the Council had received, that there was an impossibility of effecting a proper compromise. He contended that the only alternative was to fall back on the existing condition of things ; that a Committee of the Council should manage the affairs in the North. He could see no other escape from the existing dilemma, unless the members of the Council were content to accept a position which he rather fancied their friends in the North, having felt somewhat sore, would be pleased to drive them into, namely, a position of utter ridicule.

Mr. SYMES said, as Mr. Schacht had pointed out, the recommendation of the Special Committee appointed to consider this matter was approved by the Council and considered to be right, and many even at the present time believed that that would have been the best possible course for the Society. But they were all aware that it did not give satisfaction to their friends in Scotland ; that it had not been received as a solution of the difficulty ; and being so he thought every member of the Council, as well as every member of the Society who took any interest in the work of the Society, would be very desirous to see this difficulty settled. Mr. Schacht did not propose anything new which would be a solution, and that was the great weakness in his argument. The first point he raised was that it was now proposed to do something different from what had been previously decided ; but it had happened in the history of the Society over and over again that a Special Committee had considered some matter and that its report had been received, but that eighteen

months or eighteen years afterwards the Council had reconsidered the matter and found some other solution of the difficulty. It was no slight to the Committee, therefore, that to-day something else was put forward. Again, they were told it was proposed to create a North British Branch. If that had to be done *de novo* without any anterior conditions, no doubt the recommendations would have been very different. But they could not meet there as sensible and intelligent men and altogether ignore the state of things which had existed for some thirty years, and a certain claim by usage had to be considered. It was with the full force of these facts before it that the Committee arrived at this conclusion. It was said the North British Branch would consist of a certain amount of dead matter as well as living matter; but he should not be prepared altogether to say that the Pharmaceutical Society consisted merely of its members; it consisted of the members, its professors, its examiners, of the buildings, its museums, and so on. To rob the Society of its museums, buildings and literature would be a very serious loss to the Society; and he saw nothing very inconsistent in the building which existed in Edinburgh being constituted an essential portion of the proposed Branch. The next objection was that the Council was appointing some one to handle the Society's funds who was not the Treasurer of the Society, and who was somewhat irresponsible; but that was hardly so. In the first place he would have to be a member of the Society, and no one was ever elected a member without inquiry into his respectability and position, and that was some guarantee. Every member of the Society, when elected, was approved by the Council, and that in itself was something for a man to be proud of; if not, it was their own fault at any rate. Not only so, but he must be one of seventeen persons elected by three hundred members in Scotland, and he must be the one man of seventeen elected by those seventeen persons. It seemed to him, therefore, that there would be a very good guarantee that this gentleman who was to be the Chairman would be a man of the highest integrity and position, and, as the President had said, that he would himself carry sufficient dignity, as Chairman of the Executive there, to represent the Branch of Scotland, or even the Society in England, if called upon to do so. Therefore, there was every guarantee that what was proposed was directed to the good and useful purpose to heal the wound which had existed, and to bind the Society together. If every man in the Society could be got to help forward the one purpose in view, namely, its elevation and progress, a little matter like that was really scarcely worth considering. United action was of the utmost importance whenever it was necessary to go forward for legislation, and in order to achieve that, and to carry Scotland as well as England with them, it was worth making some sacrifice of their views on small matters. This subject had been considered by the whole Council very thoroughly, and he was sure all desired as far as possible, consistently with legal powers, to meet the wishes of the friends in Scotland. He hoped they would accept this, because they must see that everything possible had been done to meet them. He hoped the motion would be accepted almost unanimously. He was sure Mr. Schacht was as desirous of a peaceable solution of the difficulty as any one, only he felt that he could scarcely sacrifice the principles which had guided him so far. Perhaps, however, by the time other members of the Council had added their persuasive eloquence Mr. Schacht would be able to see with them, and he should be very pleased if a resolution could be carried unanimously.

Mr. HAMPSON presumed Mr. Schacht was a great admirer of the British Constitution, but he believed that was about the most illogical thing which could possibly be conceived. The Council was about to establish a constitution, as far as it had power, to carry on the business in Scotland, and he did not mind appearing illogical if it could establish such a Branch on a friendly and permanent footing. He thought the Council owed an act of reparation to Scotland in that matter. It had allowed affairs to go on there in an irregular way; but circumstances having occurred which had compelled it to look into the question in a thoroughly business-like way, it was now called upon to effect a settlement in a satisfactory manner. He did not mind Mr. Schacht's challenge with regard to want of logic; very few people were thoroughly logical in their actions. But the Council was perfectly consistent; it desired to remove a difficulty which was in its path, and was taking the only possible course of peacefully and satisfactorily settling the question. The alternative Mr. Schacht offered was simply to do nothing—to maintain a state of, as it were, smouldering rebellion in Scotland, and he objected to anything of the sort. The Council wanted all the strength it could have in the future, and he heartily endorsed this recommendation as the best solution which could be adopted.

Mr. WOOLLEY wished to put on record the opinion he had expressed in the Committee that an important matter of this kind could not be settled in the short space of time that this had been before the Council. The members of Council were called upon to settle this question in a satisfactory manner, and yet they had not had twenty-four hours' notice of the proposal. He for one protested against any such step being taken, and on that ground he should decline to vote.

Mr. RICHARDSON rejoiced to find a scheme had been put forward which seemed to be acceptable to both parties. He had considerable sympathy with the friends north of the Tweed, and thought it was simply an act of justice that these regulations should be formulated for the future harmony of the whole Society. He did not think the Scotch friends were at all to blame for insisting on some recognition of their proper status as a branch of the parent Society. In these days of home rule it was far preferable to conciliate Scotch pharmacists than to drive them by coercion into a kind of opposition; and he sincerely hoped the present proposition would be acceptable to them and form the basis of close friendship for many years to come. Knowing what he did of Edinburgh he would have hoped that the Committee could have seen its way to giving the higher title of President and Vice-President to the heads of the Executive, because there was a good deal in titles, and that city was famous for its festivities, for its learning, and also for its social entertainments, and it would be adding a good deal to the dignity of the Society if the chairman could have been addressed as the President of the Branch; still, as the President had given way a great deal with regard to his previously-expressed opinions, he would not insist on that point further. He hoped this would be a stepping-stone to their all going forward as a strongly united brotherhood, so as to be able to insist on all their legitimate claims.

Mr. ATKINS said the Council was now at last within a measurable distance of the close of this long controversy. The question had arisen not of its seeking in any way. It had always been an understood fact at the Council Board that there were anomalies, to use no stronger phrase, with regard to the conduct of the business in Scotland; and he was very glad to repeat once more that no personal element had entered into this controversy. It was simply because a point of departure had arisen by the acquisition of property in Edinburgh that it became important for the President who happened at that time to be in the chair to undertake, in conjunction with his colleagues, the settlement of this question, which had always been known to exist. It had been admitted on the previous evening in the Committee, and he would admit it again, that so far as the logic of the position was concerned, Mr. Schacht's position was unassailable; but he wished also to add to what Mr. Hampson had said about the British Constitution being most illogical, the further idea that it was a constitution built up of compromise It was a

question of arriving at a *modus vivendi* between opposing interests. Mr. Schacht had made a strong point, that by adopting this scheme, the decision previously arrived at, that the term North British Branch should not be conceded, was reversed. It was not conceded previously, becausc no definition was then given, and the impression then existing as to what the Branch meant was one which could not be accepted. There was a definition now, which made all the difference. What did Mr. Schacht put forward as an alternative plan? Simply that Scotland should be governed from Bloomsbury Square.

Mr. SCHACHT: The Society's affairs in Scotland.

Mr. ATKINS said to take up such a position would be simply throwing down the tomahawk and continuing this most painful controversy. Mr. Schacht seemed entirely to forget the national sentiment (whether wise or unwise was another question) which existed and which had been fostered, perhaps unwisely, for thirty-five or forty years. If the Council were beginning *de novo*, it would be a different matter; but to attempt to insist on ruling that province of Great Britain, which was more than the west of England or the north of England, a country distinct in itself, from Bloomsbury Square, would be simply to invite a most acute controversy. The only other alternative would be to form other branches, but that again was diametrically opposed to Scottish sentiment. You might have a West of England Branch, and a North of England Branch, but such branches would never acquire the position, the authority, or the dignity which the Scottish Branch had, and which it still continued to maintain. With the restriction of the meaning of the term now proposed, he was very glad that it was found possible to retain the title, for the question of titles was of some importance, though he could not see his way to support Mr. Richardson's appeal that the titles of President and Vice-President should be retained. It would lead to endless confusion to have possible questions of some dual authority; and more than that, he hoped Scotch friends would now realize, as he believed they would in six months, that the whole of this controversy was over, and that the *entente cordiale* would be restored.

Mr. WILLIAMS said he intended to support the motion. He had taken rather a strong view of this subject, and had expressed his opinions pretty freely on previous occasions. The motion now proposed did not meet his views fully, and he was very sorry to have to give up the titles of President and Vice-President of the North British Branch. Perhaps a time would come when the Society might see its way to revive them, but he was prepared to bow to the decision of the Committee and to consider that the present would be the best compromise which could be made. Another point he felt quite strongly upon was that every member of the Society in Scotland who had a vote should consider himself a member of the North British Branch as well as a member of the Society, and he could not see, logically, how it could be otherwise. This, however, was not so essential as reviving the North British Branch, and he was very glad the Committee agreed to that name being retained. Mr. Schacht's observations were of a very abstract nature, and to carry them out logically would engender a great deal of ill-feeling and be mischievous to the Society. It would be much better to carry the motion at once, so that the North British Branch might be constituted and appoint its officers in time for the new year.

Mr. BORLAND, as a Scotchman, felt exceedingly pleased that the Council could at last see its way to the end of this long turmoil. It was about eighteen months since the question was first mooted, and the resolution was passed to abrogate the title of North British Branch. Since that time three deputations had visited the Council, and each and every one urged strongly the retention of the title. Such being the case, he did not think the Council was lowering its position, or acting in any way illogically by now granting this title, which had been so earnestly contended for, and he was very pleased to find that the Scotch Branch would now be placed in what he would call a more logical and more legal position than it had ever occupied during the forty years of its assumed existence as a Branch. That of itself would go very far to heal the breach which had existed for some time. The representatives of pharmacy in Scotland were not asking for concessions, and the Council in England was not asking for concessions from the Scotch representatives. It was simply placing Scotchmen in a legalized position, which they on their part were accepting, and he felt quite satisfied that when this went forth to Scotch pharmacists it would give great satisfaction. The only point on which a difference of opinion might exist was with regard to titles; but when the thing had gone so far as it had, he believed they would not insist on that further, and indeed at a recent meeting in Edinburgh it did not appear to be a unanimous desire on the part of the whole of the members that the title of President should be retained. Some were quite lukewarm on the matter, provided the title of North British Branch were accorded. With regard to placing the funds of the Society in Scotland in the hands of the Chairman, he thought so far as business matters were concerned that might be considered as really an improvement on having two officials; the paid officials of the Society would be brought into more contact in all matters, monetary and otherwise, with the Chairman, if he were entrusted with the superintendence of the Executive.

Mr. BAILDON said he would not undertake the responsibility of moving any amendment upon this motion, though, with Mr. Williams, he should have preferred that in some respects it should have been different. But he was constrained to admit that in many respects this proposal had been a very agreeable surprise to him. In the main the substantial point which the deputation from Scotland sought had been accorded; the Scotch members had got a sort of autonomy which they thought desirable from their own point of view, and which he and others thought was desirable from the point of view of the Council. He thought the members of this executive body would be best qualified to conduct local affairs, and the Society would benefit as it had done in the past from the knowledge of the gentlemen who formed the body. He agreed in some respects with Mr. Schacht in that he did not altogether see the logic of the definition of the Branch; but it was something like an Act of Parliament where it defined in the preamble what the thing was to be. It was here defined once for all, and the thing would be in future what it was said to be. Formerly it was never defined, and he always held that there being no definition the natural conclusion was that the members formed the Branch. If the Council choose to define what was meant by the term Branch, that put a different complexion on it, and no one could make any mistake in the future. It might be an absurd definition, but still it was the definition. He did not think it was necessary to answer Mr. Schacht's arguments, because he did not think there was any prospect of the Council going back to the irreconcilable position which Mr. Schacht would reduce it to. His proposition, in short, was that Scotland should be governed from London by a Committee. There was an objection to that arrangement, which perhaps Mr. Schacht might not be aware of, namely, that in the present circumstances neither Mr. Borland or himself would act on such a Committee to rule Scotland in that way. They were now acting as a Committee for Scotland entirely as a temporary arrangement, but he would find that members coming from Scotland would not be inclined to assist in that method of dealing with Scotch affairs permanently. With regard to funds, he took it that large sums of money would not be lodged in the hands of the Chairman; certain liabilities would be incurred, and votes would be made to meet them, so that by the time the money reached the hands of the official it would be time for it to be

disbursed. Since the deputation waited on the Committee it had met three times, and he had endeavoured to state the case for Scotland to the best of his ability, and had always maintained, and was still of opinion, that in the main the Council in its opposition had been just to Scotch members, and he thought it might as well have been generous too, and if it had accorded the title as well as given the reality, it would have attained a height of moral magnanimity which was rarely reached. He should not propose an amendment on that point, as he was satisfied it would be useless, but he was very glad to think that in the main a satisfactory solution had been arrived at, and though it would not please everybody, he hoped it would please a sufficient number to form a permanent and agreeable settlement of the question.

Mr. BOTTLE said his conviction was that the Council had been generous to Scotland, and he should like to feel that it had been just, not only to Scotland, but to other members of the Society throughout the land; but when justice was referred to, he must confess he failed to see any justice in giving to Scotland that which was in excess of the privileges accorded to members in England. He supported this measure in its entirety with a desire to bring an end to the dispute, which had extended over eighteen months. If the Council were beginning *de novo* he should agree with Mr. Schacht; but he supported this proposition simply with the view of conceding to friends in Scotland that which they had so strong a sentimental predilection for, and with the desire to bring about some peaceful arrangement. The world was made up of compromises, and this was one of those compromises which he felt to be desirable. Of all men he could not understand Mr. Schacht opposing a settlement, because he noticed that there was on the paper a proposition from him with regard to going to Parliament with a new Bill. Now what chance was there of succeeding in any movement which might be made in that direction, unless they could show that the Society was a perfectly united body? This seemed to be the only way of securing the co-operation of its Scotch friends as it had been given in the past. So far as the title was concerned he rejoiced that it would be put on a definite footing, for within his own knowledge for some thirty years it had been an indefinite quantity. Now the Council was reducing it to an entity, and it would be known what the Branch meant. It was not proposed to delegate to Scotland powers the Council was not authorized to delegate. The Council would hold perfect control over the funds of the Society in accordance with the Charter. From time to time certain sums would be voted for the conduct of the business in Scotland, and gentlemen in Scotland would be delegated to spend the money in the same way as the officers of the Society, the Secretary, Curator or Librarian. If this scheme was acceptable to the Scotch members, as he hoped it would be, for it conceded three-fourths of that which they asked—everything, in fact, except the title of President and Vice-President—he hoped it would prove the conclusion of this unfortunate business.

Mr. ROBBINS supported the motion, because he thought it would clear away what had been an obstruction for a considerable time. On several occasions he had said he could not see why the name North British Branch should not be retained. It was formerly somewhat ambiguous, but now it would be perfectly clear, and if the Council had been agreed upon it before the dispute, it might have been concluded much earlier; it was better late than never, and yielding on the point had, he believed, done more to bring about a complete solution than anything else.

The VICE-PRESIDENT said he thought the members of the Council were all greatly indebted to the President for the ability he had shown in bringing this matter very nearly to a successful issue, and for the great concern and regard he had shown to the Scottish gentlemen; also for the wisdom with which he had arranged these recommendations so as to provide for the satisfaction of their desires as far as possible, at the same time maintaining a legal position.

Mr. SCHACHT asked how the President reconciled to himself the delegation of certain powers which the Council did not itself possess to anybody else. If the Council had not power to appoint a Committee, why should it allow some one else to do so?

The PRESIDENT said he should be quite ready to answer Mr. Schacht's inquiry, but it would ill become him to say anything which would undo what was already recorded, and if he were to enter into an argument on this point he might have to use language which in its construction might be misinterpreted. Therefore, he should prefer to reserve himself for a private battle with Mr. Schacht hereafter. He could assure Mr. Schacht that he felt deeply indebted to him that he had not made a personal attack upon him for inconsistency. He might very well have done so, but as he had not he should not like to say anything which would ruffle him. He could only suggest that the seventh recommendation should be amended by adding the words, "and forward vouchers for money expended."

Mr. BORLAND said it was quite apparent that Mr. Schacht had had no hand in drawing up this document, or he would have seen that the position now to be occupied by the Executive in Scotland was in entire accordance with the law. It was not a Committee at all, but a body of gentlemen who were to be called upon to assist the Council in the management of the affairs in Scotland.

The PRESIDENT said it would be a pity to have any further discussion on this point, and he hoped the motion would be passed, if not unanimously, at any rate *nem. con.*

The motion was then put and carried *nem. con.*

SPECIAL REPORTS OF THE BOARDS OF EXAMINERS.

England and Wales.

"The Board had under its consideration the following resolution of Council:—

"'That the Boards of Examiners be requested to consider the desirability of informing unsuccessful candidates for Examination, on application, of the position which they attained in such Examinations.'

"The Board after full consideration decided that in future unsuccessful candidates for Examination be informed of the cause of failure, and it was determined that this be done in the case of candidates for the Major and Minor Examinations by the Chairman of the Board, and that in the case of candidates for the Preliminary Examination the Registrar be instructed to include that information in his notice to the unsuccessful candidates."

Scotland.

"The Board of Examiners in Scotland has had under consideration the desirability of informing unsuccessful Candidates of the subjects in which they have failed to obtain the pass numbers.

"In connection with this it should be stated that it has long been the custom of this Board to give this information, at the discretion of the Chairman, to the Candidates in the technical Examinations. They think it desirable that this custom should not only be continued, but extended to the Preliminary Examination.

"This Board further considers that it is desirable that the Reports of the College of Preceptors on the Preliminary Examination, so far as they relate to Scotland, should be submitted to them, and they respectfully request the Council to take steps that this may be done in future."

The PRESIDENT said he should propose to bring the last clause of the report of the examiners for Scotland before the General Purposes Committee for consideration as it was a little difficult to know what it meant.

Mr. SYMES said if he were in order he should like to move that the reports be received and adopted.

The PRESIDENT said it was not necessary to do so; if the Council differed from it a resolution would have been necessary. The resolution referring the paragraph in question to the Committee was then agreed to.

REPORT OF EXAMINATIONS.

October, 1886.

ENGLAND AND WALES.

	Candidates.		
	Examined.	Passed.	Failed.
Major (20th)	8	5	3
„ (27th)	8	5	3
	—16	—10	—6
Minor (20th)	26	12	14
„ (21st)	34	15	19
„ (22nd)	30	10	20
„ (27th)	23	11	12
„ (28th)	31	8	23
	—144	—56	—88
Modified (20th) . . .	1	0	1
	161	66	95

SCOTLAND.

	Candidates.		
	Examined.	Passed.	Failed.
Major (19th)	2	2	0
Minor (19th)	12	4	8
„ (20th)	13	6	7
„ (21st)	14	7	7
„ (22nd)	13	5	8
	—52	—22	—30
	54	24	30

Preliminary Examination.

	Candidates.		
	Examined.	Passed.	Failed.
(12th)	258	128	130

13 Certificates received in lieu of the Society's Examination :—

2 College of Preceptors.
1 Royal College of Physicians and Surgeons of Edinburgh.
8 University of Cambridge.
1 „ „ London.
1 „ „ Oxford.

PROPOSED LEGISLATION.

Mr. SCHACHT then moved the following resolution, of which he had given notice :—

"That the Law and Parliamentary Committee be requested to draft a Bill having for its object the amendment of the clauses in the Pharmacy Act which bear upon the Society's Examinations ; the amendments to be so framed as to admit the changes that have received the approval of the Council."

He said it was not at all necessary to make any lengthened argument in support of this motion. It seemed to him but the natural consequence of the Council's work, which in this direction had extended over a period of something like four years, and perhaps it was hardly necessary to remind the Council of the stages of that labour. After a very long period, during which the subject of the improvement in the training of pharmacists was in the air, it came to a sort of crystallizing point at the moment when one of the professors issued a pamphlet calling attention to the deficiency then existing, as he considered, in the training of those who became candidates for the examinations, and indicating what appeared to him to be the right course to pursue. From that time the Council more or less undertook the matter with a view to a practical solution, and after a year, during which a large amount of labour was expended on the subject, a Committee formulated conclusions which were generally acceptable to the Council, and also obtained a large amount of endorsement from their constituents generally. All this work was concentrated in the word curriculum, and at length the Council came to a unanimous conclusion that it was desirable to adopt a curriculum. Though he was quite willing to admit that the precise details and the method of carrying it out received various treatment from different gentlemen, still they were unanimous in the conclusion that for the proper training of candidates for pharmacy something much more definite than had hitherto been realized should be constituted. When that decision was arrived at it was attempted to be carried into effect, first of all by the introduction of certain powers into a Bill which included a great number of other things which were thought desirable. From various reasons that Bill did not find favour in certain quarters, and was withdrawn. Then it occurred to some of them that by a modification of Bye-laws the object could be accomplished without further powers from Parliament. This was tried, but the Privy Council did not view the matter in the same light, and the result was that this labour of a long time at the present moment stood thus. The Council was thoroughly convinced that a certain course of training was highly desirable, but it had no power to carry out that view. It appeared to him the next step was to obtain this power. The only question seemed to be whether it was not desirable to obtain that power by Act of Parliament, and that that power should be obtained in the simplest form possible, and that it should stand by itself? The reason for this seemed to be in past experience, which was very easy of application. When the Council first attempted to get this power from Parliament, it was incorporated in a Bill which also referred to matters very much more open to discussion. In Parliament, where interests of various kinds meet and oppose each other, if one interest was opposed and touched in the least degree, the whole scheme was opposed rather than that should be carried ; hence, when the question touching the powers of Co-operative Societies or of any privileged section of the community was raised, it was natural that those who represented such interests should be the opponents of the whole Bill. But it occurred to him that if an attempt were made to pass a short Bill, having for its only object the modification of those clauses in the Act which bore upon the subject of the examinations and training of candidates for pharmacy, that would be likely to enlist the opposition of no one. Members of Council had all come to the conclusion that for pharmacists, and in the interests of the public this would be a great gain, and common sense would seem to indicate that no one outside their body could possibly find fault with the scheme, the only purpose of which was to make those who practised pharmacy a more highly qualified body. Hence there was no reason to suppose that any Parliamentary opposition would be aroused if the Bill were confined to this one subject. On the other hand, for this purpose the Council needed to depend on no particular body in the State, no section of the Government, no department ; it would only be necessary to find some parliamentary friend, which would not be difficult, who would introduce the subject either in the Upper or Lower House as a private bill, and if it were fortunate enough to pass one House of Parliament the assent of the other would, as far as he could judge, be easily obtained. This was the argument he drew from the past, but if it were necessary to enforce it from more recent expressions of opinion he might easily do so by reminding the Council of what had fallen lately from sundry representative men in pharmacy. He might quote especially the gentleman who was recently President of the Pharmaceutical Conference, whose address would doubtless be remembered, and whose opinion was entitled to the highest respect, and who insisted on the further develop-

ment of the higher training of the young people entering the business. All the argument, and it was a strong one, as put forward by him, went very much for the general previous culture of the pharmaceutical student, and he thought his excellent practical observations simply needed one enlargement, namely, the difficulty of instituting organizations for training so long as education was not required compulsorily. When once this was introduced the schemes for culture in various parts of the country would have some chance of success; but until that occurred it seemed to him the future would be just as the past, and they must be content to have failures as had been hitherto the case, not only in the older institutions, but in the most recent ones. Therefore, while remembering what had fallen from Mr. Greenish in that able address, he also remembered what was said by an eminent member from the north, a representative of one of these centres of education, that they were almost in despair whether they could keep their classes open for a second year. This was a matter of no great surprise to him, because he knew the experience to be gathered from many schools and institutions. Do what they could to promote the development of higher culture it would not succeed until that cultivation became a matter of necessity. The Council had gone so far in the matter that it seemed to him it would be stultifying the work of the last four years to stop short and not take the next step forward.

Mr. WOOLLEY seconded the motion.

Mr. HILLS supported the motion. Nothing had occurred since the unanimous expression of opinion on the part of the Council in favour of a scheme of training which would tend to alter the view of the majority, and if it was right then it was doubly right now, for every report which came from the Board of Examiners showed that something was very wrong in the system of training. It was a very happy coincidence that the Scotch business had been settled that day, for he gathered from those who represented Scotland that this settlement would be the means of bringing the Scotch and English members more in accord again. That was the only reason why he would suggest to Mr. Schacht any procrastination. It was very important that they should all be united. The Council had always been accustomed to look to their brethren north of the Tweed as pioneers in all matters of education, and he felt sure in this matter, if the scheme which had just been decided upon were carried out, their Scotch members would heartily join in any scheme which had this object in view.

Mr. ALLEN also supported the motion as a young member of the Society, and also of the Council, for he considered this was pre-eminently a young men's question. What would have become of them if the advanced section of the Council had not dealt with the educational question years ago? At the present time there was evidence that young men were thinking a great deal of this question, and nothing had convinced him more of the wisdom of this step than what had taken place at a recent meeting of the Chemists' Assistants' Association, at which it was his privilege to be present. There was then a discussion on education and examinations, and he must say he was almost astonished to hear such a complete accord of opinion on this question amongst the large body of young men there gathered together. On that account, if for no other, he felt bound to support the motion with all his power. At that meeting the trade question, which was so often mixed up with these matters, was entirely eliminated, and he hoped if a Bill were introduced with educational objects alone, there would be a possibility of getting it through both Houses of Parliament without much trouble. If once that was done, it would be a grand lever for raising the position of pharmacy; but the moment any other questions,—what were called trade questions,—were incorporated in such a Bill it became a failure.

Mr. HAMPSON said he cordially agreed with Mr. Schacht in his desire to establish a curriculum legally, but was disposed to think the Council might do a little more than simply go to Parliament with this bare request. There were other matters which would not give rise to controversy either amongst themselves, or probably on the part of anyone else. For instance, a time might arrive when any person who was examined would be, as the result of that examination, a member of the Society. It was no slight thing to go to Parliament to ask for legislation, and if something could be introduced into the Bill in the direction he proposed it would be an important addition. The Society was not increasing in strength, at any rate with regard to the pharmaceutical chemist element. This was an opportunity for securing something more than a curriculum, which should not be lost. Was it at all likely that Parliament would object to any alteration in the constitution of the Society whereby it would be strengthened and consolidated? Again, there was the question of the title. He thought the time was come when there ought to be only one title, and that that should be "Pharmaceutical Chemist." The confusion existing between "Members of the Pharmaceutical Society," "Pharmaceutical Chemist" and "Chemist and Druggist" was very bewildering to the public. He thought it would be worth waiting a little time if they could accomplish these desirable ends. He should be prepared to support the motion if Mr. Schacht could see his way to leaving to the Committee the question of introducing such matters as would not give rise to controversy.

Mr. WILLIAMS said he was very much astonished when he saw the notice of motion. Had they forgotten the way in which the last Bill was treated, and the slap in the face which they received about the Bye-laws? In his judgment it would be most dangerous to attempt to introduce any Bill into Parliament. He could see great improvements which could be made in the Pharmacy Act, and should be very glad to see them introduced and carried, but could it be supposed that Parliament, or rather the Government, would take up the matter and carry it through in the way desired? He knew perfectly well what the Bill would turn into, if it ever got so far as to be taken up seriously,—would be something very different to what they would wish, and something that they would be very sorry to see passed. It would be a very foolish thing, in his opinion, to stir up the Government in a matter like this, unless there was some more assurance than they had at psesent that it was likely to be received in the proper spirit, and that the Bill would not be used as a lever for introducing matter which would almost destroy all the good points in the Society. The Parliamentary Committee would be a mere cypher according to the wording of this resolution, as it would be simply tied up to what had already been done. He had always objected to some of the proposals which were agreed to on the former occasion, and it seemed to him the Committee would be bound not to consider those proposals in any way, but simply to frame a Bill to carry out the suggestions which were rejected by the Government officials on the previous occasion. He hoped the Committee would well consider the matter before passing the motion.

Mr. CROSS said when he read in the Journal, from time to time, the results of the examinations in London and Edinburgh, it always gave him a pang to see the number of students who presented themselves for examination, and the tremendous percentage who failed. It was not the students he pitied so much, but the examiners. To call men from their daily avocations to examine candidates so unfit to present themselves as the majority of those men were, was very unfair, and ought to command the sympathy of all their colleagues in business. He had taken some pains to find out how this result was brought about, and it seemed to him that the credit of the Society's examiners was not so great as it should be, where there was such a great percentage of failures. The outside

public would say where so many do fail, there is the possibility of a great many passing who ought not to pass at all. This all arose because there was no curriculum, no recognized standard of education. He had often conversed with assistants on this matter, and sometimes learnt that they had been up twice for examination but had not passed. They said they went up the first time to see what the examination was like, and the second time on the chance of getting through. If young men were brought into a business like pharmacy to undertake their life's work on such terms as that, it was a very serious state of affairs, which the Council ought to use its utmost endeavours to alter. He had all along sympathized with the curriculum, and, forward as he had always been in promulgating trade matters, he had always felt that as far as commercial advantage was concerned, pharmacy was bound to succeed when there was a sound educational basis on which to found it. He also largely agreed with the suggestions thrown out by Mr. Hampson. In the Universities when a man passed his examination and became B.A., he was a member of the University, and he should be glad if such a result could be brought about for the Pharmaceutical Society. It would show that it was not seeking to get an advantage for certain members of the profession, but was seeking to put all on one level, and this would do more to raise the status of chemists and druggists than anything else.

Mr. ATKINS so entirely agreed with the closely compacted argument of Mr. Schacht that he scarcely knew how in any sense to differ from the conclusions at which he had arrived, but he was bound to say he felt himself in a little difficulty in going to Parliament at present. The Council had already been unfortunate in that direction, and what reason was there to suppose it would be more fortunate now? Of course it would throw a good deal of what might be called lumber overboard, but the real question was what chance would there be in going to Parliament with another Bill? There were serious inconsistencies on the trade side of pharmacy which must sooner or later engage attention, and if the Council went with a strictly educational Bill, could it expect in a year or two to go successfully with another? It was true an educational Bill appealed to the best men amongst them, but if a plebiscite were taken on this question the feeling of the country would be found interested on the political or trade sides and he was not sure that there was such a consensus of opinion in favour of the proposal as would enable the Council to carry this Bill through Parliament. He was delighted to hear what Mr. Allen had referred to with regard to the discussion on Mr. Dymond's paper, but so far as public discussion on the curriculum had gone there had not been that unanimity of feeling outside what would be important to impel this Bill through Parliament. He should not vote against the motion, being so much in accord with it, but the question was whether it would not be better to wait a little longer. He doubted very much whether the Bill could be passed in the present confused state of the Legislature, especially as a private measure. The only chance would be to secure the authority and weight of the Government. He would much rather that the measure were launched with the authority and prestige and power of government than attempted as a private measure.

The VICE-PRESIDENT said he was perfectly in accord with Mr. Schacht in his desire to carry out this proposal for the improvement of pharmaceutical education. His own observation of the men who came up for examination during the limited period for which he had had the pleasure of attending the examinations showed him that their education was very inferior indeed. The introduction of a curriculum would be a very great boon indeed to the candidates who came up, as well as to the public at large, but he was not quite sure that this was the right time to move. He should certainly support the proposal, if not now, at some future time.

The PRESIDENT pointed out that no one had yet spoken to the point raised by Mr. Hampson, whether the Bill should be restricted to the points mentioned by Mr. Schacht.

Mr. HAMPSON said he forgot, when speaking, to express his opinion that this motion was premature at present. There would be a much better chance by waiting a little than by moving at the present moment. He should vote against the motion unless free scope were given to the Committee with regard to what should be included in the Bill.

Mr. HILLS asked if Mr. Hampson would say why he thought it premature.

Mr. HAMPSON said it was simply because at present the Council had not the Privy Council on its side. He understood that the Government Visitor, according to his written statements, was not in harmony with this proposal. The first step to take would be to convert the Privy Council, and then there would be a fair chance of carrying the measure. On the other hand he thought it would be desirable to wait a little time until members of Parliament and the Government might feel that they had really thought over the matter more deliberately.

Mr. ALLEN asked if it was not the fact that there were two Government Visitors to the Examinations, and that whilst one was lukewarm, or perhaps antagonistic, the other was in complete accord with the views of the Council.

Mr. BAILDON said he felt with Mr. Hampson in great measure, and he could not help thinking that to move at the present moment was somewhat premature. He felt himself some difficulty in making up his own mind on this matter, which had been in abeyance for some time. An allusion had been made to the feeling in Scotland, but he should not like to say what the general feeling was on the subject of a curriculum; perhaps Mr. Borland could say better. He could not help feeling that to take action immediately would look something like a sort of flank movement to get over the recent adverse decision by the Privy Council, which might excite opposition. It was a question of expediency whether the Council should move immediately, and take up only this one single point. If it got this through, and took up the trade question separately, the Council would have nothing more to say for itself, and there would be nothing but the naked trade question; but if it went with the education and trade questions together, the one would be a sort of make-weight for the other. Personally he thought it would be a good thing to have a curriculum, but there were other reasons why the percentage of failures in the examination were so great. The examination was really a very difficult one for young men to pass all at once. It was somewhat cramped and condensed into a very short space, and he had no doubt that many young men would come out much better if there were a more elaborate examination. In many examinations, the candidates were allowed to pass in certain subjects at one time, and the rest subsequently.

Mr. RADLEY thought if the subject were remitted to the Committee it should be as a whole question; to take into consideration the whole question as to time and matter, and report to the Committee.

The PRESIDENT remarked that the motion did not commit the Council to go to Parliament with a Bill—the question of time stood over. An important point was whether it should go to Parliament at all, and if so whether the Bill should be confined to the education question simply, about which there was general agreement, or whether other matters should be introduced in connection with it. If other matters were introduced it was obvious the motion must go as an open one to the Law and Parliamentary Committee.

Mr. BORLAND said during the time the question was before the Council and country generally, the Scotch members as a whole gave in their adhesion to the principle of advanced education. He quite agreed with what

had fallen from Mr. Hampson, that it was very desirable to incorporate with such a motion as this one a little more extensive in its nature. It would be a very good thing if the Council could introduce into it the proposal to have only one title, "Chemist and Druggist" or "Pharmaceutical Chemist"; by such a measure it would carry all the chemists and druggists, and all the young men aspiring to hold that position.

The PRESIDENT thought probably all members of the Council were in accord with the motion in point of principle; the whole question was one of expediency. All these little things which Mr. Schacht had disregarded were very important in their way, but, nevertheless, he thought he was right in confining his attention to one of them. Mr. Hampson thought there would be no opposition to a proposal that every one who passed the examination should become a member of the Society, but he probably did not remember what happened when the Act of 1868 was prepared. There was great difficulty then in preventing the Bill being wrecked, on account of the opposition of the examined men. They said, "You are going to allow all men who are in business on their own account, who have not passed any examination, to become members of the Society; and to go further and say (as the Bill was originally drafted) that in future every man who passes the Minor shall be eligible to become a member." It was then seriously proposed to have one uniform title, and it roused a great deal of opposition, and it was only by leaving something still to be done in order to become a pharmaceutical chemist, that the opposition was overcome. A meeting was held of those who objected to anyone becoming a member except those who passed the Major examination, and so strong was the feeling, that he felt compelled to move an amendment in the Council to that effect, and he carried the Council with him. Mr. Sandford, the President at the time, was left almost alone, but he protested that it would be better to be more liberal; and experience seemed to show that he was right. Mr. Sandford said it was better to have everyone within the fold; but on the other hand it was argued, Let us hold up something for men to work for, and it was hoped that when men were compelled to pass one examination a large number would go on and pass the other. Facts had shown that this was not the case. But now the difficulty was this: there was a much larger number of examined members of the Society. When the subject had been broached there had been a number of angry letters in the Journal about it, and he was sure that a great many of those he came in contact with would not accept a Bill of this sort without remonstrance. On the other point, of mixing up trade questions with the Bill, it would be found on reference to the correspondence with the Government on the last Bill, that there was a feeling on the part of the Department that legislation with regard to poisons should be in the hands of the Government, whilst pharmacy pure and simple and educational matters should be in the hands of the Society. Mr. Hampson's suggestion was the nearest approach to Mr. Schacht's which could be conceived, and he should like to see it carried; but it was a question of expediency. There were always difficulties in getting a Bill through Parliament. Mr. Schacht contemplated getting a private member to introduce the Bill, in the hope that if not opposed by the Government it would pass; but the great difficulty was, what would happen to any Bill, which was, as this must be, an amendment of the Pharmacy Act, 1868, when it went into Committee? If Mr. Schacht thought the Council was strong enough to prevent anything objectionable being tacked on to the Bill it would be all right, but it was sometimes exceedingly difficult to prevent additions in Committee. It would be within the power of any member, or of the Government, to tack on any subject to the original Bill, as an amendment. This was a strong argument in favour of limiting the scope of the Bill as much as possible, and he believed Mr. Schacht brought this forward, not merely because it was his special subject, but because he had come to the conclusion that it was a matter which could not be opposed on any legitimate grounds. He agreed with him that it could not on ordinary grounds, but there was the question of trade interests; if they did not include them, the trade who opposed the Society would oppose the Bill, and if they did, those who would be affected would oppose it. Another difficulty was that the department had over and over again told the Council that it was not prepared to recommend any further powers being given to the Society until what were called its statutory powers were completely fulfilled; namely, the prescribing of poison regulations. The words used by the former medical adviser of the Privy Council were always quoted by Mr. Peel whenever a deputation waited on that body. In his report for 1870, that officer said:—"I also regret to state that the very important power which the first section of the Act vests in the Pharmaceutical Society, of prescribing with the consent of the Privy Council regulations as to the keeping, dispensing and sale of poisons, has hitherto remained unexercised by the Society, and that consequently the public is still without the protection which such regulations might give and which notoriously is much needed." Next year he used much stronger language; and this was a difficulty which might have to be faced. Small as this educational proposal was from a public point of view the Council would be held to be asking for increased powers, and this objection would no doubt be again raised. Perhaps he felt it more keenly from having had it dinned into his ears time after time. If it could be got over there would be some hope of getting along, and he did not think there would be any serious opposition on the part of the Privy Council to the educational part *per se*. Speaking generally, Dr. Greenhow was with them, but he would prefer a sort of precedent training for candidates in the shape of apprenticeship. The difference between Dr. Greenhow and the Council was more one of form than of substance, and in one of his reports he stated that it was unfortunate the Council had not such powers. The principle would be conceded that the tendency of the day was more and more in favour of regular technical training. It was not quite correct to say that the Bye-laws were rejected. They failed to pass because it was held by the law officer of the Privy Council that they exceeded the powers conferred by the Act of 1868. He hoped the Council would accept the motion, but unless it was agreed to with something like unanimity it would be better not to pass it at all.

Mr. HAMPSON said he should not propose an amendment, but should vote against the motion, as he considered it objectionable in its present form.

Mr. SCHACHT, in reply, said he was grateful for the general approval of his object which had been expressed, and for the suggestions which had been made, which he had considered to the best of his ability. With regard to the supposed breach of duty in not making poison regulations, to which the President had referred, he would not enter into the merits of the question; but he thought it rather unfortunate that the President, who he believed held the view that such regulations ought to have been made, should have been in office and had to attend at the Privy Council when this matter was brought up. If he had been in his place, and had had such an observation hurled at him on every occasion, he should have hurled it back again, and said that the Council had done all it could, and that if there was any breach of duty, it was the Act of Parliament which was in fault. The Council had framed regulations and adopted them as recommendations, so that it had done all it had power to do.

The PRESIDENT said that was exactly what he had said, but without avail.

Mr. SCHACHT thought Mr. Williams was in error in saying that the Council had received any rebuff at the hands of the Privy Council; that body simply declared

that what the Council asked for was beyond its powers' and for that reason it now wanted to modify the Act. As far as he knew there was no reason to expect any opposition with regard to an improvement in education, and that was why he was anxious that no other subject should be introduced, which would only invite opposition. The more subjects introduced, the more certainly there would be opposition. The President had shown how the very simple matter referred to by Mr. Hampson had excited a great deal of opposition in the Society, and he feared that even a small modification of the constitution to the extent of admitting registered Minor men to membership would be interpreted by officials as an attempt to consolidate the power of the Society, of which they might be jealous. At any rate, there would be a chance of the intentions being misrepresented and opposition being evoked. On the other hand, if the Council went simply with the object of improving pharmaceutical training, and could show palpably that this would be for the benefit of the public, there could be no imputation of wrong motives. The members of Council were quite agreed among themselves on this matter; they had recorded over and over again the principles on which they wished to frame new regulations; there could be no opposition from their own body, and he did not see how it could arise in any other quarter. Lastly, he would say that he could not see any better chance of success if action were postponed. Party strife was as likely to continue in the future as at present, and he thought the Council would be only doing justice to itself by following up its recent work without undue haste, but without unnecessary delay.

Mr. HAMPSON thought it would be better if the motion were withdrawn for the present.

Mr. GREENISH thought it a pity to press forward so important a matter at such a late hour, when members had left. It would be better to adjourn the debate.

The PRESIDENT did not see how that could be done after Mr. Schacht had replied.

Mr. WOOLLEY said it would be very little encouragement to those members who had remained.

Mr. SCHACHT said there were sixteen members still present.

The motion was then put and carried by ten votes to two.

THE NEXT EVENING MEETING.

The PRESIDENT stated that at the next evening meeting several specimens from the India and Colonial Exhibition would be described, and as the gentlemen representing the various countries could not be present on Wednesday, the 10th inst., he suggested that it should be left in his hands to determine whether or not the meeting should be postponed for a week. This was agreed to.

LOCAL SECRETARY.

It was resolved that Mr. William Henton Pullin be appointed Local Secretary for Leamington, in the place of Mr. Henry Davis, deceased.

The PRESIDENT remarked that Mr. Davis was one of the Founders of the Society, and had always been a most zealous officer, though he had not taken so prominent a part as some others at public meetings.

A letter was read from the Chemists' Assistants' Association, containing a copy of a resolution on the subject of examinations and education, passed by that Association.

The resolution was as follows :—

"That this meeting is of opinion that examination *en rapport* with a compulsory course of education is a trustworthy test of qualification."

An application from the Aberdeen and North of Scotland Society of Chemists and Druggists for a grant for educational purposes was referred to the Library, Museum and Laboratory Committee.

Proceedings of Societies in London.

BRITISH PHARMACEUTICAL CONFERENCE.

A meeting of the Executive Committee was held at 17, Bloomsbury Square, on Wednesday, October 27, at 4 p.m.

Present—Professor Attfield in the chair; Messrs. Carteighe, Davies, Gerrard, Plowman, Symons, and Dr. Thresh and Mr. Naylor (Hon. Gen. Secs.).

The minutes of the previous meeting were read and confirmed. Letters regretting inability to attend were read from the President (Mr. Atkins), Messrs. Dott, Groves, Maben and Stephenson.

Mr. Naylor informed the meeting that the paid officer of the Conference had accepted an engagement as dispenser on board a steamer for Australia, a circumstance which had forced upon him an abrupt termination of his duties as secretary.

Mr. Plowman, from professional knowledge, explained that the condition of the health of Mr. Princep was such as to render it in the last degree advisable that he should embrace the earliest opportunity of taking a sea voyage.

The appointment of a Secretary to the Conference was then considered. The Hon. Gen. Secs. announced that they had received four applications. The Chairman remarked that in selecting a new officer two courses were open to them: either to proceed on the lines on which Mr. Princep was appointed, or to return to the practice in vogue prior to 1880, and appoint an Assistant-Secretary. He believed now, as then, there were gentlemen who, in the interests of pharmacy, would be proud to serve in the capacity of Assistant-Secretary to the Conference, and who would regard the small salary they received not as remuneration but as an honorarium. It was intimated that two of the applicants had expressed their willingness to accept the post in harmony with these conditions.

A general discussion ensued, affirming this general principle; after which it was moved by Mr. Plowman, and seconded by Dr. Thresh, "That an Assistant-Secretary be appointed for one year at a salary of £40 per annum, that he be required to attend the Annual Meeting, and that his expenses at the Annual Meeting be allowed, the sum not to exceed £10.

It was proposed by Mr. Naylor, and seconded by Mr. Davies, "That Mr. W. H. Ince be appointed Assistant Secretary to the Conference on the terms agreed upon."

The resolutions were successively put and carried unanimously.

In answer to an inquiry from Mr. David Hooper, Secretary for Madras, relative to the subscription for membership of the Conference, it was decided that the amount of native coin remitted must be equivalent to 9*s.* 6*d.* in English money.

CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting of this Association was held at 103, Great Russell Street, October 27, Mr. H. H. Millhouse, President, in the chair.

The minutes of the previous meeting were read and a clause inserted to the effect that on the occasion of the voting on the amendment and resolution, during the discussion on pharmaceutical education and examination, several members present did not vote. The minutes were then confirmed. Several gentlemen were proposed for membership.

The Chairman next called upon Mr. Heward to read a paper on "Sheridan."

Mr. Heward, who was greeted with hearty cheers, then gave an outline of the parentage and education of Sheridan, followed by an account of his literary, theatrical and parliamentary career, interspersed with many anecdotes illustrative of his private character, and occasional extracts from the works and speeches of that celebrated man. The paper was listened to with marked interest.

A discussion followed, in which the Chairman and Messrs. Blackham and Strother took part. Mr. Heward having replied to points raised in discussion, a vote of thanks to him was proposed by Mr. Phillips, seconded by Mr. Botham and carried unanimously.

The Chairman having announced the next meeting, the proceedings terminated.

Provincial Transactions.

MANCHESTER PHARMACY STUDENTS' ASSOCIATION.

The first meeting of the third session of the above Association was held in the Pharmaceutical Laboratory, Owens College, on Thursday evening, October 28, Mr. William Elborne (President) in the chair.

The minutes of the previous meeting having been read and confirmed, the Chairman gave an extempore address introductory to the work of the session. He first congratulated the meeting upon the very good attendance that evening, and reminded those present that the primary objects of the Association were to encourage study and original work in pharmacy and all subjects connected therewith, and also to promote that friendly intercourse among its members which is so conducive to its welfare and to the furtherance of its objects. As he scanned the recently printed new list of the officers of the Association, he could not help but notice with regret the absence of three or four names of gentlemen who had done so much for the Association in the past, but who now had been removed from them into other spheres of life—he alluded to those of Professor Jackson, of Melbourne College of Pharmacy (their former much respected President), and Messrs. Bird, Griffiths, and Kirkby; he, however, hoped that in the future the same interest in the Association would be taken, and he was very pleased to state that there was every prospect of another very successful session. Alluding to the lamentable deficiency in the spirit of enterprise and the general apathy shown by the majority of students of pharmacy in matters truly pertaining to their calling, he urged upon the members each individually to take up some matter for investigation, which, if not original, would probably tend towards a better knowledge of subjects they were already considered to be familiar with. The Chairman then said that during the past two months he had spent some time at the Indian and Colonial Exhibition, where, by the kindness of the Executive Commissioners, he had been presented on behalf of the Owens College Materia Museum with a large collection of interesting drugs and raw products, all of which, by permission of the Professor of Materia Medica (Dr. Leech), were on view that evening for inspection by the members of the Association.

The Chairman then, in the capacity of Reporter on Materia Medica, gave an extempore lecture on "Strophanthus," and exhibited specimens of fruits, seeds and root of the plant, presented to the Museum by Mr. Thomas Christy, of London. Mr. Elborne hopes to publish his results of an examination of the seeds when his experiments are completed. Dr. Leech, he believed, was also engaged upon the pharmacological action of the various parts of the plant other than the seeds.

Next followed a Report on Pharmacy, by Mr. J. C. Husband, F.C.S. In submitting it he said that there were only a few special points which had become prominent in pharmacy since the termination of the last session of this Association, some of those being in connection with the British Pharmacopœia, 1885, and others outside of that work. One of these was with regard to the official strength of opium. There seemed to be a general agreement that this was decidedly too low, that a percentage of 14 or 15 of morphine was nearer the mark; the action of the Pharmacopœia authorities tending to put a premium upon poor qualities as well as upon adulterations of the drug. Attention was drawn to a correspondence then going on about extract of opium, which made from good Turkey drug contained over 25 per cent. morphine, and the question was asked "What is to be done in this case?" In what way must it be diluted? Nux vomica presented an example of the peculiar policy of standardizing a drug in terms of total alkaloids when one of these only was supposed to be active; an extract containing the B.P. 15 per cent. might have 10 per cent. of brucine and 5 per cent. of strychnine, or *vice versâ*; the total alkaloids thus giving only an approximate value of the medicinal quality of the drug. After having mentioned two methods of administering the active principles of pomegranate root bark, which have been recently discussed in pharmaceutical papers, and the preparation of mercury oleate from the red instead of the yellow oxide, he said he could not resume his seat without drawing the attention of those present to a resolution adopted at the last British Pharmaceutical Conference respecting unofficial formulæ; it was a matter of interest to all pharmacists. He was in favour of a Committee being appointed for the purpose specified, though he thought that the General Medical Council was the body to which the duty of selecting should belong. With a few suggestions concerning suitable work for the session just commencing he concluded a thoroughly practical report.

The following gentlemen took part in the discussion which followed:—The Chairman, Mr. Duncan, Mr. W. Lane, Mr. W. S. Turner, Mr. Walter Gibbons and Mr. H. Wilson.

A Report on Botany was given by Mr. W. Spencer Turner.

Mr. W. Spencer Turner, in presenting his report on botany, said that it was not easy to give new facts on such a subject. Investigations were continually being made and their results made public, but time was required to make them useful. He mentioned progress made in the examination of the tissues of plants, and showed some doubly stained sections of bracken, palm, petiole, lime, etc., in which the different tissues were stained red and blue respectively. He then referred to the two bryonys, which have lately been discussed in the *Manchester City News*, saying that *Bryonia dioica* (Cucurbitaceæ), or true bryony, has all the characters of its order, while *Tamus communis* has cordate shining leaves reticulately veined, no tendrils, and the flowers with a six-parted perianth. He showed a specimen of *Tamus* and figures of both, pointing out that its reticulate-veined leaves classed it with the Dictyogenæ, and that it and bryony are each the only representatives of their respective orders natives of England. He showed a specimen of sea buckthorn, *Hippophaë rhamnoides*, which is very abundant on the sand banks of the Lincolnshire coast, having been planted to bind the sand together, fulfilling the same purpose as the better-known *Carex arenaria*, and still commoner sea reed, *Ammophila*. In mentioning the waterweed, so common in ditches and rivers in the east of England, Mr. Turner noted its scientific name *Anacharsis* and the punning name bestowed on it by its admirers of *Babingtonia damnosa*.

In the discussion, which was abruptly curtailed owing to the lateness of the hour, Mr. Elborne remarked that the popular name of white bryony root was mandrake (the true mandrake being properly confined to *Mandragora officinalis*), which was held in superstitious value in by-gone times; the rhizome of *Podophyllum peltatum* was also termed mandrake in America.

Mr. Lane said that *Tamus communis* was found in hedgerows at Sale.

The lateness of the hour prevented Mr. A. W. Duncan, F.C.S., giving his Report on Chemistry. This was postponed till the next meeting.

The meeting then terminated.

Parliamentary and Law Proceedings.

Prosecution for the Sale of Defective Lime Water.

On Tuesday, November 2, at the Nottingham Borough Police Court (before Alderman Goldschmidt and Mr. Starey), John Whitworth, chemist and druggist, was summoned for having sold to Edward Burns, on October 6, a pint of lime water not of the nature, substance, and quality required.

Mr. F. B. Harris (from the Town Clerk's office) appeared for the prosecution, and defendant pleaded guilty.

Mr. Harris stated that the case was a curious one. Defendant did not derive any advantage by selling the lime water deficient in strength. The lime water had been analysed and found to contain $2\frac{3}{6}$ grains of lime to the pint instead of 5 grains, and that took away the quality of the liquid as a medicine.

Defendant said that as soon as he found the lime water was deficient he analysed it and found that the lime had been absorbed by the carbonic acid from the atmosphere.

The Magistrates inflicted a penalty of £5, remarking that defendant was liable to a penalty of £20.—*Nottingham Evening News.*

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

The Unofficial Formulary Committee.

Sir,—A "Conspiracy of Silence" has at some time and in relation to some subjects been severely reprehended, and one is disposed to think that the motives of a part of your recent correspodents on the Non-official Formulary quesmust have been to break the silence and to "draw" members of the Committee.

If a feeling of vague apprehension is exhibited by these writers, this may only illustrate the truism "*omne ignotum pro terribile.*" I beg to say to all concerned that this letter is as non-official as is the designation of our Committee, and that any self-formulated limitation of its instructions must not be expected from that body. It is, however, safe to say that members of the Committee will preserve an open mind towards opinions and information offered by their professional brethren.

Discussion of ethical principles when practical issues await their solution cannot fail to be of benefit, but I doubt whether the proprietors of nostrums will find their claims to exclusive and everlasting possession to be quite so sacred in the eyes of the body at large as they may appear to themselves. Probably they all adopt for their own use, at some time or other, processes which someone else "invented" a few years earlier. Certainly when "introducers" of the higher class come into collision the result is exhibited in heated words showered on the "imitator" and disastrous to the faith of the outsider. Inventors in other directions than physic are rewarded by the State with a patent right, but the period for which this is granted is a limited one, and the necessary proof of originality to defend it would put a severe strain upon some of our well-advertised remedies. Will those who hold a brief for the nostrum mongers tell us with how short a "close time" they will be satisfied?

The physician might, doubtless, keep to himself the results of his experience of the action of drugs, handing them down to his son, as a secret too valuable to leave, even as a legacy, to the outer world. But more beneficent ethics control the actions of all the higher branches of the medical profession, and I believe they should extend to the calling of pharmacy. I am well aware of the instances in which some of our ablest men, whether guided by sagacious advice from advanced physicians, or otherwise, have contributed to medicine new preparations that will confer lasting reputation on their inventors and which have already brought them well-earned pecuniary reward. But, I am equally conscious of a flood of well-advertised nostrums, that are unwholesome excrescences on the materia medica. No one desires to check enterprise and improvement in medicine, and in the race the steady-going "Formulary" is sure to be left behind by "Inventor." But the former represents collectively the individual rights of our body at large, and these are quite as essential to the general good as is protection for the inventor.

Perhaps my over-anxious friends may turn to the conclusion of this sermon, asking to what action it points. It may partially relieve them if I say that I believe imitation is not the special function of the Formulary Committee.

Leeds. Richard Reynolds.

Election of Annuitants.

Sir,—I see in a recent Journal that a "Subscriber" finds fault with the practice of canvassing for votes. I sincerely hope the gentleman who wrote this letter will never find himself in the unfortunate position of any one of the ten whose names are now before us, who are seeking our help at the next election.

I have (in conjunction with a brother member) been interesting myself on behalf of an old fellow townsman and brother tradesman, who after forty years' struggle in business finds himself now at the age of sixty-eight in the greatest distress, on the verge of pauperism; this old man has a sister nearly as old as himself living with him who has never been parted from her brother. This sister, like the old man, has never been married. Through old age and infirmity they are both quite unfitted for any employand, and are past work. I fail to see that I am acting improperly in soliciting the votes of subscribers under such circumstances. I think, as a rule that it is not the candidates themselves who spend the money on printing, but some friend who interests himself on the candidate's behalf. "Subscriber" should not forget if a candidate is not successful one year, he has to face twelve months' privation before he or she can apply again. This old man for whom I am pleading was unsuccessful last year and had it not been for the generosity of the Council of the Pharmaceutical Society in awarding him £10 during the year he must have become an inmate of our workhouse; this money is being doled out in sums of 5*s.* per week. I hope when "Subscriber" reads these lines he will modify his opinion as to the propriety of canvassing for votes.

Sheerness. David Prosser.

Education and Examination.

Sir,—The uncourteous treatment received at the hands of Mr. T. A. Ellwood and others by Mr. Blackham at the recent meeting of the Chemists' Assistants' Association may be set down as the provocation for this letter, which I hope you will permit to see the light in the *Pharmaceutical Journal.*

I think it time a voice (I wish it were a very strong voice) was raised against this dreadful cant of education; of its being valuable for itself and itself alone, and not for the purposes of examination and the acquirement of daily bread. At one time I subscribed to this thesis, but a few years' conduct of business for my own benefit has quite knocked that conceit out of me.

I have no doubt Mr. Blackham is well able to take care of himself without any assistance from me, but the irritability displayed in some quarters, and on many other occasions than this, towards any who venture to disagree with the axis on which the Pharmaceutical Council wags its tail, or the velocity of the same, is hurtful to the feelings of this heretic writer.

The Privy Council deserves our best thanks for rejecting the mad schemes of the Council, and it was nothing more than could be expected from a body of men gifted with common sense.

What is this compulsory education and examination for, I should be glad to know? For whose benefit is it intended? For those who have to obtain the means of existence by the distribution of drugs and chemicals for medicinal uses, or for the protection of the public generally? It fails ignominiously in both cases.

We have to show a knowledge more or less intimate of substances not poisonous, or at least not included in the

schedules, and these articles are passing with monstrous rapidity away from those who have taken pains and incurred expense in their study, to another class who know nothing of their characteristics and properties, and cannot even spell the names of the items correctly in their elaborate price lists.

Why, I should be glad to know, should not our compulsory education and examination be confined to poison and to poison alone? And then persons engaged as chemists and druggists would voluntarily study such other substances and methods of manufacture, as it would be to their pecuniary advantage to do.

On the other hand, let the dealer in bromide of potassium, chemical food, cod liver oil, spirits of nitre, etc., be dragged into the examination room, there to be tenderly asked a few straightforward questions about the articles he sells, and until such interview was satisfactory to the examining body, an injunction should issue.

Furthermore, I apprehend it should be illegal for a number of persons to conspire together to compass that which in the individual is a fracture of the law. Conspiracy in some form of evil-doing is supposed to be an aggravation of the original offence. Why should it not be so with the shareholders or proprietors of co-operative stores? These corporations are said to have no bodies to be kicked or souls to be saved. He who discovers this to to be a popular error will deserve well of his country.

Is the present system advantageous to the public? I should say, emphatically, no. Otherwise a generous public would appreciate our services, which it does not, or does not show it in the direction of granting sustenance to the rank and file of the trade.

In this neighbourhood last week a poor woman obtained from a heterodox shop a pennyworth of bitter apple, through ignorance took the whole, and was a candidate for a coroner's inquest in a few days. On credible authority, I have been informed it was not even labelled. The vendor was perfectly within his right in so selling, because there is nothing to prevent him by Act of Parliament.

The same thing, I admit, might have occurred at an orthodox establishment, all, save and except that most pharmacists would have labelled poison, and made some inquiries which would no doubt have been resented as impertinent.

The argument that entrance to our business should be made more difficult by those already engaged therein, and for their personal benefit, seems to me iniquitous. Instead of trying to keep off legitimate barndoers from the pharmaceutical dungheap, let us rather endeavour to purify it of the presence of carrion crows, the omnium gatherum vampire grocer and dealer and co-operative stores.

Our education causes us to have high stomachs. As an apprentice I was equally contented to retail 7 lbs. of soft soap or cart grease, or dispense a box of pills. As a pharmaceutical chemist, nausea set in violently at the mere thought of any dealings in the first two necessary commodities.

I fear the founders of the Pharmaceutical Society have much to answer for, more than they wotted of at the time of the incubation of the plot. Good, amiable, gentle souls that they were, they created a structure like Mrs. Gamp's bonnet-box, well fortified as to the cover but imperfectly armoured at the foundation. They wished to give "Professional character, influence and respectability to the whole body of pharmacists." I should like a census taken of this whole body, and see what the whole body would have to say of its success. That the highly developed organism, the West-end pharmacist, manured, watered, and fertilized by the sunshine and smiles of the medical panjandrums, would vote that it had succeeded I have no doubt. That the agricultural grub, the country chemist and druggist, would be so favourably unanimous, I have some doubt And who shall say that the functions of the latter and the duties he performs in obscurity are not as sweet smelling as those of that other higher order of creation before mentioned? And he has as good a right to exist, and as just a claim for help, when his needs have been pointed out to the old hen who sits at the corner of Bloomsbury Square. And if she is powerless to lend any real assistance, let her stay her irritating claws.

Also, why should the grub be called upon to exhibit as much learning as the London pundit, if when his customers consult London medical men they are directed to a London chemist's shop to have their medicines prepared, on the ground of extra proficiency on their parts, and extra stupidity and incompetence on the part of the poor country relative?

If the trade were to be made a profession, why was it not made so as to bear a general resemblance to other professional communities? Why was there no central governing autocratic bureau, which should have power to remonstrate with, and, if recalcitrant, to remove from the registers such Judas members as fill up grocer's shops with cheap and nasty physics, to the detriment of their professional brethren?

Powers for punishing wrong-doing are possessed by the College of Surgeons or Physicians for the medical man's comfort; infractions of recognized modes of procedure on the part of solicitors is visited with the punishment of "name struck off the rolls."

Wholesale vendors of drugs, etc., should also be subjected to the same rules of education and examination as retail vendors of drugs.

Briefly, my grievance against the Pharmaceutical Society and all its work is, that it plants hopes and aspirations in the breast of the young pharmacist, which are doomed to early destruction,—that the whole body, or even 10 per cent., can ever earn a livelihood by the professional department of the business I utterly disbelieve,—and that it has destroyed the old condition of affairs without substituting an improved new.

We are impinged upon now, and shall eventually be crowded out of existence by all sorts of traders; the medical men as a body will not abandon the dispensing of medicines, no matter what reasonable facilities are held out to them, but prefer rather the employment of an unqualified assistant. This I regret.

We are compelled to trespass on the proper dominions of the medical man. This I regret equally.

I have examined into the matter microscopically, and cannot see where or in what manner the Pharmaceutical Councils have assisted me, and others likewise, in the endeavour to honourably and professionally exist by the calling of pharmaceutical chemist.

71, *Bohemia Road, St. Leonards-on-Sea.*

JOHN FEAVER.

Errata.—On page 356, col. 1, line 29 from top, *for* "Carpenter, Joseph Montague," *read* "Carter, Joseph Montague." Also on p. 359, col. 1. (Chemists' Assistants' Association), *for* "Mr J. E. Lane handed round a specimen of strophanthus follicles" *read* "Mr. J. E. Saul handed round," etc.

Beta.—Your observation that the grains scraped from the "bullet tapioca" differed but little from those of tapioca agrees with what was said last week, that tapioca is an agglomerated product of cassava starch, since the same definition applies equally to "bullet tapioca." Sago starch grains are three times the size of cassava starch grains, but as the starch is met with in commerce, the rings in them are not very perceptible, because in the preparation of sago the grains undergo alteration through becoming massed together. A quarter inch objective will scarcely show the markings. Rub down the "bullet tapioca" on a glass slide with a little water, and when it shows no lumps, but only a little milkiness, put on a cover glass and the grains will be seen, a little agglomerated and altered by heat. For a drawing of cassava starch see an article by Mr. Greenish (*Pharm. Journ.*, [3], vii., 169).

P. H. Marsden.—(1) *Cynoglossum officinale.* (2) *Erodium cicutarium.* (3) *Pedicularis palustris.* (4) *Rhinanthus Crista-galli.* (5) *Equisetum sylvaticum.* (6) *Vicia sepium.* (7) *Centaurea nigra.* (8) *Prunella vulgaris.* (9) *Melilotus officinalis.* (10) *Ononis arvensis.* (11) *Senecio Jacobœa.* Please to limit the number of specimens to six in future.

Beta.—We have no definite knowledge as to the extent to which the claim is made.

Defence.—Unless your letter were authenticated with the name of the writer, we do not think the proposal contained in it would carry much weight.

S. Smith.—Opinions are not quite agreed as to the exact nature of the reaction. See a paper by Messrs. Acworth and Armstrong in the *Journal of the Chemical Society* (1877, ii., 54).

THE INFUSIONS OF THE BRITISH PHARMACOPŒIA.

BY R. A. CRIPPS.

During the revision of the British Pharmacopœia no class of preparations has been more changed than that of the infusions.

It will be seen from the following table, that of the total number of twenty-nine, no fewer than seventeen have been more or less altered, that of dulcamara has been omitted, and one new one (jaborandi) introduced. The alterations in compound infusion of orange and of quassia are of such a slight nature as to call for no special comment, but in the cases of the remaining fifteen the time of infusion has been reduced (in most cases to one-half), while several have been further modified by ordering the drug to be in powder of a specified degree of fineness. Slight alterations in the proportions have also been made in some cases, and infusion of cinchona is now to be prepared from red bark, with the addition of aromatic sulphuric acid.

Table I. (*Showing the alterations in the new Pharmacopœia*).

Name of Infusion.	Pharmacopœia of 1867.			Pharmacopœia of 1885.		
	Proportion of drug used.	Division of drug.	Time infused	Proportion of drug used.	Division of drug.	Time infused
Inf. aurantii compositum.	Orange peel ½ oz.; Lemon peel 120 grs.; Cloves 60 grs. — to 1 pt.	Cut small.; Cut small.; Bruised.	15 m	Orange peel ½ oz.; Lemon peel 112 grs.; Cloves 56 grs. — to 1 pt.	Cut small.; Cut small.; Bruised.	15 m
Inf. buchu . .	1 oz. to 1 pint.	Bruised.	1 h.	1 oz. to 1 pint.	Bruised.	½ h.
Inf. calumbæ .	1 oz. to 1 pint (cold).	Cut small.	1 h.	1 oz. to 1 pint (cold).	Cut small.	½ h.
Inf. cascarillæ.	2 ozs. to 1 pint.	Coarse powder.	1 h.	2 ozs. to 1 pint.	No. 20 powder.	½ h.
Inf. cinchonæ.	1 oz. yellow bark to 1 pint.	Coarse powder.	2 h.	1 oz. to 1 pint (contains 2 drs. aromatic sulphuric acid).	No. 40 powder.	1 h.
Inf. cuspariæ .	1 oz. to 1 pint (120° F.).	Coarse powder.	2 h.	1 oz. to 1 pint (120° F.).	No. 40 powder.	1 h.
Inf. digitalis .	60 grains to 1 pint.	Leaves dried.	1 h.	56 grs. to 1 pint.	Leaves dried	15 m
Inf. dulcamaræ	2 ozs. to 1 pint.	Bruised.	1 h.	Omitted.		
Inf. gentianæ compositum.	Gentian 120 grs.; Orange peel 120 grs.; Lemon peel ½ oz. — to 1 pt.	Sliced.; Cut small.; Cut small.	1 h.	Gentian 110 grs.; Orange peel 110 grs.; Lemon peel ½ oz. — to 1 pt.	Sliced.; Cut small.; Cut small.	½ h.
Inf. jaborandi.	Not in Pharmacopœia.			1 oz. to 1 pint.	Cut small.	½ h.
Inf. krameriæ.	1 oz. to 1 pint.	Bruised.	1 h.	1 oz. to 1 pint.	No. 40 powder.	½ h.
Inf. lini. . .	Linseed 320 grs.; Fresh liquorice 120 grs. — to 1 pt.	Whole.; Sliced.	4 h.	Linseed 300 grs.; Liquorice 100 grs. — to 1 pt.	Whole.; No. 20 powder.	2 h.
Inf. lupuli . .	1 oz. to 1 pint.	—	2 h.	1 oz. to 1 pint.	—	1 h.
Inf. quassiæ .	120 grs. to 1 pint (cold).	Chips.	½ h.	110 grs. to 1 pint.	Chips.	½ h.
Inf. rhei . .	½ oz. to 1 pint.	Thin slices.	1 h.	½ oz. to 1 pint.	Thin slices.	½ h.
Inf. senegæ. .	1 oz. to 1 pint.	Bruised.	1 h.	1 oz. to 1 pint.	No. 20 powder.	½ h.
Inf. sennæ . .	Senna 2 ozs.; Ginger 60 grs. — to 1 pint.	Leaves.; Sliced.	1 h.	Senna 2 ozs.; Ginger 56 grs. — to 1 pint.	Leaves.; Sliced.	½ h.
Inf. serpentariæ	½ oz. to 1 pint.	Bruised.	2 h.	½ oz. to 1 pint.	No. 20 powder.	½ h.
Inf. uvæ ursi .	1 oz. to 1 pint.	Bruised.	2 h.	1 oz. to 1 pint.	Bruised.	1 h.

The object of this paper is to determine the influence of these changes upon the resulting preparations. In this respect I have been to a certain extent anticipated by Mr. Barnes, who so long ago as November 2, 1870, read a paper at the evening meeting of the Pharmaceutical Society, in which he showed that the greater number of the infusions could be equally well prepared in much shorter time than was ordered by the Pharmacopœia of 1867. In that paper, however, Mr. Barnes dealt solely with the question of time, without reference to the fineness of powder, and other changes introduced into the new Pharmacopœia, and this only in respect to the amount of extractive obtained. I have therefore thought that it would be in some degree profitable to repeat his experiments, with the variations indicated, and at the same time to supplement them with further observations as to physical and chemical properties. The following are the directions in which this investigation was prosecuted.

1. *Odour.*
2. *Taste.*
3. *Colour.*—The darker of the two infusions was taken as the standard, and represented in the table by the number 100. A convenient quantity of this was added to 100 c.c. of distilled water in a Nessler glass, and the colour imitated by adding the second infusion to another 100 c.c. of water in a similar glass. From the quantity used the amount equivalent to 100 of the first was calculated.

In some cases the colour was also observed after rendering alkaline by ammonic or potassic hydrate; as, for instance, the infusion of rhubarb was made alkaline by ammonic hydrate, as a further indication of the approximate amount of chrysophanic acid (or similar body) present. This is indicated in the table by small figures below the larger ones.

4. *Solid Residue.*—A convenient quantity of each infusion was evaporated, and the residue dried until it ceased to lose weight.

5. *Tannin.*—In the cases of infusions of bearberry and krameria the tannin was estimated by Löwenthal's permanganate method; in the other instances the tannin being only of secondary importance, it was considered sufficient to examine colorimetrically by means of ferric chloride.

6. *Alkaloids.*—In the case of cinchona the amount of total alkaloids was determined by a modification of the official method of assaying fluid extract of cinchona.

Infusion of cusparia was examined by means of Mayer's reagent, 50 c.c. of infusion being used, and the amount of reagent required for complete precipitation noted.

The following table shows the results obtained:—

Table II. (*Showing the influence of the alterations in the new Pharmacopœia*).

Name of Infusion.	Odour.	Taste.	Colour.		Solid residue. Per cent.		Tannin.		Alkaloid.	
			1867.	1885.	1867.	1885.	1867.	1885.	1867.	1885.
Inf. buchu . .	Alike.	Alike.	100	100	1·148	0·984	Nearly alike by Fe_2Cl_6.			
Inf. calumbæ .	Alike.	Nearly alike.	100	125	0·530	0·425	—			
Inf. cascarillæ.	1885 much more aromatic.	1885 more bitter.	150	100	0·870	1·150	By Fe_2Cl_5. 136	100		
Inf. cinchonæ.	Masked by cinnamon in 1885 preparation.	1885 more bitter.	156 152	132 148	0·686	0·696	Nearly alike by Fe_2Cl_6, but No. 1 slightly weaker.		0·090 p. c.	0·093 p. c.
			116 116	100 100	0·726	0·770			0·102 p. c.	0·159 p. c.
Inf. cuspariæ .	1885 more aromatic.	Alike.	110 106	100 100	1·528	1·584	—		50 c.c. = 5·7 c.c. Mayer.	50 c.c. = 5·9 c.c. Mayer.
Inf. digitalis .	1885 stronger.	Alike.	100	104	0·278	0·253	—			
Inf. gentianæ compositum .	1885 stronger of lemon.	Alike.	100	115	1·236	1·094	—			
Inf. krameriæ.	Alike.	Alike.	125 120	100 100	0·738	0·896	0·399 p.c. By Fe_2Cl_6. 115	0·424 p.c. 100		
Inf. lini . .	1885 stronger of liquorice.	1885 sweeter.	180	100	0·664	0·850	—			
Inf. lupuli . .	1885 more aromatic.	Alike.	100	108	1·156	1·050	Nearly alike by Fe_2Cl_6.			
Inf. rhei . .	Alike.	Alike.	100 100	120 118	0·556	·0538	—			
Inf. senegæ .	1885 stronger.	1885 more acrid.	120	100	1 202	1·512	By Fe_2Cl_6. 120	100		
Inf. sennæ . .	1885 stronger of ginger.	Alike.	100 100	115 110	2·870	2·705	—			
Inf. serpentariæ	Nearly alike.	Nearly alike.	120	100	0·289	0·381	By Fe_2Cl_6. 120	100		
Inf. uvæ ursi .	Alike.	Alike.	100	100	2·022	2·078	0·561 p.c. By Fe_2Cl_6. 1885 was slightly stronger.	0·575 p.c.		

From the above table it will be seen that in those cases in which the time has been reduced, without any other modification, there has been, except in the case of bearberry, a decrease in the solid residue, in some instances a considerable one; there has however been no great difference in physical properties.

The infusions of digitalis and gentian show a diminution about equivalent to the decrease in the proportion of drugs ordered in the new formulæ.

The influence of the finer division of the drugs however, is to considerably increase the activity of the resulting preparations, some of these infusions calling for special remarks.

Cascarilla.—A coarse powder is ordered by the old Pharmacopœia; a sieve of eight meshes to the linear inch was employed as fairly representing a coarse powder. The infusion prepared according to the 1885 Pharmacopœia was fully one-third stronger than that of the 1867 edition.

Cinchona.—The great variation in the yellow and red barks rendered a strict comparison of the old and new infusions impossible; however, the influence of the other changes was observed, using the same sample of the bark in each case; four infusions were made.

No. 1. No. 8 powder, two hours, without acid (1867).
No. 2. No. 40 powder, two hours, without acid.
} Influence of powder.

No. 3. No. 40 powder, one hour, without acid.
No. 4. No. 40 powder, one hour, with acid.
} Influence of acid.

} Influence of time.

The effect of a finer powder is not nearly so marked as in most cases, showing an increase of only about 3 per cent. of the total alkaloids. When the infusion is made in one hour, *cæteris paribus*, the resulting preparation is distinctly stronger than that made in two hours; this anomaly is explained by the fact that the cinchotannates of the alkaloids are much less soluble in cold than in hot water, a larger amount is therefore deposited before straining.

The greatest difference is caused, however, by the acid, the infusion containing which is fully half as strong again (in alkaloids) as the strongest of the others.

In estimating the solid residue it was necessary to neutralize the sulphuric acid by soda, correcting the weight of residue for sulphate of sodium.

Krameria.—In this case the effect of the finer division of the root is very marked, but a No. 20 powder would have been more suitable on account of the great difficulty in obtaining rhatany in No. 40 powder, the operation of powdering an ounce occupying as long as the preparation of the infusion.

Linseed.—The great difference is due to the increased amount of liquorice.

During the discussion which followed the reading of Mr. Barnes's paper the question arose whether by re-dissolving the solid residue left after evaporation, a preparation at all representing the original infusion could be obtained. I find that in some cases the residue is not soluble in water, and in those cases in which it is dissolved, the resulting solution is by no means equivalent, in all its properties, to the infusion from which it was obtained ; the aroma, as might have been anticipated, is destroyed.

NEW TEST FOR TANNIC ACID.

BY J. E. SAUL.

A remarkably delicate test for sugar has recently been submitted to the Austrian kaiserliche Akademie der Wissenschaften. The reaction affords, I find, a good method of distinguishing gallic acid from tannin. The test may be applied as follows : Agitate about 0 01 gm. of the sample with 3 c.c. of H_2O ; add three drops of 20 per cent. alcoholic thymol-solution, and then 3 c.c. of strong H_2SO_4. Tannin under these conditions yields a turbid *rose-coloured* solution. Gallic acid, on the other hand, remains untinted ; or only develops the faintest possible pink coloration, visible more especially in the sulphuric acid layer at the bottom of the test-tube. This cannot, however, be mistaken for the deep rose tint produced with tannic acid.

The reaction is, no doubt, due to the fact that although gallotannic acid is not a glucoside, yet in commerce it always contains a variable proportion of combined grape sugar. It is probable, therefore, that *absolute* gallotannic acid—such as Hugo Schiff succeeded in regenerating from gallic acid—would not respond to this test; but the "*purissimum*" quality, manufactured by Mr. Merck, readily furnishes the characteristic coloration.

Pyrogallol, similarly treated, yields a dull violet solution.

NOTES ON THE WATER SUPPLY OF LONDON.

BY R. A. ROBINSON.

An inquiry on another matter has lately brought under my notice the water supply of the metropolis, and some of the facts and figures (derived from Sir F. Bolton's report and other sources) may be of interest to readers of the *Pharmaceutical Journal.*

Source of Supply.—London is supplied with water from the Thames, the Lea and springs in the valleys of those rivers, also from chalk wells in the north and south. The Thames and springs in its valley supply rather more than half; the Lea and its springs about one-third; and the wells about an eighth of the total amount. The West Middlesex, Grand Junction, Southwark and Vauxhall, Lambeth, Chelsea, and East London Companies take their supply from the Thames near Hampton, Molesey, and Sunbury, and when the river is in flood the intakes are closed to avoid taking in turbid water. The New River Company is supplied from the Lea, Chadwell Springs, and chalk springs, and the Kent Company from chalk wells.

Filtration.—The filtration of the water is through beds of sand, gravel, shells, etc., varying from five to eight feet in thickness and when the rate does not exceed five hundred and forty gallons per square yard of filter bed in twenty-four hours the filtration is effectual ; this limit is now always adhered to. All the companies give a constant supply in some parts of their district, but some to a much larger extent than others ; the Metropolis Water Act, 1871, provides power to compel the companies to give constant supply under certain conditions when the authorities may see fit to demand it, and in such cases proper fittings have to be adjusted to the houses, or the compulsory power is inoperative.

The vast importance of keeping cisterns clean and the waste pipes free from direct communication with drains is not yet sufficiently recognized and carried out, as a large number of houses are still supplied with cisterns of dangerous construction.

In Sir F. Bolton's report the serious attention of householders is asked to the following points :—

1. It is most desirable that all stop-valves should be fixed outside the premises of water tenants, because if they are inside, and during a severe frost a number of bursts occur on the lead communication pipes, all the houses in the street will be deprived of their supply during the time repairs are being done, while if the stop-valve is outside it will only be necessary to shut it down.

2. Regulation No. 14 of the Board of Trade Regulations, 1872 (given below), relative to waste pipes, if carried out properly, will prevent contamination of the water from the gases generated by sewage, which are extremely liable to flow back into the cisterns and become absorbed by the water unless the overflow pipe is brought outside the house and the end left exposed to the air, instead of being carried into the drain.

It is also recommended that the Regulations 13, 14 and 17, which are as follows, should be enforced :—

"(13.) Every cistern used in connection with the water supplied by the company shall be made and at all times maintained water-tight and be properly covered and placed in such a position that it may be inspected and cleaned. Every such existing cistern, if not already provided with an efficient 'ball tap,' and every such future cistern shall be provided with a sound and suitable 'ball tap' of the valve kind for the inlet of water."

"(14.) No overflow or waste pipe other than a 'warning pipe' shall be attached to any cistern supplied with water by the company, and every such overflow or waste pipe existing at the time when these regulations come into operation shall be removed or at the option of the consumer shall be converted into an efficient 'warning pipe' within two calendar months next after the company shall have given to the occupier, or left at the premises in which such cistern is situate, a notice in writing requiring such alteration to be made."

"(17.) No wooden receptacle without a proper metallic lining shall be hereafter brought into use for the storage of any water supplied by the company."

There are thirty-three Regulations, all of them important, but many go into great detail and deal with

the weight of lead to be used and the diameter of the pipes, etc.

Purity of Water.—So far as the purity of the water supplied to London is concerned, the result is satisfactory, considering the bulk of it is river water. For the month ending September 30, the water supplied by the seven chief companies was found to be clear, free from ammonia, hardness averaging about 14·2 degrees, and otherwise of good quality. It appears, therefore, that if the householders will take the necessary precautions to have the cisterns and pipes in good order, there is good ground for assuming that one of the first essentials to health, viz., a good supply of water, is within the reach of inhabitants of the metropolis, though, unfortunately, the poor, who need it most, are not so well able to secure an abundant supply. The average daily supply is upwards of 171,000,000 gallons at the present time, and a parliamentary return for 1883 gives the quantity per house at 186 gallons per day, which is smaller than in 1872, when it was 190 gallons per day, although the increase in water rentals has been enormous.

During August last, the average daily supply was about 230 gallons per house per day, and nearly half the houses had a constant supply.

We have not yet attained the standard of the old Romans, who allowed 300 gallons per day per head of the population, and in such a huge city as London, it is not very probable that we shall get within measurable distance of it.

Dr. Frankland is of opinion that a plentiful supply can be had from the deep wells in the Thames basin, and that the river water should be abandoned if possible. In his report it is stated "the improvement effected in the river water by filtration, revealed by the determinations of the relative numbers of micro-organic spores or germs present in a given volume of the raw and filtered water, is very striking. These determinations have been made by Dr. Percy Frankland during the past year, and the results show, that whilst the unfiltered Thames water exhibited, by gelatine cultivation, on an average 2219 germs per cubic centimetre, the filtered water contained only 38, which corresponds to a reduction of 98·3 per cent."

The following table gives the dividends paid in 1872 and 1882 by the Water Companies :—

	1872. Per cent. £	s.	d.	1882. Per cent. £	s.	d.
Chelsea	6	0	0	7	5	0
East London	6	0	0	7	10	0
Grand Junction	8	0	0	8	10	0
Kent	6	2	0	10	10	0
Lambeth	6	0	0	7	10	0
New River	7	8	9	11	18	8
Southwark	5	10	0	7	10	0
				8	10	0
West Middlesex	9	16	7	10	0	0

In 1872 the actual value of the share capital of the companies was nearly £8,000,000, and in 1880, £10,344,000 ; but the estimated value of the same capital was, in 1872, £12,330,000, and in 1882, £24,795,000.

Although the companies appear to give a fair supply, yet there are many reasons why such an important undertaking should not be left in the hands of private companies, and the question is one of the most prominent in connection with improved metropolitan government.

PHARMACY ACT, 1868.

RECTIFICATION OF THE REGISTERS OF PHARMACEUTICAL CHEMISTS AND CHEMISTS AND DRUGGISTS.

We are requested by the Registrar to publish the following list of persons whose names will be erased from the Registers unless they communicate with him on or before 30th December next.

Those marked (*) are Pharmaceutical Chemists.

Abbey, Joseph	37, Fishergate, Nottingham.
Abrams, Benjamin Robert	7, Princes Buildings, Coventry Street, London, W.
Acton, Walter	32, West Street, Kings Road, Brighton.
Adam, George	Kirkhill, Kinnethmont, Aberdeenshire.
Airey, George	24, Wallgate, Wigan, Lancs.
Alexander, John	Mid Street, Aberchirder, Banffshire
Allen, Frederick Charles	36, Digbeth, Walsall.
Alpass, Horace Seymour	11, Ivanhoe Road, Sefton Park, Liverpool.
Angus, William Simpson	Rhynie, Aberdeenshire.
Armfield, Samuel	Poynton, Cheshire.
*Ashmead, John Stubbings	46, All Saints Road, Westbourne Park, London, W.
Ashton, Alfred	51A, High Street, Camden Town, London, N.W.
Attwell, Arthur	387, Caledonian Road, London, N.
*Baissac, Eugène Jean Denis	Mauritius.
Baker, Harry	Pershore, Worcestershire.
Banks, Frederick Charles	7, Pelham Villas, Salisbury Road, Dalston, London, E.
Bateman, John	Wibsey, Yorks.
Beattie, John	85, Edgware Road, London, W.
Beaulah, William	Fort Anne Hotel, Douglas, Isle of Man.
Bell, Richard Edward	161, East Street, Walworth, London, S.E.
Bell, William	56, Jolliffe Street, Liverpool.
Bingham, William Hill	Alexandra Street, Southend.
Bishop, Thomas King	Clifton Road, Aston Manor, Birmingham.
Bisset, James	66, John Street, Aberdeen.
*Blackburn, Francis	2, Upper Woburn Place, Tavistock Square, London, W.C.
Blanchard, Thomas	Trowbridge, Wilts.
Blewett, Edward	1, Mall, Clifton, Bristol.
Bothamley, Valentine	Newark-on-Trent.
Boucher, William	Mill Street, Kidderminster.
Bradley, John	Roceliffe, Borough Bridge, Yorks.
Branson, Thomas	2, Harris Street, Leeds Road, Bowling, Bradford, Yorks.
Brasnett, Robert John	High Street, Erith, Kent.
Brignal, William Anthony	16, Lowhill, Liverpool.
Broadbent, James	East Bierley, Yorks.
Broadbent, Sidney	Church Street, Littleborough, Lancs.
Brough, Frank Thompson	Westminster Memorial, Shaftesbury.
Brown, Angus Sinclair	Doncaster.
Brown, Peter Stuart	Bathgate, N.B.
Brown, Robert	20, High Row, Darlington.
Brown, Robinson	222, High Street, Dudley.
Bruce, Alexander	Wealthiton of Keig, Aberdeenshire.
Bruce, Charles James	Wealthiton of Keig, Aberdeenshire.
Bryant, Richard William	Regent's Park Road, London, N.W.
Budgett, Arthur Edward Sydney	The Grove, Stratford, London, E.
Burch, William	21, Onslow Road, Southampton.
Burrows, Hampden Charles.	9, Russell Square, Leicester.
Cant, Hemington	Three Mills Lane, Bromley-by-Bow, London, E.
Carroll, George	107, Patrick Street, Cork.
Cassels, David Mallock	Wellgatehead, Lanark.
Chalmers, Thomas	117, Stirling Road, Glasgow.
Chapman, Thomas	87, Hendon Road, Sunderland.
Charles, Michael	1, Albert Street, Cloudesley Road, Islington, London, N.
Cheal, Harry Alexander	Otley House, Ipswich.
Childs, Charles John	264B, Oxford Street, London, W.
Clarance, Felix Robert	9, Blatchington Road, West Brighton.
Clarke, Thomas	24, Castle Street, Sheffield.
*Cleaver, Edward Lawrance	2, Russell Chambers, Bury Street, London, W.C.
Clode, Charles	81, Benwell Road, Drayton Park, Highbury, London, N.
Clutsom, Edward Tucker	1, Rozate Hill, Eastville, Bristol.
Cockerton, Walter	81, Maldon Road, Haverstock Hill, London, N.W.
Colley, Thomas	63, Eldon Street, Newcastle-on-Tyne
Colling, Herbert	34, West Street, Brighton.

Cook, Richard	Esplanade, Ealing, London, W.
Cook, William Herbert	Morriston, Swansea.
Cookson, George	25, Bagnall Street, Springfields, Wolverhampton.
Coster, Alfred Joseph	374, Old Kent Road, London, S.E.
Cottman, Frederick	15, Market Place, Olney, Bucks.
Cradock, Albany	23, Windsor Terrace, Southampton.
Cran, Alexander	Kildrummy Massat, Aberdeenshire.
Craven, Frederick	Batley Carr, Yorks.
Crompton, Jonathan Crowther	54, Northgate Street, Gloucester.
Cross, Charles Henry	93, Mulgrave Street, Princess Road, Liverpool.
Cross, Thomas	17, Carfin Street, Govanhill, Glasgow.
Cullwick, George Hamar Jones	53, Oughton Place, Birmingham.
Cummock, John	Templehill, Troon, N.B
Curnow, William Albert	89, Gordon Road, Peckham, London, S.E.
Darby, John Clark	57, Albion Road, Stoke Newington, London, N.
Davidson, George	107, St. Patrick Street, Cork.
Davies, Charles	12, Oxford Street, Leamington.
Davies, Edward	Market Place, Bishop's Castle, Salop.
Davies, Thomas William	Longhurst House, Villa Road, Brixton, London, S.W.
Davis, Robert Samuel	374, Old Kent Road, London, S.E.
Davison John	103, Sheffield Road, Barnsley.
Deane, Frederick Dawson	5, Townsend Lane, Anfield, Liverpool.
Deans, John Kerr	48, Houston Street, Glasgow.
De Witte, Henry Huskisson	New Brighton, Cheshire.
Dickson, George Steward	Bridgefoot, Warrington, Lancs.
Dixon, Frederic	39, Huntingdon Street, Kingsland Road, London, N.
Drysdale, Joseph	16, Dewar Place, Edinburgh.
Duffus, George	11, Union Place, Aberdeen.
Duncanson, Andrew	4, East Thomas Street Edinburgh.
Duncombe, John Lionel	20, Rue de la Chapelle, Trouville-sur-Mer, France.
*Dutchman, Walter	44, Seven Sisters Road, London, N.
Dyke, John Skinner Daniel	The Dispensary, Grace Street, Bromley, London, E.
Eastwood, Thomas Earnshaw	27, Stockport Road, Manchester.
Ebdell, Thomas	31, Vicar Lane, Leeds.
Edgar, Francis George Chappell	Godstone, Surrey.
Edisbury, Henry	84, Heyworth Street, Everton, Liverpool.
Edkins, John	6, Lorrimore Street, Walworth, London, S.E.
*Eggleton, Benjamin	Hockerill, Bishop Stortford, Herts.
Ellis Thomas	Sydney, New South Wales.
Ellison, John Clement	Clarence Road, Wood Green, London, N.
*Evans, Evan James	Hill Road, Clevedon.
Evans, Henry Williams	Westgate, Dewsbury.
Evans, Thomas	15, High Street, Denbigh.
Evinson, Thomas	Chesterfield.
Ewart, David	147, Kirkgate, Leith, N.B.
Farndale, George	14, Arcade, Briggate, Leeds.
*Ferneley, John William	Mitcham, Surrey.
Field, Thomas Goodwin	5, Winders Road, Battersea, London, S.W.
Flecknoe, Josiah	88, Far Gosford Street, Coventry.
Florance, John Draper	High Street, Lower Tooting, London, S.W.
Forbes, Robert	Carnoustie, Forfarshire.
Forge, John	Arlington Place, Gloucester Road, Birkdale Park, Southport, Lancs.
Foster, Richard	Clayton West, Yorks.
Foster, William	Clayton West, Yorks.
Fox, John	Great Wigston, Leicestershire.
Fraser, John	Fife Keith, Banffshire.
Freeland, Helen	13, Salisbury Terrace, Newington, Edinburgh.
Fry, Edwin Sargood	3, Adelphi Terrace, Grange Road, Ramsgate.
Fuller, Richard Thomas Cornelius	105, Graham Road, South Wimbledon, Surrey.
Gall, Andrew	26½, Skine Square, Aberdeen.
Gallimore, Reuben	Newbould Road, Chesterfield, Derbyshire.
Gare, John, Jun	1, Grand Parade, St. Leonards-on-Sea.
Garland, Henry	304, Walworth Road, London, S.E.
Gent, William Thomas	50, Presbury Road, Macclesfield.
Germain, Thomas	6, Mason Street, Preston, Lancs.
Giles, George Charles	York Road, Leeds.
Gill, Sutton Dudley	113, Every Street, Manchester.
Gillard, William	134, Mildmay Road, Stoke Newington, London, N.
Gleadow, Bernard Fearne	24, St. Mary Axe, London, E.C.
Glover, William	12, Elliot Street, Liverpool.
Godfrey, Frederick	Newton Abbot, Devon.
Gordon, John	205, Union Street, Aberdeen.
Goulstone, Llewellyn	1, Birkenhead Road, Seacombe, Cheshire.
Graves, John William	29, Edward Street, High Street, Deptford, London, S.E.
Gray, Richard	193, Queen's Road, Hatcham, London, S.E
Gray, William	51, Saud Hill, Newcastle-on-Tyne.
Grieves, Herbert	92, Ackerman Road, North Brixton, London, S.W.
Gwynne, David William	1, High Street, Cardiff.
Haddock, Job	Newton-le-Willows, Lancs.
Halfhide, Thomas Young	49, Abingdon Road, Kensington, London, W.
Hall, John Thomas	44, Lowhill, Liverpool.
Halley, Alexander	2, Cathedral Street, Glasgow.
Hammond, Benjamin	Spital Street, Guildford, Surrey.
Hanson, George Henry	62, Lambeth Road, London, S.E.
Harbutt, William	33, Skinner Street, Stockton-on-Tees.
Harding, Christmas	36, Stainsby Road, Poplar, London, E.
Harding, Robert	Wednesbury, Staffordshire.
Harmer, George Anthony	46A, Marsham Street, Maidstone.
Harper, Edward	Newtown, Montgomeryshire.
Harper, Walter	6, London Terrace, Richmond Road, Hackney, London, E.
Harrington, Richard Beau	Rayleigh, Essex.
Harrison, Thomas	Wheeler Gate, Nottingham.
Harrison, Thomas, Jun.	Wheeler Gate, Nottingham.
Hart, William James	730, Old Kent Road, London, S.E.
Hawkins, Thomas	New Prospect House, Southampton.
Hayward, Charles	Clareborough, near Retford, Notts.
Hayward, Charles William	Holbeach, Lincs.
Hazledine, Thomas	7, Regina Road, Tollington Park, London, N.
Heginbottom, Edward	249, Mill Street, Liverpool.
Hepburn, John	222, Albany Road, Camberwell, London, S.E.
Hill, Robert	42, Buxton Road, Huddersfield.
Hives, Tom Gamble	Syston, Leicestershire.
Hobson, John Francis	George Street, West Smethwick, Worcestershire.
Hodgson, James	Neston, Cheshire.
Hodgson, Jonathan	60, Gallowtree Gate, Leicester.
Hollings, Edmund	Winchcomb Street, Cheltenham.
Hollis, William	1, Albert Street, London Road, Stoke-upon-Trent.
Holman Henry	High Street, Hadley, Middlesex.
Holt, George Palmer	Bexley Heath, Kent.
Holt, Samuel	164, West Derby Road, Liverpool.
Hooson, Edward	18 Prospect Terrace, Jarrow-on-Tyne.
Hope, Christopher	Sedgefield, Durham.
Hopkinson, William Henry	Market Place, East Retford.
Hopps, John George	Alne, near Easingwold, Yorks.
Hornby, Alfred Thorold	Stockport, Cheshire.
Hornby, William Thomas	Hillgate, Stockport.
Hosie, James	Kincardine O'Neil, Aberdeenshire.
Howard, Samuel Bird	7, Head Street, Colchester.
Howorth, George Buxton	5, Queen Anne Street. Liverpool.
Hudson, Herbert	Holme-on-Spalding-Moor, Yorks.
Hudson, Robert Thackeray	192, Fulham Road. South Kensington, London; S.W.
Hudson, William	21, Hill Street, Hastings.
Hughes, William	Tyn-yr-Heol, Amlwch, Anglesey.
Huntley, Benjamin Ralph	10 Albion Terrace, Hartlepool.
Hutton, Edward	Duke Street, Darlington.
Iberson, John	18, Cheapside, Barnsley, Yorks.
Jackson, William	30, Ockenden Road, Essex Road, London, N.
James, James	21, Union Street, Dowlais, Glamorganshire.
*Jasper, Frederick William	24, Pall Mall. Sandhurst, Australia,
Jeffcoat, James	39, Eastgate Street.
Jepson, Hugh Henry	Wellington Street, Gorton, Lancs.
Jessop, Josiah Benjamin	45, Franchise Street, Blakenhall, Wolverhampton.
Johns, Thomas Joseph Rowett	8, Cumberland Street, Devonport.
Johnson, Arthur	78, Frederick Street, Rotherham.
Johnston, David	125, Crown Street, Aberdeen.
Jones, Hugh Ellis	75, Oxford Street, Swansea.
Jones, John Henry Sumption	Kings Road, Canton, Cardiff.
Jones, Llewellyn	Apothecaries Hall, Denbigh.
Jones, Owen	28, Lower Walsall Street, Wolverhampton.
Jones, Thomas	Aberavon Glamorganshire.
Jones, Thomas	Corwen Merionethshire.
Jordan, James Alfred	113, Every Street, Manchester.
Kendrick, John	215, New John Street West, Birmingham.
Kennedy, William	Hill Street, Glasgow.
Kerr, James	Mintlaw, Aberdeenshire.

Keys, Frederick	5, Elm Park Road, Chelsea, London, S.W.
Kington, John P.	59, West Street. Hull.
Kirk, Jane	405, Gallowgate Street, Glasgow.
Kirkus, John Richard	45, Witham, Hull.
Kitchen, William	30, Highgate, Kendal, Westmorcland.
Laing, Alexander Gordon	1, Warriston Place, Edinburgh
Lane, John William	69, Bridport Place, Hoxton, London, N.
*Langton, William	Bampton, Oxon
Law, Alfred	Maple Road, Penge, London, S.E.
Lawton, Adam	57, High Street, Princes End, Tipton, Staffordshire
Leake, Charles	72, Landells Road, Lordship Lane, Dulwich, London, S.E.
Lee, Thomas	Duke Street, Lower Broughton, Manchester.
Lees, William	167, Lord Street, Southport.
*Lewis, David	111, Oxford Street. Manchester.
Lidgett, Walter Fletcher	20, Albert Street, Brigg, Lincolnshire.
Light, John Henry	51, Castle Street, Bristol.
Lines, William Edward	Thornborough, Buckingham.
Livsey, Norman	Barnoldswick, Yorks.
Long, William	103, Coleshill Street, Birmingham.
*Lord, Thomas	Ashworth, near Rochdale.
Low, Joseph	7, Bell Place, Glenogle Road, Edinburgh.
Lowe, John	21, Broadway, Deptford, London, S.E.
Lynch, Edwin Bould	61, Brewery Street, Salford, Manchester.
Lynn, Crispus Thomas	195, Upper Whitecross Street, London, E.C.
MacDonald, Angus	Main Street, Coatbridge, Lanarkshire, N.B.
McDonald, James	Fraserburg, N.B.
McGregor, James	Inverden Towie, Aberdeenshire.
Machon, Robert	Millfield, Sunderland.
McNaught, Louis Arthur	6, Flint Street, Humberstone Road, Leicester.
Mann, Edwin	22, Granville Street, Alexandra Park, Manchester.
Marin, Ferdinand Baptist	8, Duchess Street, Portland Place, London, W.
*Marks, Benjamin	11, Grove Street Road, South Hackney, London, E-
Matchan, Robert	Bilton, Holderness, Hull.
Mather, Francis	46, Wade Lane, Leeds.
Matthew, James	Cumineston, Aberdeenshire.
Maude, Samuel Wesley	11, Amberley Terrace, Leeds.
Maudson, Joseph Walker	Parkwood Springs, Sheffield.
Meggitt, Elijah Morris	52, Great Passage Street, Hull.
Melvin, James	Hill Place, Chorlton Kings, Cheltenham.
Metcalfe, Alfred	The Square, East Retford.
Miller, Alexand. Sutherland	17, William Street, Edinburgh.
Miller, John Alexander	86, King's Cross Road, London, W.C.
Mills, James Arthur	22, Auckland Road, New Wandsworth, London, S.W.
Mitchell, John	254, Upper Street, Islington, London, N.
Morgan, John	3, High Street, Ilfracombe, Devon.
Morris, John Thomas	Faversham, Kent.
Morton, James Thomas	Orchard Street, Derby.
Morton, Samuel Edward	4, Brayards Road, Peckham, London, S.E.
Moss, Thomas	20, Berriew Street, Welshpool, Montgomeryshire.
Muir, Alexander Martin	79, Reid Street, Bridgeton, Glasgow.
Musgrave, John Critchell	2, Knowsley Cottages, Torre Park, Torquay.
Newey, Thomas	Frugal Place, Wheeler Street, Birmingham.
Newman, Samuel Charles	Bristol.
Nicholls, Ada Anne	Market Sq., Hanley, Staffordshire.
Nicholson, Charles	82, Upper Sutton Street, Aston, Birmingham.
Nicol. John	Ramsay Lodge, Portobello, N.B.
Oldfield. Jonathan	314, Deansgate, Manchester.
Oliver, John Gerry	3, Stanley Villas, Northcote Road, Battersea Rise, London, S.W.
*Oliver, William Hurdon	18, Bridlington Street, Hyson Green, Nottingham.
Owen, Samuel	The Cross, Oswestry.
Parker, Daniel Caparn	220, Graham Road, Hackney, London, E.
Parkes, George James Robert	Havelock Buildings, Chapel Ash. Wolverhampton.
Parkin, Joseph	8, Elwin Terrace, Sunderland.
Parkinson, Joseph	4, Ducie Terrace, Stockport Road, Levenshulme, Manchester.
Parry, Hugh	Brynsiencyn, Anglesey.
Parry, William Robert	6, South Castle Street, Liverpool.
Paterson, Henry	194, King Street, Aberdeen.
Paterson, William	3, Cowley Road, Oxford.
Peacock, Samuel	Long Street, Great Wigston, Leicestershire.
Pear, John	40, Wells Street, London, W.
Pepper, Gales	New Brompton, Kent.
Perks, Samuel Woodhouse	27, Upper George Street, Bryanston Square, London, W.
Phillips, George Craig	Swanmore Road, Ryde, Isle of Wight.
Phillips, John	154, Marine Parade, Brighton.
Pickering, John	1A, Caygill Street, Salford, Manchester.
Plant, George William	Augusta Road, Moseley, Birmingham.
Plant, Richard Sleight	12, Robert's Terrace, Marmaduke Street, Hull.
Pointon, George	Erdington, near Birmingham.
Pollard, Joseph	Coventry.
Pottinger, Thomas	12, Lind Street, St. John's, London, S.E.
Price, Benjamin	30, Connison Street, Breck Road, Liverpool.
Profeit, John	Nethertowie, Towie-by-Inverkindie, Aberdeenshire.
Prust, Thomas William	152, Briggate, Leeds.
*Puckey, Courtney	Woodfields, Shanstead, Essex.
Pursell, John Rushton	23, Walton Road, Kirkdale, Liverpool.
Rae, Alexander	31, Bridge Street, Banff, N.B.
Ransom, George	Winterton, Lincolnshire.
Reade, William James	62, Victoria Street, Wolverhampton.
Redford, John Gorton	6, Bond Street, Manchester.
Rees, James	Iona, Anglesea Road, Ipswich.
Rennison, James	2, Dannatts Court, Norfolk Street, Sunderland.
Rhodes, Sam	170, Westgate, Bradford, Yorks.
Riddell, William	Banchory Ternan, Kincardineshire.
Roberts, Edwin Rogers	Shaftesbury, Dorset.
Roberts, John	67, Primrose Road, Leeds.
Roberts, John	1, Mount View, Upper Tranmere, Cheshire.
Roberts, John Michael	High Street, Pwllheli, Carnarvonshire.
Robertson, Alexander	Bellihiglash, Banffshire.
Robertson, Donald	Bervie, Kincardineshire.
Robinson, John	129, Villas Road, Plumstead, London, S.E.
Rogers, Roger Thomas	Trefriw, Carnarvonshire.
Rose, George William	50, Fishergate, Preston.
Roue, Francis Fairchild	15, Market Place, Wigan, Lancs.
Roughton, William	46, Bartholomew Street Leicester.
Russell, Charles Harridge	6, Lewisham High Road, New Cross, London, S.E.
Sadgrove, Arthur Augustus.	84, Grove Rd, Holloway, London, N.
Sandell, John Tyack	9, Boundaries Road, Balham, London, S.W.
*Savage, John Welch	9, Bank Street, Newton Abbot, Devon.
Sawer, William	Palmerston Road, Ipswich.
Sewell, Jonathan Joseph	Stainburn House, Stainburn, near Workington.
Sharp, Robert Henry	159, Grange Road, Bermondsey, London S.E.
Shaw, Alexander Alness	12, Heath Street, Smallthorne, Burslem, Staffordshire.
Shaw, James	Hatfield, near Doncaster.
Shillcock, Arthur	12, Berkley Villas, Wood Vale, Lordship Lane, Forest Hill, London, S.E.
Shipley, William	5, Paradise Vale Terrace, Broughton Road, Salford, Lancs.
Sicre, Frederick John	12, Deacon Street, Everton Road, Liverpool.
Sim, William	Banchory Ternan, Kincardineshire.
Simcock, George	Crescent, Willenhall, near Wolverhampton.
Sinclair, William Jun.	34, Upper Kirkgate, Aberdeen.
Skinner, James Charlton	55, Scotland Road, Liverpool.
Sleight, Thomas George	7, Liddle Street, Hull.
Sloan, Jessie	Mossend, Bothwell, Lanarkshire.
Smith, William	Hardgate of Clatt, Aberdeenshire.
Sneyd, William	Husbands Bosworth, Leicestershire.
Solomon, William Henry	Leicester.
Southgate, Wilfred Burnham	55, Cogan Street, Hull.
Spencer, Charles	18, Queen Street, Oxford.
Spensley, Thomas Brentnall	Southfield, Southsea, Hants.
Stanton, Emanuel	Bredbury, Cheshire.
Stead, Samuel	9, Grosvenor View, Camp Road, Leeds.
Steel, Alexander	29, Walsingham Road, Upper Clapton, London, E.
Stewart, Charles	6, Glen Street, Edinburgh.
Stewart, John	64, Coldharbour Lane, Camberwell London, S.E.

Stokoe, John	30, High Street, Doncaster.
Storey, John	1, Victoria Terrace, Lower Road, Rotherhithe, London, S.E.
Story, William	1, Little Cumming Street, Wynford Road, Kings Cross, London, N.
Straehan, James	Sydney, New South Wales.
Strawson, Henry	16, Rockingham Street, Leeds.
Stuart, Robert	Lumphanan Station, Aberdeenshire.
Sutcliffe, Edward West	Denmark Hill, London, S.E.
Sutherland, Donald	Royal Infirmary, Aberdeen.
Sutton, Thomas George	41, Prescott Street, Liverpool.
Taylor, David	2, Newport Road, Priestman Street, Manningham, Bradford, Yorks.
Taylor, John Robert	Risca, Mon.
Taylor, Joseph	2, Park Street, Walsall, Staffordshire.
Taylor, Shemelds	Skelton in-Cleveland, Yorks.
*Taylor, Thomas	81, High Street, Peckham, London, S.E.
Taylor, William Henry	212, Seven Sisters Road, London, N.
Tempest, Arthur	Lord Street, Colne, Lancs.
Thom, Alexander	78, Queen, Street, Edinburgh.
Thom, James	21, Lorne Road, Tollington Park, London, N.
Thom, William	Comers, Midmar, Aberdeenshire.
Thomas, Daniel Griffith	52, Walterton Road, St. Peter's Park, London, W.
Thomas, Samuel	Stoney Way Cottage, Laugharne, Carmarthenshire.
Thomas, Thomas Edward	Church Square, Morriston, Swansea.
Thompson, William	Colpy-by-Insch, Aberdeenshire.
*Tibbs, Frederick	63, Chalk Farm Road, London, N W.
Tildesley, John	Great Marlow, Bucks.
Todd, Levi	149, Church Street, Preston, Lancs.
Totherick, Robert	Mosley Street, Newcastle-on-Tyne
Tovey, Charles	The Establishment of the Khedive, Cairo, Egypt.
Tripp, Zeno	17, Fernhead Road, St. Peter's Park, London, W.
Tucker, James	86, Northgate Street, Gloucester.
Turner, William	Newmill, Keith, Banffshire.
Upfill, William Thomas	235, Kingsland Road, London, E.
Wade, John	Walsden, Todmorden, Lanes.
Walker, James, Jun	Turriff, Aberdeenshire.
Walker, William George	15, Watts Place, Chatham.
Wall, John	1, Pittville Street, Cheltenham.
Wallace, William	Minnyhive, Dumfries-shire.
Ward, William Edwin	Byard Lane, Nottingham.
Watson, Thomas Fenwick	52, New Bridge Street, Newcastle-on-Tyne.
Watson, Thomas Harrison	28, Elm Road, Seaforth, Liverpool.
Watson, William	Tarland, Aberdeenshire.
Watt, Thomas	Kintore, Aberdeenshire.
Watts, John	High Street, Old Brentford, Middlesex.
Wealthall, Thomas	72, Medlock Street, Hulme, Manchester.
Welch, Thomas	7, Pilgrim Street, Newcastle-on-Tyne.
*Wenham, George Daniel	29, Newmarket Road, Norwich.
West, William Curtis	162, Deptford Road, Rotherhithe, London, S.E.
White, William	5, Edwin Terrace, Essex Road, Northernden Road, Sale, Cheshire.
Whiteside, Robert Edwin	42, Lower Scale Street, Hull.
Whittle, John Thomas Parker	Great Bridge, Tipton, Staffordshire.
Whyman, George Grundy	27, Hanover Street, Liverpool.
Williams, Henry Jones	205, Derby Road, Bootle, near Liverpool.
Williams, John	251, Netherfield Road, Liverpool.
Williams, Sarah	Beaufort Square, Chepstow, Monmouth.
Williams, Thomas	251, Netherfield Road, Liverpool.
Williams, William	51A, High Street, Camden Town, London, N.W.
Wilson, David Morgan Weir	4, Caledonian Terrace, Edinburgh.
Wilson, James Edward	43, Berners Street, Oxford Street, London, W.
Windle, William Frederick	1, Thomas Terrace, Lower Norwood, London, S.E.
Winfield, Frank	High Norgate, Darlington.
*Wingate, Stephen	1, High Street, Winchcomb, near Cheltenham.
Winn, Henry	Westgate, Dewsbury.
Withycombe, Edward George	Dunster, Somerset.
Witte, William Henry	63, Catherine Street, Stepney Church, London, E.
Wood, Edmund	3, Matham Grove, East Dulwich, London, S E.
Woodhead, William Henry	58, Grovesnor Street, Manchester.
Woodward, Edward	99, Dolobran Road, Sparkbrook, Birmingham.
Wright, Alfred	Elland, Yorks.
Wright, Charles	9, Stockwell Road, London, S.W.

The Pharmaceutical Journal.

SATURDAY, NOVEMBER 13, 1886.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

PHARMACEUTICAL EDUCATION IN THE PROVINCES.

FOR the information of those of our readers who reside in the neighbourhood of Birmingham we take this opportunity of making known that the first monthly meeting of the Midland Counties Chemists' Association will be held on Tuesday evening, the 23rd inst, and on that occasion Mr. Town-Councillor BARCLAY will deliver an inaugural address as the President of the Association. The subject of the address will be "Pharmacy in the Provinces, with special reference to Education," and at the present moment it is particularly important that this subject should be brought under the consideration of those actually engaged in business in the provinces with a view to obtaining something like a general consensus of opinion from them which may serve as a guide in one direction or the other as to what is desirable in that respect. The views expressed from time to time in opposition to the improvement of pharmaceutical education we do not regard as being representative of the general feeling of chemists and druggists throughout the country, whether connected with the Pharmaceutical Society or not. In any case they appear to manifest a total want of appreciation of what is indispensably requisite for the advancement of pharmacy as an occupation. The contention that scientific education is superfluous for the pharmacist because the sale of cart grease or soft soap can be conducted as well or even better without it does not in itself present an inducement for a reply, and we do not hesitate to repeat that it is only with reluctance that we have given publicity to such statements. It is with equal reluctance that we this week insert another letter expressing approval of them. But while regretting that pharmaceutical chemists and members of the Society can be, as we think, so blind to their own interests, and so regardless of the responsibilities resting upon them as to the common interests of their colleagues, as would appear to be the case from the way in which the endeavour to promote technical education is sometimes spoken of, and though recognizing the right of everyone to the expression of his opinion for what it may be worth, we think it is very desirable that this very important subject of pharma-

ceutical education should not be left as a kind of shuttlecock to be tossed about in any direction. It is high time, after all the labour which has been expended by the Pharmaceutical Society as a body upon the attempt to raise the status of pharmacy and its followers by means of scientific education, that some definite issue should be arrived at as to the principle upon which that work has been carried on for more than forty years. After all that has been done of later years by the Council in endeavouring to devise a scheme by which the objects of the Society and the aim of its founders might be brought within reach of practical realization, it is high time to ascertain whether the work thus carried out has been, as some do not hesitate to declare, a worthless waste of time, a visionary pursuit of an object that is not wished for by the members of the Society, and that would not tend to bring about the beneficial effects which are believed in by those engaged in the work. If those who oppose the establishment of a system of pharmaceutical education and prefer to maintain the present condition of things are in a position to support their views and wishes, either by argument, or even by mere force of numbers, there may be some reason for their being considered, so far as those are concerned who might elect to cast in their lot under such a system; but it is unreasonable that opinions of the kind we have referred to should be made use of to impede the progress of others who believe in the necessity of an improved system of education, and are themselves willing to submit to the requirements indispensable for its establishment.

There can be no doubt that the two classes above mentioned do exist, and that the decision of the educational question lies between them. That decision must also be of such a nature that those who may be convinced against their will cannot continue for all practical purposes to be of the same opinion still, but must yield to the more influential section of the body. This is an issue which it seems necessary to face without delay. It may involve a disruption of the pharmaceutical body, and a separation of its members into two or even more parts; but the very success that has so far attended the efforts to carry out the principles upon which the Pharmaceutical Society was founded seems to demand that such an issue should be faced, out of loyal consideration for those who have supported the work of the Society and have put their trust in the eventual realization of the objects sought for by it. The continuance of the permissive system of education is in fact no longer possible with justice. If the voluntarily ignorant or the voluntarily educated are to be subjected, by reason of the course they prefer, to disadvantage and disability, it is certainly the former class which should suffer. At present, however, the contrary is the case, and the persons who without constraint devote themselves to studies that are admitted to be requisite for pharmaceutical qualification are as likely as not, after expending their time, labour and money in the work of study, to find themselves handicapped in their competition with opponents in trade who have never gone through the same ordeal and rely more upon smart trading for success than upon anything essentially appertaining to the thoroughly qualified pharmacist.

At no time was there a greater need for distinction between the pharmacist and the mere vendor of articles which may be either drugs, quack medicines or drysalteries. The efforts that have been made for many years by provincial associations as well as the Pharmaceutical Society, to arrive at a satisfactory result by voluntary action cannot be said to have been successful, but have in all instances met with more or less failure. On all sides we hear of the discouragement experienced by the falling off of entries by students to courses of lectures provided for their benefit. At Newcastle, Manchester and many other places it has been found necessary to give up the arrangements made for classes, and even at Birmingham there is reason to believe the same result has been experienced. We understand that the number of names given in at the commencement of the session of the Midland Counties Chemists' Association has been so small that the classes had to be postponed until further notice. Complaints have been made as to the unsuitability of the hours at which the classes were held, of insufficient accommodation, and of the default of any adequate provision for practical chemistry, the most important of all subjects for the pharmaceutical student. For our own part we cannot perceive any remedy for this state of things likely to be effectual but that furnished by the establishment of a compulsory course of study. It is therefore, in our opinion, particularly opportune that Mr. BARCLAY should take upon himself the task of bringing this educational question forward for discussion, and we believe that very great service would be rendered to the interests of all engaged in the varied phases of the drug trade if he could evoke an unequivocal and authoritative expression of opinion that might serve with others either to strengthen or stay the attempts of the Society's Council in regard to this matter of education.

We would remind our readers that an Evening Meeting of the Pharmaceutical Society, postponed from this week, will be held on Wednesday evening next, at eight o'clock, when a paper will be read on "The Drug Exhibits at the Colonial and Indian Exhibition," by Mr. E. M. Holmes, F.L.S., and a "Note on Tincture of Strophanthus," by Mr. W. Martindale. We understand that a large number of specimens presented to the Society's Museum and others loaned for the occasion will be exhibited, and in order to give an opportunity for their examination the Lecture Theatre will be opened at seven o'clock.

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In another part of this Journal (p. 388) will be found a list of 406 persons whose names will be erased

from the Register of Chemists and Druggists unless they communicate with the Registrar before the 30th of December next. In every case two registered letters of inquiry have been sent to the registration address of the person named without eliciting any response, and the provisions of the tenth section of the Act having been thus complied with the Registrar will, at the date mentioned, unless otherwise advised by the parties concerned, proceed to erasure under the powers conferred upon him for the correction of the Register.

* * *

We learn that at a meeting of the Unofficial Formulary Committee appointed by the British Pharmaceutical Conference, Mr. W. Martindale was appointed Chairman and Mr. W. A. H. Naylor Secretary to the Committee.

* * *

We understand that Dr. John Gordon, of Aberdeen, is a candidate for the chair of Materia Medica in Aberdeen University that has become vacant by the death of Professor Dyce Davidson, to which we referred a week or two since. Dr. Gordon was a distinguished student at Aberdeen University, taking prizes in materia medica and graduating with honours. He was selected by Professor Davidson as his class assistant and he has contributed various papers on materia medica to the local medical societies. He has also passed both of the examinations of the Pharmaceutical Society of Great Britain and has had considerable experience in teaching. Many of our readers who were present at the Pharmaceutical Conference Meeting in Aberdeen last year will probably remember with pleasure having had the opportunity on that occasion of making Dr. Gordon's acquaintance, and we have no doubt that those who did so will heartily join in wishing him success in his candidature for a position in which his talents and amiable qualities would find congenial scope for exercise in promoting the study of a subject intimately connected with pharmacy as well as with medicine.

* * *

Several members of the pharmaceutical body have been chosen at the late municipal elections to occupy positions of prominence in the corporate bodies of the places in which they reside. At a meeting of the Town Council of Duns held last Monday, Mr. William Gunn, Pharmaceutical Chemist and Member of the Pharmaceutical Society, was unanimously elected Chief Magistrate for the third term of three years. Mr. John Babtie, Pharmaceutical Chemist and Member of the Pharmaceutical Society, was unanimously elected for the fourth time Provost of the Burgh of Dumbarton. Mr. Allwood Simpson, Associate of the Pharmaceutical Society, was elected a member of the Stalybridge Town Council, and Mr. William Parkinson, of the firm of R. Parkinson and Sons, was elected to the Town Council of the Borough of Burnley.

* * *

An eminent Russian pharmacist, Privy Councillor Julius Trapp, has just celebrated the fiftieth anniversary of his commencement of business. He has been Professor of Pharmacy in the Military Medical Academy of St. Petersburg, the most renowned medical school in Russia, and also a member of the medical council and the military medical commission. In commemoration of the jubilee, a dinner was given in his honour, and the Russian Pharmaceutical Society, of which he is an ex-president and original member, presented him with an illuminated address.

* * *

The death is announced of Professor A. Wigand, of Marburg. He was chief of the Pharmacological or "Pharmacognostical" Institute and Director of the Botanic Gardens. He had for some time been engaged in the preparation of the fourth edition of his work on Pharmacognosy.

* * *

The Customs Returns show that the duty collected on chloral hydrate imported from abroad during the year ending March 31 last amounted to £1045, being an increase of £105 as compared with the preceding year. The duty on transparent soap, in the manufacture of which spirit had been used, amounted in the same time to £224. Only £6 was collected on account of chloroform.

* * *

The South Australian Branch of the British Medical Association has issued a preliminary announcement of its intention to take the necessary steps for holding in Adelaide, in September next, a Medical Congress, for the discussion of subjects relating to Public Medicine, Hygiene, Medicine and Surgery.

* * *

The Council of the Society of Arts, having arrived at the conclusion that the work for the promotion of which the Section of Applied Chemistry and Physics was originally founded in 1874 is now efficiently carried on by the Institute of Chemistry and the Society of Chemical Industry, has decided to discontinue the Section.

* * *

Amongst the papers announced to be read at the ordinary Wednesday evening meetings of the Society of Arts during the coming session are—"Purification of Water by Agitation with Iron and Sand Filtration," by Mr. W. Anderson (Nov. 24); "Glow Lamps, their Use and Manufacture," by Major-General C. E. Webber, R.E. (Dec. 8); and "Development of the Mercurial Air-Pump," by Professor Silvanus Thompson. The adjourned discussion on Dr. Tidy's paper on "Sewage Disposal," read last April, has been fixed for December 1.

* * *

The first meeting of the Chemical Society in the new session will be held on Thursday, the 18th inst., at 8 p.m., when the following papers will be read:—"A Spectroscopic Study of Dyes and Colours," and a "Note on Naegeli's Theory of Fermentation," by Professor W. N. Hartley; "On the Reduction of Nitrites to Hydroxamine," by Dr. Divers and T. Haga; and "On the Preparation and Saponification of Hydrocyanides of the Diketones," by Drs. Japp and N. H. J. Miller.

* * *

On Wednesday evening next, the 17th inst., there will be a meeting of the Chemists' Assistants' Association held in the Rooms, 103, Great Russell Street, when a paper will be read on "The Latest Methods of Preserving Apparently Worthless Teeth and Roots," by Mr. C. J. Rathbun, D.D.S. As the postponed Evening Meeting of the Pharmaceutical Society will be held on the same evening it has been arranged that on this occasion the chair shall not be taken until half-past nine o'clock.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly meeting of the Council was held on the 3rd instant at the Society's rooms, No. 11, Harcourt Street, Dublin, at three o'clock.

The President (Mr. William Allen) in the chair.

The other members of the Council present were the Vice-President (Mr. Draper); Mr. Grindley, Dr. Collins, Dr. Evans, Mr. Beggs, Mr. Wells, Mr. Hayes, Mr. Brunker, Mr. Simpson, Professor Tichborne, Dr. Montgomery, Mr. Hodgson (Treasurer), and Sir G. B. Owens.

A letter was read from Mr. Thomas R. Connolly, M.P.S., of Dundalk, asking the Council to supply the members of the Society with the *Chemist and Druggist* instead of the *Pharmaceutical Journal*.

The President said this could not be done. They had a special arrangement with the *Pharmaceutical Journal*.

Mr. Wells said there were two sides to the question. He believed that a great many people wished for the *Chemist and Druggist*. He could get it for 10*s*., whereas he had to pay £1 for the Journal.

Mr. Brunker: This question had been discussed over and over again, and the Council are in favour of continuing the Journal even at a larger expense. Considering the very favourable terms on which members are supplied with the *Pharmaceutical Journal* it would be unwise to reopen the question.

The Registrar was directed to write to Mr. Connolly to that effect.

A letter was received from Mr. Peter L. Doyle, who had been a candidate at a late Preliminary examination, asking for his marks.

The President: We have hitherto withheld the marks and I do not see any reason for giving them now. I was always against their marks being given to the candidates, or even obtained for them by members of the Council.

Mr. Hayes: What is the objection to giving them?

The President: The experience of the English Society is that when a candidate is told where he fails, he studies that particular portion of his course only, and at his next examination he is worse in the other portions.

The Vice-President: What is the practice of the English Society?

The President: They do not give the marks.

Mr. Brunker: Another objection is that it will give rise to frequent applications to the Council to reconsider the decisions of the examiners, which they have no right to do.

Mr. Wells: It should be understood that the Registrar is not to give copies of the marks to anybody.

The President: According to my directions Mr. Ferrall is not to give copies of the marks to members of the Council.

Dr. Tichborne: Why should not members of the Council be allowed to have them? On what ground should these papers be kept as the private property of the officers of the Council?

The President: They are not kept as the private property of anybody.

Dr. Tichborne said he felt very strongly on this subject. He applied to Mr. Ferrall for the marks at the last examination, and received a letter from him in which he stated that he was sorry he could not furnish him with them, as to do so would be contrary to his instructions. That was perfectly right on Mr. Ferrall's part: but he asked him, did he get those instructions specially in his case? and he said "yes." He (Dr. Tichborne) had a motion on this subject, and he thought it a monstrous thing that a member of the Council who required information on a motion of vital importance to the Society should be refused access to the papers. If they allowed that to pass they did not know where it would end. It was new to him that the papers of the Society were the private possession of the Chairman or the Vice-Chairman, or anyone else.

The President: Were you refused to be shown the books, Professor Tichborne? Kindly answer that question.

Dr. Tichborne said Mr. Ferrall told him that he could take them or see them, but that he (Mr. Ferrall) had his instructions. Of course, he (Dr. Tichborne) might have been out of order in asking Mr. Ferrall to write them out; but the President had just now said that the members of the Council were not to be allowed to have access to them.

The President: Excuse me, what I said was that Mr. Ferrall was not to copy them, even for a member of the Council. Before you came in I explained that these marks had been over and over again obtained against the wishes of the Council and given to candidates, which was a breach of faith with the Council.

Dr. Tichborne: I will not enter into that question.

Mr. Wells said that a grinder not connected with the Society showed a gentleman whom he knew a copy of marks given at one of the Society's examinations. There was a breach of faith somewhere.

Dr. Evans: Whom did he get them from?

Mr. Wells: That I cannot tell you.

Dr. Evans said he fully agreed with Dr. Tichborne that it would be an outrageous thing if members of the Council could not go to Mr. Ferrall and get the marks from him.

The President: Of course, if the Council wish I shall give different instructions, but I cannot do so until I see that it is their wish, for it has been arranged that the marks shall not be given. If they are given surreptitiously it is a breach of faith.

Mr. Hayes: What do you mean by "surreptitiously?" If a member asks Mr. Ferrall for a copy of a candidate's marks, and Mr. Ferrall refuses to make one, but says—"you can copy it yourself"—that does not make the least difference. I think that every member of the Council has a full right to ask for the books and take a full and true copy of the results of our examinations.

The President: That is my opinion.

Mr. Hayes: That is, for himself; but if he wishes to do what may be looked on as dishonourable that is his look-out.

Dr. Tichborne: It is quite competent to the President to bring that before the Council, but it must be proved.

Mr. Simpson said that in all boards the members had a right to see all the books.

Mr. Brunker said the reports of the examiners were laid on the table of the Council, and it was absurd to suppose that they could be withheld from the members. It was another thing as to whether the Registrar should be asked to make copies of the marks.

The President said there was a great deal of back work on hand. The indexing of the minute books was ten years in arrear; and there was the looking up of persons who had not replied to two registered letters as required by the Statute. If the Registrar was in addition to be called on to act as a clerk for any member of the Council, he would never be able to get through the other work.

Dr. Tichborne: If you wanted copies yourself, could you not get the Registrar to make them?

The President: No, I have never done it. I never asked Mr. Ferrall, I told him it was no business of his to copy things for me.

Mr. Hayes: It would have taken Mr. Ferrall less time to copy the marks than to write the letter. A little civility is never a waste of time.

The President: The question before us at present is whether Mr. Doyle is to get his marks or not.

Mr. Brunker: I am not aware whether during my term of office, any application was made by a member of the Council for a copy of marks or not; but I know that trouble was caused on one occasion by a candidate

having got possession of his marks. An application was made for the reconsideration of them; and I instructed Mr. Ferrall that no candidate should be supplied with his marks. But the question of supplying members of the Council with copies of the proceedings never cropped up. All the information is lying open here, and there is no possibility of excluding it from members.

The President: Nor no intention of doing so.

Dr. Tichborne: Excuse me, there is a direct refusal in the letter.

The President: The question is whether Mr. Doyle is to get his marks or not. I think the majority of the Council are of opinion that we should not give them.

Dr. Collins asked was it part of the regulations of the Society that a young man who broke down in one part of his examination, but was good in the rest, should be remitted for three or six months in order that he might make himself up in the part he had failed in and then be be permitted to come in for examination in that part alone?

The President: It is not.

Dr. Collins said a regulation to that effect had been made by the Medical Council, who were of opinion that it was unfair to oblige the young man to go in upon all the subjects over again.

Dr. Montgomery said that any candidate at the examinations in Trinity College could get his marks. In his opinion the marks ought to be given to the candidates at the Society's examinations, both preliminary and final.

Mr. Wells said in the Royal University the marks used to be given to the candidates, but one of the Secretaries had informed him that that practice had been given up and the candidate was only informed in what branch he had failed.

Sir George Owens moved that Mr. Doyle's request be not complied with.

Mr. Beggs seconded the motion.

Mr. Simpson: I propose that he should be told what he was deficient in.

Mr. Hayes moved an amendment to that effect.

Finally,

Sir George Owens moved that Mr. Ferrall be instructed to inform Mr. Doyle of the subject or subjects in which he failed, but not to give the marks.

Mr. Hayes seconded the proposal, which was agreed to.

A letter was read from Mr. John McIlwaine, of Newry, stating that as he was going to Australia he was obliged to resign his seat on the Council.

Dr. Tichborne moved the following resolution:—

"That this Council have read the resignation of Mr. John McIlwaine with great regret, and that the Registrar be directed to inform him of same."

Mr. Wells, in seconding the motion, said that Mr. McIlwaine had always taken a great interest in the Society, and done what he could to promote its interests.

The motion was unanimously agreed to.

A donation was announced from the Mason Science College of the Calendar for 1886–7.

On the motion of the Vice-President, seconded by Dr. Collins, thanks were voted to the donors.

Dr. Tichborne, pursuant to notice, moved the following resolution:—

"That a Committee be appointed to report to the Council upon the best mode of carrying out certain contemplated improvements in the examinations, more particularly as regards: (1) arranging for a conference of the examiners, and (2) to give increased accommodation for carrying out the practical chemical examinations."

The Society had two functions to perform. One was the making of arrangements for the proper carrying out of the examinations of the candidates for the licence; and the other was the prevention of illegal compounding. The former he considered the more important of the two. His notice of motion therefore dealt with the most important subject that the Council could entertain. Numerous complaints and a great deal of dissatisfaction had been expressed outside in reference to the Society's examinations; and these seemed to be gathering force. It was therefore well to review their position. It had always been his principle to interfere as little with the examiners as possible. If they had not confidence in their examiners, let them get rid of them and appoint others; but do not interfere with them as long as they were their examiners. He believed that principle could not be departed from without doing themselves more or less injury. At the same time they had always laid down the lines on which those examinations were to be conducted; and then came the question how far the Council might not have made mistakes on many points. He asked a committee to inquire into these points. Of course the President and the Vice-President were *ex-officio* members of all the committees; and he would suggest that the late President, Mr. Brunker, Dr. Collins and Dr. Montgomery, as men who had had actual experience of examinations and examining boards, should also be on the Committee. His notice contemplated small matters bearing upon the mode of conducting the examinations which might with the most advantage be dealt with by the Committee; and the only matters on which he now wished to touch lay strictly within the department belonging to the Council. They all knew that the system of marking at examinations which the Council had adopted had been devised with the particular object of selecting the best men all round. One of the points laid down was that if a candidate was good in one or two subjects and bad in the others, he should be rejected. At the last April examinations eight out of ten candidates were rejected; and at the last examinations the rejections were nearly 90 per cent. Such a thing had never been heard of in the annals of their examinations, and there must be some cause for it. Probably, one cause was their system of marking. He would now refer them to the figures which he had had such awful difficulty in getting at. Out of six candidates only one passed. He would take the cases of three of the gentlemen, whom he did not know and had never even seen.

The President: I think I must stop you. You cannot criticize the report of the examiners until after it has been received by the Council.

Mr. Brunker: I move that the report of the examiners be received.

Mr. Beggs seconded the motion, which was agreed to.

Dr. Tichborne said they would be surprised to learn that the three rejected candidates whose cases he said he would take had considerably better marks than the gentleman who passed. The latter got 16 in botany, which was passing by the skin of his teeth; in materia medica 40, the minimum being 24—the only thing he did well out of the seven subjects; in theoretical chemistry 35, the pass mark being 20; in practical chemistry 20, the pass being 31; and in pharmacy and the compounding of prescriptions, subjects which the Society considered important, and in which the minimum was 13½, he got 15, which was passing by the skin of his teeth again. In the reading of prescriptions, the minimum in which was 18, he got 22. The papers he did were fairly good, his marks being 20 and 13. So that he passed by the skin of his teeth in three out of seven subjects: and in one of the subjects in which he got a pass mark, he was informed that he had to be brought back into the room, and re-examined in order to enable him to make the 16. Now take the case of one of the gentlemen who were rejected. In botany he made 22, as against the 16 of the pass man. In materia medica—which was the pass man's best subject—this rejected candidate made 44 as against his 40. In theoretical chemistry, he got 37 as against the pass man's 35. He broke down a little in practical chemistry, getting only

16, which rejected him. In pharmacy and the reading of prescriptions he was better than the other; and they were about the same in their papers. His total was 180 as against the passing gentleman's total of 179. Take the case of another rejected candidate. He scored 200 as against the 179 of the gentleman who passed, and was better than he in all the subjects except one. He could refer the Council to other cases, but he would stick to the gentlemen whom he did not know personally. He did not want to run down the gentleman who passed. He would say, if they liked, that he deserved to pass; but if they signed reports rejecting men, who in a large majority of their subjects were far above the standard attained by the gentleman who passed, they would be making their examinations a farce and a laughing-stock for the public. One, he believed, of the rejected gentlemen went in at a Royal University examination the week afterwards and passed his first half year with flying colours. He believed that these curious returns would be modified if there were a conference of examiners. The real secret of the curious statement that came before the Council was that they did not confer. He knew that two of the examiners objected to doing so; but conference of examiners was the custom with every other examining board in the United Kingdom—at least with all the medical licensing bodies. He believed that if a consensus of opinion in favour of conferring was shown in the Council their examiners would defer to it. It was said that the examination in chemistry was so conducted that the first lot of candidates who came in got too much time, while those who came after them were cut short. All should be examined together, and at the same exercises.

Dr. Collins said he would second the motion with pleasure, but that his name had been mentioned. If the Committee should be appointed it would give him an opportunity of getting the principle sanctioned by the Medical Council adopted, namely, that where a young man failed in one or two subjects, and was good in the rest, he should afterwards be allowed to go in for examination on the subjects only in which he had failed.

The President said he did not see any necessity for the proposed Committee at all. All these matters were quite covered by his resolutions which were passed on the last day. The examiners would not confer. Two of the examiners had, however, asked for increased accommodation in the way of tables, etc, and he would move as an amendment to the resolution of Dr. Tichborne that the matters to which it referred, together with the request for additional accommodation, be referred to the Law Committee. The Council had enough of Committees already without appointing another one.

Mr. Grindley seconded the amendment.

Mr. Brunker said it occurred to him that the bringing on of this matter looked as if the members of Council did not know their own minds. It had been thoroughly threshed and discussed during some years and the Council at length forwarded a letter to the Privy Council explaining the principles on which their examinations were conducted; and he did not think anything had occurred since to change the opinion that they then expressed. The principle on which their system of marking was arranged was clear enough. It was that a man might be a little weak upon one subject, but that if he was, he must make up a larger percentage in his other subjects in order to enable him to pass. In that way it was provided that in order to pass, a man must make up 55 per cent. on the whole examination. It was only necessary that he should make 40 per cent. in chemistry; 45 per cent. in pharmacy; and 40 per cent. in botany and materia medica. He did not want to lay down the axiom that the examiner was infallible; but he gave his marks on what came before him. True, one of the rejected gentlemen had obtained 200 marks. He was admirable in botany and materia medica; but in the chemistry examination he fell very short of 40 per cent., and in practical chemistry had fallen short of 45 per cent. In pharmacy he made a very good examination; but though the total of his marks was very large, it did not make up his deficiency in practical chemistry, which next to pharmacy was the most important subject. It was there that the training of the candidates was best tested: and as from the want of working schools in which young men could avail themselves of chemical benches, and work for sixty or eighty evenings instead of about twenty-nine, which a large number of the candidates had only put in, it was necessary that the examiner should be pretty strict.

Dr. Tichborne: Do you know where these four men came from?

Mr. Brunker: I do not. I am referring to my experience as a member of the Certificates Committee. A large number of those who present certificates in practical chemistry have only twenty-nine or thirty attendances.

Dr. Tichborne: I think we are going outside the question.

The President: I do not see any necessity for stopping Mr. Brunker up to the present.

Mr. Brunker said it had been occurring to him that there might be some modification in their system with regard to the amount of practical chemistry to be required from candidates; their present regulation was only tentative. It had worked very well so far, but if any Committee should be appointed the question of its modification should enter into the sphere of their investigation. But as regarded the rest of what was contemplated by the resolutions now before the Council, he thought it would be unwise for them to say in effect, "We are beginning to think that we were not quite right last month."

The Vice-President said he thought the Council would stultify themselves if they said now that a system of marking which they vindicated last month required amendment.

Dr. Tichborne: The question is not so much as to the marking as the desirability of a conference of the examiners.

The Vice-President: The point you occupied most time about was the marking.

The President: That point was settled at the last meeting by the letter to the Privy Council. We told them our opinion on the subject, and I will not be a party to going back on that opinion now. I therefore think that my amendment covers everything that is required.

Dr. Montgomery said they ought to receive Professor Tichborne's suggestions in a good spirit, and he (Dr. Montgomery) would vote for having the Committee which he asked for. They ought certainly to inquire how it had come to pass that such a large number of candidates had failed to satisfy the examiners. He could not see any objection to Dr. Tichborne having the Committee he asked for; and if that Committee should not think it desirable to take further action in the matter they could say so. As to the chemistry examinations he thought that all the candidates should get the same length of time in the examination.

The President: I am not aware that there is any difference.

Mr. Grindley: Have any complaints been made to the Council as to the mode in which the examinations are carried on?

The President: Not that I know of.

Mr. Grindley: We should not take any outside talk into consideration. If any direct complaint is made to the Council let it be considered.

The President: Not only has no complaint been made, but we have a Visitor from the Privy Council, who has reported that our examinations are carried out with efficient skill; and I do not think we have a right to assume that he would state that as a matter of fact if it were not so.

Dr. Montgomery: I have not heard any complaints, but I think we should give every opportunity for investigation. It will not do any harm to the examiners or anybody else.

Mr. Wells said that in 1885, there were 30 candidates in for the licence and 21 of them passed. Last year, 25 came up and 16 passed. At the July examinations, of this year, 7 passed and 3 failed; in April, 2 passed and 7 failed; in January, 3 passed and 3 failed; in October of last year, 4 passed and 1 failed. The Society's present mode of marking had been taken from the English Society, who had found it most successful.

Dr. Tichborne: I do not object to the mode of marking if we can make it work; but it is not working.

Mr. Wells: I asked our Visitor, Dr. Duffey, whether he did not consider our standard a low one, and he said that he did, and that the men who could not pass it were not fit to pass.

Dr. Tichborne: Read out the names of the Law Committee.

The Registrar read out the names of the gentlemen on that Committee, as follows:—Dr. Collins, Dr. Evans, Mr. Payne, Mr. Grindley, Mr. Brunker, Mr. Wells, and the President and Vice-President.

Dr. Tichborne said it was a most unprecedented thing on the part of the President to try to throw out the Committee which he proposed. It was evidently intended to shelve the matter, because it would be impossible to investigate these things unless the person who had thought them out was on the Committee. If this apparent mischief could not be rectified, he did not see the use of having the Society. He had brought this matter forward in the best spirit and with a desire to avoid personal attack, yet there was evidently a kind of feeling in the matter. The minor matters could be all dealt with in committee; but the President's amendment meant simply crushing it out.

The President: No, decidedly not

Dr. Tichborne: At any rate you want to crush me out.

The President: Well, I will tell you why I object to Professor Tichborne's name being on the Committee. I think that no grinder or person making money by the candidates should be on any committee relating to the examinations. Such a thing is most unheard of and should not be allowed. I think that plain speaking is the right thing; and that no member here will vote for having a grinder on the management of the very examinations that he is grinding his pupils for. I shall do everything in my power to prevent it, and therefore I leave Professor Tichborne's name out of the Committee.

Dr. Tichborne: As to that personal attack you will allow me to reply. It is true that I have pupils, but I never went into the examination room. Perhaps you are not aware that a great many universities consider it quite legitimate for professors to examine their own pupils. I will not go into that question, but I ask members of the Council, is such an attack justifiable from the President? He knows perfectly well that I never exercised my privilege as a member of the Council of going into the examination rooms. I will now. I do not interfere in the examinations; I only want to give greater facilities, and that candidates shall go in together and be examined together; what we want is fair play. I would rather not go into the question; but as the President makes a personal attack on me——

The President: It is no attack—no attack at all.

Dr. Tichborne: I beg your pardon, sir, it is an attack, I might as well object to the fact that the President has his own students in pharmacy. Has not every member of the Council who keeps an open pharmacy his own pupils?

The President: I never have taken any pecuniary——

Dr. Tichborne: Had not the Chairman himself a man going to him in the evening, who was going in for an examination until we passed a resolution? I think these personal recriminations are very bad.

The President: I was not on the Council then, Professor Tichborne. You ought to explain the case, otherwise I shall have to do it. You accuse me of doing something apparently as illegal.

Dr. Tichborne: You did not do it when the resolution passed.

The President: What objection have you to my taking apprentices?

Dr. Tichborne: You might as well say that you have no right to go into the room. I would as well be justified in saying that you had no right to go into the room where examinations were going on because you had apprentices who would be candidates. As a member of the Council I have a perfect right to go in and look on at the examinations so long as I do not interfere with them.

Mr. Hayes said it was an extremely painful thing to hear these personalities. He had never heard such things before at the meetings of the Council, and the latter had been going on for many years. He felt extremely pained that the President should have allowed himself to speak of Professor Tichborne as he had done. Professor Tichborne had never acted at the Council otherwise than as a gentleman, and he was only seeing that his pupils, and all others who came to the examinations, got what was right. He had never interfered in the examinations, or shown that he wanted to do anything that was unfair; and yet it was now thrown in his teeth that because he ground pupils he was not fit to sit on a committee which he proposed to examine into the working of the Society.

The President: That is my deliberate opinion.

Dr. Tichborne: That is the very reason, sir, why I take it that you ought to court my inquiry.

Mr. Wells said no one respected Dr. Tichborne more than he did. He had always been a friend to him and had assisted him in the way of business; but so long as he (Mr. Wells) was on that Council he would not be a party to anyone who prepared pupils for examination as a grinder coming forward and making their regulations. They had a very strong precedent in the matter. In the English Society a gentlemen well known and as respected as any man on the Council in his position came forward and sought a seat on the Council. He was shown by the votes of the members that they would not have it; and he (Mr. Wells) thought that it would have been better taste on the part of Dr. Tichborne not to have asked to go on this Committee. They should not have on the Committee anyone who was specially interested in the result of the examinations making laws with respect to them.

Mr. Hayes said that if the views of the last speaker were carried out to the full extent none of them who were in the trade could have apprentices. He would be as hard on his own apprentices as any other man's.

Mr. Brunker asked to be allowed to say a word. While he did not see that there was really any occasion for appointing this Committee, he would be the last person in the world to keep down discussion, or to stand in the way of inquiry. Therefore he thought that by all means the Committee should be appointed, and the inquiries made. He did not believe there would be any great results, but as Dr. Tichborne had brought the matter before the Council, they would be placed in a very false position if they allowed it to be said that they wanted to burke inquiry. From having attended the examinations himself over and over again, his idea was that the examinations were very fairly conducted indeed; and so far as the time allowed to practical chemistry was concerned, he did not think that any difference was made between the candidates. Any difference that was observed arose from the slowness or quickness of the candidates themselves. Therefore it would be a great mistake if any further opposition were given to the appointment of the Committee. Let it be appointed to investigate everything that Dr. Tichborne should bring before it. He was very certain that whatever

good results might arise from the appointment of the Committee, no bad results would. When it made its report the Council could decide whether they would accept its recommendations or not. But do not let it be said that they wanted to burke inquiry.

The President then put his amendment, which was negatived, there being a show of hands, four for and seven against it.

The words "certain contemplated" were struck out of the original motion so as to make it read "on the best mode of carrying out improvements in the examinations," and it was put and carried.

The President: You had better name the Committee.

Dr. Tichborne named the President, the Vice-President, Dr. Collins, Dr. Montgomery, Mr. Brunker, and the mover and seconder. He would name any other gentleman the President would like to add, but he had found that small Committees acted better than large ones.

The Committee, as named by Dr. Tichborne, was appointed.

On the motion of Mr. Beggs, seconded by Mr. Evans, the report of the Law Committee was adopted.

On the motion of Dr. Collins, seconded by Mr. Grindley, the name of Mr. Hendry, who had omitted to reply to a registered letter inquiring his address, and who had forwarded his subscription to the Society, was re-instated on the Register.

On the motion of Mr. Grindley, seconded by Mr. Wells, Mr. J. L. Rae was elected a member of the Council in lieu of Mr. McIlwaine, resigned.

On the motion of Mr. Brunker, seconded by Mr. Grindley, the Examiners were re-elected.

The Council then adjourned.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The first general meeting of the thirty-eighth session was held at the Royal Institution, on Thursday evening, October 28, 1886. The President, Mr. A. C. Abraham, F.C.S., in the chair.

The minutes of the previous meeting were read and confirmed and the following donations to the library and museum announced:—

To the Library.—Current numbers of the *Pharmaceutical Journal*, from the Society; *Pharmaceutical Record of New York*, from the publisher; *Canadian Pharmaceutical Journal*, from the Society; 'Proceedings of the Liverpool Geological Society,' 1885–86, from the Society; *British and Colonial Druggist*, from the publisher.

To the Museum.—Specimens of *Rheum officinale*, *Rheum Rhaponticum*, *Rosa Gallica* and *Hyoscyamus Niger*, from Mr. Rufus Usher, Banbury, though Mr. A. Fraser; and of Strophanthus from Messrs. Evans, Sons and Co.

A vote of thanks having been unanimously accorded to the respective donors of the above,

Mr. M. Conroy, on behalf of Messrs. Evans, Sons and Co., presented to the museum a specimen of Strophanthus in the pod as received from Africa. Also a specimen of seeds of same arranged in a bottle so as to display their beautiful plumose appendages. Mr. Conroy explained that the drug was now obtainable, though it was still very scarce and dear. He thought it would be interesting to the meeting to know that a pod similar to the one which he had just presented to the meeting weighed 190 grs. The empty pod weighed 35 grains; the seeds 85 grains; and the appendages and stalks 35 grains.

A short discussion followed, in which the President, Mr. J. S. Ward and others took part.

There being no other miscellaneous communication the President called upon Mr. Henry Dauber, Jun., M.C.S.I., to read a paper entitled "South America International Exhibition."

In the discussion that followed the President, Messrs. Conroy, Tyson and J. S. Ward took part, and a hearty vote of thanks, proposed by Mr. Conroy and seconded by Mr. Ward, was accorded to Mr. Dauber for his paper, and the meeting then terminated.

OLDHAM CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

A meeting of this Association was held on Thursday evening, October 28, in the Church Institute, when the following papers were read by the members named:—"The Manner of Collecting Gum Acaciæ," by Mr. James Lees; "Butyl Chloral Hydrate," by Mr. Wilkinson; "Quinine," by Mr. J. E. Wood; "Some Experiments with Antiseptics," by Mr. Andrew, and "Iodoform," by Mr. C. E. Wood.

As a change from the ordinary class work it had been requested that a few of the members prepare short papers on some subject of pharmaceutical interest, to which request the above gentlemen responded.

The very pleasant evening spent showed that much useful information could be got by meetings of this sort, and this one will probably not be the last the Association will spend in this way.

Mr. James Lees occupied the chair.

Proceedings of Societies in London.

CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting of this Association was held on Wednesday, November 3. Mr. H. H. Millhouse, President, occupied the chair.

The minutes of the previous meeting were read and confirmed, and a number of gentlemen proposed for membership.

Some miscellaneous business having been introduced by Messrs. E. S. Taylor and the Chairman, the latter called on Mr. Braithwaite to read the paper prepared by himself and Mr. Farr.

Mr. Braithwaite, who was very cordially received, then read the following paper:—

Laboratory Notes.

BY J. OLDHAM BRAITHWAITE AND E. H. FARR,

Pharmaceutical Chemists.

Note on the Estimation of Morphine in Opium.

It is now nearly two years ago since Mr. Conroy read a paper on the above subject, in which he brought forward the method of assay now official in the B.P., 1885.

At the time of reading the paper Mr. Conroy expressed an opinion, that a shorter time than twelve hours would be sufficient for the solution to stand after the ammonium chloride had been added.

After using the process for some time, our own opinion tended in the same direction, and as it is frequently necessary, or, at least, desirable, to complete an assay on the same day as it is commenced, we have made a set of experiments to that end, as by the present official process it cannot be completed in one day.

Another point to which our attention was directed was the amount of impurity, such as colouring matter contained by the morphia precipitated in the process of assay, whether it was or was not compensated by the amount of morphia retained by the solution or lost in manipulation, though, of course, in the latter case there should theoretically be no loss, but, unfortunately, in manipulation we cannot all attain perfection, and consequently there will be a slight loss in addition to that due to insolubility. In our own experiments, the results obtained fully uphold those of Mr. Conroy, who states that the loss due to solubility, etc., is 1 grain, or, using decimal weights, 0·1 gram, and they show, further, the great accuracy with which the process may be carried out, as

in four experiments with pure morphine the difference between the highest and lowest amount of morphia lost was only ·003 gram.

In trying the effect of time in standing, after the ammonium chloride was added, two series of experiments were carried out, with different opiums; and each experiment was done in duplicate.

The following were the results obtained :—

Sample A.

	Weight of morphia obtained.	Mean.	Percentage.
Two hours' standing . .	1·594, 1·606	1·60	16·0
Six hours' standing . .	1·6255, 1·6125	1·619	16·19
Twelve hours' standing .	1·6165, 1·6135	1·615	16·15

Sample B.

	Weight of morphia obtained.	Mean.	Percentage.
Two hours' standing . .	1·1095, 1·1125	1·111	11·11
Four hours' standing . .	1·1130, 1·1190	1·116	11·16
Twelve hours' standing .	1·1115, 1·1105	1·111	11·11

The foregoing experiments fully satisfied us that nothing was gained by the twelve hours' standing, and it remained for us to ascertain what relation existed between the product as weighed, and pure morphine. The plan we adopted for this purpose was to redissolve the morphia in lime water, and treat the solution as in the original process. A large proportion of the colouring matter is left on the filter paper and the remainder stays in the liquor, the reprecipitated morphine being almost white, as the sample shows.

The amount of colouring matter present was estimated in four samples by the above method with the following results, the mean of duplicate experiments in each case. The amount of morphia taken was 1 gram.

	No. 1.	No. 2.	No. 3.	No. 4.
Morphia recovered. .	·826	·835	·840	·810
Loss	·174	·165	·160	·190
Loss due to colouring matter	·074	·065	·060	·090

It will thus be seen that the amount of colouring matter is liable to slight variation, and on one occasion, working on the same opium, two results were obtained differing ·3 per cent. from each other, in consequence of colouring matter, it afterwards proved. The average amount of impurity in the morphia may be taken at 7 per cent. of its weight, so that in powdered opium of 14 to 15 per cent., which is about the average commercial strength, the weight of impure morphia obtained closely approximates the amount of pure morphia actually present in the sample, so there need be no controversy as to whether any correction for solubility should or should not be made in writing a report on a sample of opium.

As a rule the morphia from tinct. opii is darker than that from extract or powder, at least such is our experience. It contains about 10 per cent. o colouring matter in such samples as we have examined.

Some experiments were tried with one hour's standing, and the precipitation of morphia is generally complete in that time, if the bottle be well shaken, as the B.P. directs. The drawback here, however, lies in the fact that the morphia does not subside well in that limited time, and, consequently, it is not easy to remove the ethereal layer with the narcotine.

In conclusion, we would advocate in any future Pharmacopœia, the reduction of the time for standing, from twelve hours to two hours, an alteration which will allow of the completion of an assay of opium in about six hours, as we maintain that such alteration will not affect the accuracy of the process.

Tincture of Rhatany.

At an evening meeting of the Pharmaceutical Society, held last April, Mr. Holmes read a paper, which some of you may remember, on a new variety of rhatany.

After the meeting, during conversation, Mr. Holmes suggested some experiments on the two official kinds of rhatany as to the amount of extractive and their comparative suitability for pharmaceutical purposes. Acting on his suggestion we have made some experiments and will now bring the results before you. The experiments were made on rhatany selected from bulk as forming a fair sample of the whole and were conducted in each case under conditions as nearly as possible uniform.

The amount of extractive was as follows—

Krameria triandra.		*Krameria argentea.*	
1 . .	27·12	1 . .	21·52
2 . .	24·96		
3 . .	25·04		
4 . .	27·60	2 . .	26·72

The experiments numbers 1 and 2 with *K. argentea* correspond with numbers 1 and 4 respectively of those with *K. triandra* having been conducted under precisely the same conditions of temperature, etc.

The tincture made from Para rhatany forms a bright mixture with water in all proportions, whilst that made from Peruvian rhatany becomes turbid on adding water. The taste of the Para, as might be expected, is a trifle more astringent, but in other respects there is little difference.

One other point might be mentioned in this connection, which is about the method of preparing the tincture. We find that by maceration for a longer period than forty-eight hours, a better tincture is produced than if the exact time be adhered to; this being more marked in the case of Para rhatany.

The temperature also has marked influence on the product; this, too, being greater with the Para variety.

We may say that in speaking of Para rhatany we allude to the variety described under that name in 'Pharmacographia.' Commercially it is known as Savanilla rhatany.

Exhausted Cantharides.

The sample of cantharides which we have here is interesting as affording evidence of a very ingenious fraud. To the eye it has the appearance of a fine sample of flies. It will be noticed, however, that the peculiar and characteristic odour of the insect is not nearly so marked as in a sample of unsophisticated ones. A further examination showed most unmistakably that the flies had been tampered with, as, in addition to the faintness of the characteristic odour, they were very light and brittle, being free from any greasy feel when crushed in the hand. These circumstances caused us to make a chemical examination, in order to see what was the nature of the difference. For this purpose 5 grams each of a known sample and of the suspected one were bruised and treated with 50 c.c. of ether. After allowing them to stand for a sufficient time in a warm place, the ether was made up to its original volume, and 10 c.c. from each flask evaporated in beakers at the ordinary temperature of the laboratory. The ethereal solution of the known sample was yellow, with a slight tinge of green, and left on evaporation a residue corresponding to 10 per cent. of the weight of flies taken, whilst the other solution was nearly colourless, and left but 2 per cent. of residue.

The extractive from the first sample was fatty and greenish-yellow, showing numerous crystals of cantharidin; whilst that from the other was brownish-yellow, and showed no trace of any crystalline body.

An equal quantity of extractive from these samples was placed one on each arm, with the result that the suspected sample produced but a very slight blister, whilst the other gave rise to a large one. This showed, conclusively, that the flies in question could only have contained a very slight proportion of cantharidin which,

with the fatty matter, seems to have been removed by means of ether, or some other similar solvent.

Another sophistication, probably accidental, is found in the "rose beetle," *Cetonia aurata*, which is frequently met with, to a greater or less extent, mixed with cantharides. Apart, it is very unlike the blistering fly, but when mixed the similarity of colour renders the detection less easy than it would appear.

In conclusion, we take this opportunity of thanking our principals, Messrs. Wright, Layman and Umney, to whom we are indebted for the supply of material and for the use of their laboratories.

The paper was followed by an animated discussion, in which the Chairman, Messrs. Bird, Burnett, Blackham, Dymond, Ellwood and Millard took part.

Mr. Farr then replied to points raised in the discussion, and, after the announcement of the next meeting, the proceedings terminated.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

The opening meeting of this Association was held on Thursday, Nov. 11. The President, Professor Attfield, F.R.S., occupying the chair.

The election of officers for the ensuing session was first proceeded with, Messrs. E. J. Millard and H. Trembath being appointed scrutineers to examine the voting papers, and the result was as follows:—Vice-Presidents, Messrs. E. G. Baker and W. F. Southall; Honorary Secretary and Treasurer, Mr. F. W. Short; Assistant Honorary Secretary, Mr. E. J. Eastes; Executive Committee, Messrs. E. A. Petter, E. White, E. J. Woolley, and A. Smith.

During the examination of the voting-papers, the President explained the objects of the Association, and on the conclusion of this portion of the business the Introductory Address was delivered by Mr. S. R. Atkins.

Introductory Address.

BY S. R. ATKINS.

Gentlemen,—You have done me the distinguished honour, through your President, to ask me to deliver the address to your Association at the commencement of the ensuing session. No sooner do I sit down and consider what I shall say to you, than I at once begin to realize the difference between a promise and its performance. The difficulty I feel is in saying that which is fresh and novel, or in so presenting familiar truths that they shall seem like new ones. I have not taken what perchance might have been a wise precaution, namely, re-perused the addresses which have been delivered to you in previous years, but I can readily believe that the entire field of ethics, as bearing on your special and general training, has been carefully and amply surveyed. If, therefore, in the following remarks, I have traversed familiar ground, at least I have this consolatory thought, they are spoken to a new set of students; and, further, it may be confidently assumed no two minds regard a truth from precisely the same angle of vision.

Well, gentlemen, you have, I hope, deliberately and lovingly chosen the craft and calling of a pharmacist as your work in life, and you are in this School to secure a portion of the requisite training to enable you to take your proper place amongst your fellow men.

I say a portion of that knowledge, for this School does not undertake to supply all your needs; a portion of that necessary equipment should have preceded your entrance, and much will remain to be acquired in subsequent years, but an absolutely essential portion of the knowledge needful to your ultimate success in life must now and here be secured.

The final product is a well-cultured pharmacist and, let us hope, a successful trader.

A well-trained, well-taught man has "given hostages to fortune;" he must, however, be an all-round man—mind stored with technical truth, hands subtle and diligent in special manipulation; a man not ashamed of an apron if needed to be worn, or of dusting his bottles if he has no one to do it for him, and yet a man who shall be able intelligently to discourse with the specialist on the latest discovery in science, with the therapeutist on the most recent remedy in medicine, or it may be with some one who is neither of these "on the facts and philosophies of this prolific age."

Perhaps you are incredulous as to the desirability of such an evolution as this; I trust not so. All knowledge for its own sake is precious; but never was there an age or a country in which that knowledge is remunerated as in our own. Only let its possessor be a practical man—a man endued with "faculty."

Permit me, then, to offer you in all kindliness and diffidence, a few suggestions for your guidance as students,—hints special and general.

Your special and immediate study is pharmacy and its collateral branches of knowledge. To these, I would ask you to give for a time fixed and concentrated attention. This is essential to the acquisition of that knowledge you need to inspire yourselves with confidence, and the public with faith in your skill.

I desire emphatically to urge the necessity of this concentration of study; the distinctness, thoroughness and tenacity with which a principle is grasped depend on this. Let me illustrate the point. You go through a gallery of paintings, and are impressed with the beauty of what you see, but you retain no definite recollection of any one special picture. But on the other hand, if you deliberately select two or three of the great masterpieces, sit down before them, until so to speak they have been transferred to your own mind, burnt into the tablet of memory, you have thus secured a life-long possession, "a thing of beauty, a joy for ever."

The haziness and instability of much of our knowledge may be explained from the fact that its impression was superficial.

Reflection is the next mental quality I would desire that you should cultivate. Few people really think: most are but the passive receptacles of the thoughts of others. To think at all is not an easy thing: to think closely and consecutively is yet more difficult. The mind requires much disciplining to master the art, and like a restive colt it jibs and bolts in every direction before it submits to be harnessed to steady and useful labour.

The present age is not helpful in this direction; pace rather than security, show rather than solidity, too much characterizes the era in which we live. So you reply, "Yes, that may be true, yet we cannot find time to journey by the stage-coach of former generations, much less to travel on foot." I will not dispute the contention, save to remind you that if your sole object be to reach the end of your journey as speedily as possible, the railway you will gratefully employ, but if you desire to study a country and its people, you will not rush through it by an express train.

Observation.—The faculty of observation should be associated with that of reflection. We, as pharmacists, have special opportunities and peculiar facilities for cultivating this habit; we are constantly separating and combining the materia medica of the Pharmacopœia—there is scarcely a single act in our daily work which has not a reason for the doing worth our noting and remembering.

This habit of close continuous observation of the processes we conduct will inspire an interest in them and a perpetual suggestiveness from them that will go far to convert the mere drudgery of labour into intellectual and pleasurable results; it will, moreover, be useful mental athleticism, imparting new power and fresh vigour, and will materially conduce to the practical success of life by impressing society with the solidity of your attainments.

You are pursuing the sciences of chemistry and

botany, and studying materia medica and pharmacy. This is a work that will tax all your time and energy, if you resolve not merely to know that which others have done, but to break fresh ground, and add something of your own to the wealth of knowledge—in fact to cultivate research.

I would very earnestly press this consideration on the advanced students of this School, the men endued with a strong scientific "bent," and for whom time and means are adequate. Gentlemen, let me entreat you to do something substantial and lasting in pharmaceutical research for the reputation of this School.

I am glad to recognize the fact that such research has been honourably pursued in past years by members of this Association; these results enrich the annals of pharmacy and I rejoice to know are quoted authoritatively by foreign journals of science.

Your system of abstracting by reporters, dividing the field of reading amongst themselves, is admirable, and should be developed to the fullest extent that the time and opportunity of the staff admit.

Nothing has more painfully impressed itself on my own mind after reading and observing the work of a good many pharmacists than the want of thoroughness and consequently of finality in it. May I venture to suggest that you take up some subject and make it your own. Familiarize yourselves with the results of previous labourers; then concentrate your attention on this particular subject, if possible exhaust it, say the last word that need be said, give the ghost a respectable burial and if he dare show his head once more above ground, ring the bell, order him to leave the room and inform him when his obsequies were celebrated?

The human mind needs for its own peace something like certainty and finality.

When will "Spiritus ætheris nitrosi"—not itself, but its literature—have gone where the wicked cease from troubling, etc., etc.

You will confer an immense obligation on pharmacy by determining what are the best processes and furnishing typical standard products.

The known field of labour is so vast, requiring so many workers and such an expenditure of time and energy that it seems unkind to suggest excursions into the realms of the unknown. And yet I do so.

There is before and beyond you a boundless field of inquiry. There is not a fragment of the material creation around and above you, or a single law finding its expression in the boundless field of nature but will respond with new truth to your analytical search.

The very first plant or flower you pluck in the hedgerow may contain an active principle worth isolating. And now that new regions of the earth are being opened up by explorers and fresh products are arriving, native remedies—the unknown deities ignorantly worshipped—such remain for you to declare. Here is a field for research!

The synthetic power of the elements and their practically endless capability to combine and form new compounds.

The action of light, heat and electricity on simple and compound bodies.

These and a host of others challenge the seeker after truth; and what a reward may be yours, to open up a broad highway through the dense forest of unrevealed facts.

I purposely address these remarks to the young men before me who are conscious of the explorer's longing; this cannot be the vocation of many amongst you. The inevitably pressing claims of life will prevent you from prosecuting such investigations as have been indicated, but I have endeavoured to show that both the ordinary and the extraordinary student have their places to fill in the economy of life.

I am quite aware that I have dealt mainly with ethical and scientific considerations rather than with social and political ones.

I regret most sincerely that after a self-imposed curriculum of honest, honourable study, and passing successfully through the examination room, we cannot promise you a more secured and protected pursuit of your craft as pharmacists. It is hard, very hard, nay, it is unjust, that after you have complied with the just demands which in the interest of the public safety the State makes on you, it does not grant you a legally guarded sphere in which you can exercise your skill and find its appropriate reward.

And yet I believe in the educated pharmacist, *per se*, as the man who ought and who generally does succeed in securing his share of life's prizes.

And now, gentlemen, having urged on your attention the claim of these special studies, to pursue which you have entered this School of Pharmacy, permit me briefly to widen our field of thought, and to regard you as men of culture taking your appropriate positions in educated society.

I hope that you are fond of books. To myself they have been the great charm and solace of life. In chosen words does William Ellery Channing acknowledge his indebtedness to books:—"It is chiefly through books that we enjoy intercourse with superior minds, and these invaluable means of communication are in the reach of all. In the best books great men talk to us, give us their most precious thoughts, and pour their souls into ours. God be thanked for books. They are the voices of the distant and the dead, and make us heirs of the spiritual life of past ages. Books are the true levellers. They give to all who will faithfully use them, the society, the spiritual presence of the best and greatest of our race. No matter how poor I am. No matter though the prosperous of my own time will not enter my obscure dwelling. If the sacred writers will enter, and take up their abode under my roof, if Milton will cross my threshold to sing to me of Paradise, and Shakespeare to open to me the worlds of imagination and the workings of the human mind, and Franklin to enrich me with his practical wisdom, I shall not pine for want of intellectual companionship, and I may become a cultivated man, though excluded from what is called the best society in the place where I live."

As to your choice of books, I only need remind you of the remark of Lord Bacon, "Some books are to be tasted, others are to be swallowed, and some few to be chewed and digested."

The pharmacist, especially, needs the society thus opened up to him in the pages of great writers; his vocation demands much isolation, and in his earlier business years, at least, it may be much patient waiting for commercial success. What a charm, a dignity, and a grace may environ your lives if now you cultivate the friendship of great thinkers.

I pray you acquire and foster the love of reading; a love which introduces you to the society of the great, the good, the intellectually famous, which refines, elevates and purifies the mind, acquainting us with the discoveries of science, the inventions of art, the charms of literature, the speculations of moralists, the creations of the poet and novelist, and the records of history, travel, philosophy; such are the realms in which we are free to wander. And I am absolutely certain, speaking from of course a limited personal experience, but from a much wider observation, that a mind thus stored is compatible in every way with the discharge of the most ordinary and trivial round of duty.

A thoughtful observer has said, "It is a characteristic feature in connection with mental employments that their fruits are enduring; of all the works of men the products of thought alone give immortality." Sensual pleasures pall on the appetite by repetition, mines of wealth become exhausted, the carefully reared flower fades, mansions built with nicest care and skilful art crumble underneath the noiseless though destroying tread of time, and—

"Nations melt
From power's high pinnacle
When they have felt
The sunshine for a while
And downward go
Like an av'lanche loosened
From the mountain's belt."

Books are the pasture fields for minds to roam. Books are the gymnasia in which intellectual thews and sinews are developed. They impart knowledge, train the judgment, largely supply the place of experience, stimulate to exertion, correct erroneous impressions and teach the grace of composition, for unconsciously we acquire the style of expression of our favourite authors.

Gentlemen, may you and I so encourage the taste and habit of reading, that we may be able to appropriate the enthusiastic words of Fletcher—

"The place that does contain my books—the best companions—is
To me a glorious court, where hourly, I
Converse with the old sages and philosophers;
And sometimes for variety, I confer
With kings and emperors, and weigh their counsels—
Calling their victories, if unjustly got,
Unto a strict account, and in my fancy
Deface their ill-placed statues.
Can I then
Part with such constant pleasures to embrace
Uncertain vanities? No! be it your care
To augment a heap of wealth:
It shall be mine
To increase in knowledge—
Lights there! for my study."

You read to possess the thoughts of others; you read also to create thoughts for others; imports will vastly transcend in quantity and quality our exports; but there must be some amount of exporting, when mental health and vigour co-exist.

The world is full of thought excitants, and youth is the season in which the desire to know is most active.

The presence of these two facts—the capacity of mental excitation, which the universe possesses, and the intuitive acquisitiveness of the human mind--is the basis of all exertion to educate oneself and others.

I have previously indicated that we specially need to foster the habit of real, earnest, patient thinking. Thinking is digestion and assimilation combined.

Your thought is labour; you create and you enrich society, and such labour is the true philosopher's stone, transmuting the simplest and commonest materials of life into the enduring gold of priceless treasured lore.

"Excellence," says Sir Joshua Reynolds, "is never granted to man, but as the reward of labour. To well-directed labour nothing is denied—nothing is to be obtained without it."

To such an association as the one I have now the honour to address, all should be the taught and teachers in turn, each should aim at being in appropriate sequence pupil and educator. Here, too, may be studied the art and grace of expression.

You will find it helpful when you have something to say, to know how to say it. It is no argument to assert that thinking and speaking are often found in inverse proportions; granted that fluency is often dissociated from depth, how much more effectually would the flatulence of such pretentious talkers be knocked out of them, if only the men who know could distinctly and impressively tell us what they know?

I admit that in our path through life we are constantly meeting with men who know much, and thoroughly too, men whose social converse is an exquisite delight to listen to; men who could enrich society on a vastly enlarged scale, if only they could clothe in appropriate expression on the platform or in the tribune the thoughts that burn and breathe within their souls.

One such, a perfect enclycopædia of learning, I recently saw, and compassionated. He knew his subject thoroughly,—indeed is an acknowledged authority on it,—he rose to speak, stumbled in the attempt, became more confused, finally resumed his seat, having failed to say that which he knew thoroughly. Those who knew him esteem him none the less and value his attainments highly. I can scarcely hope that those who did not know the reality of his scholarship did him the justice he failed to do himself.

Let me present you with a more cheerful contrast.

I remember being present, some years ago, at a meeting of one of the sections of the British Association. A long and somewhat confused discussion had arisen on a difficult question, when there entered the room a gentleman who was promptly recognized by the President as an expert on the subject in hand. He was at once appealed to, and with a perfect mastery of the problem, and with a felicity of diction that was simply fascinating, he said all that was required to be said, and the debate closed, for the combined thinker and orator had spoken the last word.

Young says:—

"Thoughts shut up, want air and spoil,
Like bales unopened to the sun;
Had thought been all sweet,
Speech had been denied.
Speech ventilates our intellectual fire;
Speech burnishes our intellectual magazine,
Brightens for ornament, and whets for use."

And now, gentlemen, from these severer studies you will need relaxation and rest, and they will then be yours fairly to claim.

Have, each one of you, one or more favourite pursuits, call them what you please, "fads," or "hobbies." Do not neglect athletics, at the same time do not worship them. Cricket, football, tennis, cycling, swimming, running, skating, etc., wisely and discreetly used, each of these may assist to build up that sound body so much to be desired to enshrine the healthful mind.

Whilst for the home, where best your character can be studied and your true influence felt, music, art, architecture, etc., will each repay your devotion. And if, when you have done your immediate and close connection with Bloomsbury Square and have settled down to your life work in some metropolitan or provincial pharmacy, you honour me with an invitation to visit you, I will listen with pleasure as you show me and explain your varied collections of birds' eggs, butterflies, coins, fossils, *et hoc genus omne*; I will try and enter into your enthusiasm, and I shall quit your hospitable fireside, thankful that our dear old country has such men scattered all over the land, the very salt of society.

I am not expected to moralize on such an occasion as the present, and yet I am sure you will forgive me for reminding you of the true end of life with its priceless opportunities and responsibilities. Try and do some good in the world, for

"Life's more than health and the quick round of blood;
'Tis a great spirit and a busy heart.
We live in deeds, not years; in thought, not breath;
In feelings, not in figures on a dial.
We should count time by heart-throbs. He most lives
Who thinks most, feels the noblest, acts the best."

Gentlemen, I leave with you these few thoughts, penned amidst the pressure of many and varied duties, remembering, as Lowell says:—

"There is no wind but soweth seeds
Of a more true and open life,
Which burst unlooked for into high soul'd deeds,
With wayside beauty rife."

On the conclusion of the address a vote of thanks to Mr. Atkins was proposed by the Chairman, seconded by Mr. F. C. J. Bird, and carried by acclamation.

After a short reply by Mr. Atkins—

Votes of thanks were passed to the Chairman and to the outgoing officers, and the meeting adjourned

Parliamentary and Law Proceedings.

Prosecution under the 17th Section of the Pharmacy Act.

At the Malvern Petty Sessions on Wednesday, the 3rd instant, before Mr. C. M. Berington (Chairman), Sir John Hawkins, and Mr. W. H. Woodman Hastings, Alfred Stokes, patent medicine vendor and dealer in drugs, Church Street, Malvern, was charged with having unlawfully sold on September 22 last, to Alfred Short Wright, Assistant-Secretary to the Chemists and Druggists' Trade Association of Great Britain, half an ounce of laudanum, the same being a preparation of opium and not labelled with the name of the seller of the same.

Mr. Glaisyer, who appeared on behalf of the Chemists and Druggists' Trade Association of Great Britain, said this was a prosecution under the 17th section of the Pharmacy Act, 1868, which he read, laying special emphasis on the provisions that "for the purposes of this section the person on whose behalf any sale is made by any apprentice or servant shall be deemed to be the seller." On September 22 last Mr. Wright went to Malvern and visited the Patent Medicine and Drug Stores, Church Street, where he purchased from a man behind the counter half an ounce of laudanum. The bottle in which the laudanum was supplied was labelled "Laudanum—poison, F. J. Holdcroft, Family and Dispensing Chemist, Patent Medicine and Drug Stores, Church Street, Malvern. Prescriptions carefully dispensed." The laudanum had been tested and found to be a preparation of opium. Mr. Glaisyer went on to say that he should prove that Mr. Stokes was the proprietor of the Drug Stores in question, for his name appeared on the rate book for the district, and that he had personally paid the rates in his own name; furthermore, the defendant in the character of proprietor had made an application to the Bench in September last for a retail wine licence in respect of these very premises.

Mr. Alfred Short Wright, Assistant-Secretary to the Chemists and Druggists' Trade Association, deposed that on September 22 last he went to the shop of the defendant, on the windows of which appeared the words "The Patent Medicine and Drug Stores," and asked for half an ounce of laudanum and was served with it in a bottle labelled, which he produced. He had examined the article supplied to him and found it to be laudanum, a preparation of opium which was scheduled as a poison under the Provisions of the Pharmacy Act. He had also been present in that Court on September 22, when Mr. Stokes had made an application to the Bench for a retail wine licence for the Drug Stores in Church Street in his own behalf, stating that he was the proprietor of the Stores. Cross-examined as to whether Mr. Holdcroft, whose name appeared on the label, was duly qualified, he said he believed he was. He believed it was Mr. Holdcroft who supplied him. The only "Holdcroft" entry that appeared on the Register of Chemists and Druggists was "Holdcroft, Francis Joseph, 18, Sheep Market, Leek, Staffs," and that related, he believed, to the person employed by Mr. Stokes.

Mr. Oliver, rate collector, deposed that Mr. Stokes was rated in respect of the premises in Church Street, and had paid him the rates personally.

Mr. Beauchamp, for the defendant, said the case entirely depended upon the construction to be placed on the Pharmacy Act. Mr. Stokes might be presumed to be the proprietor of the business in question, but he had never pretended that that business was carried on by himself, and in that respect he had infringed no section of the Pharmacy Act. Mr. Stokes had studied the Pharmacy Act and had thought that he was complying in the fullest sense with its requirements. The seller of the poison was a duly qualified chemist and the bottle was labelled with the name and address of the seller, therefore he submitted that the Act of Parliament had been complied with. If the Act had been infringed Mr. Stokes had been improperly summoned, as he was not the actual seller of the poison to Mr. Wright.

Mr. Glaisyer cited the case of Templeman *v.* Trafford, where it was held that the proprietors of the shop or place in which poisons were sold must be deemed to be the sellers.

Mr. Beauchamp said that the 17th was the only section of the Act which his client had infringed, and the infringement was not a deliberate one. The offence was a trivial one and justice would be met by the infliction of a very small penalty.

The Chairman said the Bench were unanimously of opinion that the law had been broken, but did not think that the offence was one which called for a severe penalty, defendant would therefore be fined 10*s.* and costs.

Mr. Glaisyer applied for the allowance of an advocate's fee and the expenses of the witnesses there. The Bench, however, declined to allow.

Prosecution of a Co-operative Society by the Victoria Pharmacy Board.

At the Melbourne District Court on Thursday, September 9, (before Mr. Panton, P.M., and Messrs. J. M'Donald, E. Keogh, B. Rappiport, and L. Sanders), the Equitable Co-operative Society was summoned by Mr. H. W. Shillinglaw, Registrar of the Victoria Pharmacy Board, for that being a society registered under the Colonial Industrial and Provident Societies Act, 1873, and not being a registered pharmaceutical chemist, the Society did carry on business as a chemist and druggist, contrary to the section 25 of the Pharmacy Act of Victoria. There were four distinct charges.

Dr. M'Inerney, for the defence, objected that the summons had been served not on the Equitable Co-operative Society, but on Mr. Nuttall, the secretary, but the Bench overruled the objection.

The first case taken was in respect to the business of a chemist and druggist being carried on at the offices of the society, 89, Collins Street, East, on August 26, 1886.

Service of the summons at the society's office having been proved,

Henry William Shillinglaw, Registrar of the Pharmacy Board, produced the minute of the Board authorizing him to prosecute on its behalf. He wrote to the defendant society on January 14 last, calling attention to the necessity for its compliance with the Act, and after some correspondence he called and saw Mr. Nuttall, the secretary. Mr. Nuttall asked him what would be compliance with the Act, and he (Mr. Shillinglaw) told him that compliance with the Act would be to discontinue dispensing prescriptions and that portion of the business that constituted an infringement of the Act, also that the company could not carry on business under the Act.

To Dr. M'Inerney: The name of James C. Goold is on the Pharmacy Register, and on August 26, the address opposite his name was 89, Collins Street, East Melbourne. He is registered under the Pharmacy Act.

Evidence having been given as to the dispensing at the establishment of the Equitable Co-operative Society, of a prescription containing sulphate of quinine, liquor of strychnia, sulphuric acid dilute, syrup and water, and Professor Jackson, Director of the College of Pharmacy, having given corroborative evidence as the result of the analysis made by him,

The Bench, without calling upon Dr. M'Inerney, decided that the prosecution had not made out their case, and that the medicine was duly dispensed by a duly qualified chemist, that he complied with the Act in every way, and that the public was protected.

Case dismissed, with £8 3*s.* costs.

Mr. Isaacs intimated that he should appeal.

The other cases against the society were adjourned by consent, pending the result of the appeal to be Supreme Court.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Education and Examination.

Sir,—You say that it was with reluctance that Mr. Feaver's letter was published, but I should have thought the Council would have been glad to have had the opinion of as many chemists as possible respecting so important a subject as a compulsory curriculum, and had the chemists been asked their opinion I doubt very much whether Mr. Schacht would have been of the same opinion as he is now, viz., that the scheme would meet with no opposition from within the body to which it applied. Mr. Feaver is not the only pharmaceutical chemist who does not agree with this scheme for a compulsory curriculum.

I think this compulsory curriculum is not necessary, and I maintain that the chemist of to-day is sufficiently educated to carry on his business with credit to himself and satisfaction to his customers.

Do the public show any signs that they are of opinion that it would be to their advantage for the chemist to be better educated than he is? I think you will agree with me that they do not, or they would not be content to go for their drugs to those who in many cases have no pharmaceutical education whatever.

I am inclined to think that it will be well for the Council to leave this compulsory curriculum alone until such a time as it is able to offer those who tender themselves for this curriculum some advantage other than that of the education itself. It is very clear that taken as a whole chemists are better educated now than they were twenty years ago, even; yet I should be sorry to say they were any the better off in a pecuniary sense, which with most chemists is the main thing.

London, W. C. E. Palmer.

What is Laudanum?

Sir,—Your readers may be interested to read Dr. Sydenham's remarks on his celebrated preparation of opium as they appear in John Pechy's translation published 1696. He says "the liquid laudanum, which, as I said, I used daily, was prepared according to the following plain manner:—Take of Spanish wine 1 pint, of opium 2 ounces, of saffron 1 ounce, of the powder of cinnamon and cloves each 1 drachm, let them be fused together in a bath two or three days till the liquor comes to a due consistence, strain it and keep it for use. I do not think this preparation has more virtue than the solid laudanum of the shops, but I prefer it before that for its more commodious form, and by reason of the greater certainty of the dose."

In the 'London Dispensatory,' published in 1678, I find several preparations to which the term laudanum is applied. Of these, laudanum vitrioli contains no opium, and is an electuary; the great laudanum of Quercetan is abstracted to the thickness of honey, and the rest, with the exception of laudanum liquidum, are compound pill masses, one being entitled laudanum opiatum, "laudanum with opium." Several of these pill masses contain, among other things, saffron and essential oils, and this, no doubt, suggested Dr. Sydenham's formula, the chief merit of his preparation being its simplicity.

I am far from satisfied with the derivation given by your correspondents, and hope others will supply further information on the point.

While looking up this subject in Culpepper, I was surprised to find the following, the original method of preparing lanoline:—

The Manner of Preparing Œsipus.—"Take of wool uncleansed, which was taken off from the neck, ribs and shoulderpits of the sheep, put it into warm water often times, and wash it diligently till all the fatness be come off from it into the water; afterwards press it out, and lay it by, then pour that fat and filthy water out of one vessel into another, holding the vessel on high, pouring and repouring till it be froathy; let the froath settle, then take away the fat that swims on the top, pour and repour it as before till it be froathy; then again take away the fat that swims at the top; do so so often till no more froath appear, nor fat swim at top; then take the fat with the froath, and wash it up down and with your hand in clear water, so often and so long till the filth be washed from it, which may be known by the water remaining clear, and the fat being tasted do not bite your tongue, then keep it in a thick and clean pot in a cold place."

116, *Denmark Hill, S.E.* T. H. Powell.

Sir,—Your Sheffield correspondent desires some information as to "what laudanum is," and the name of an authority. Permit me to inform him that although the term "laudanum" may be in Sheffield of doubtful significance, it is throughout the county of Kent understood to apply to the Pharmacopœia tincture of opium, and this on the authority of Pereira, Squire and others.

Dover. Cantiana.

Sir,—Thanks to Mr. Jones for his reply. Mr. Bell has rightly said, we should like to know authoritatively. Knowing laudanum liquid. Sydenhamii is the true claimant to the word laudanum, then in all well-ordered pharmacies for laudanum, tr. opii, B.P., would be supplied. Yet under the name laudanum, a preparation of opium is sold, varying in quantity and menstrua from aqueous, vinous, to glycerine and water; glycerine, water and spirit to proof spirit and dilute spirit (15 to 25 p.c.). The question What is Laudanum, needs to be answered "By Authority." This question, with many others, is a most practical demonstration for pharmacists being elected on Pharmacopœia Committee, or another alternative that the Council of the Pharmaceutical Society shonld publish by authority a Pharmaceutical Pharmacopœia giving synonyms, as—official Tr. opii., syn. Laudanum; Tr. benzoini co., syn. Friar's balsam, etc.; Tr. camph. co., syn. Asthmatic elixir, Paregoric elixir; Liq. am. acet., syn. Mindererus spirit; Tr. Aloes Co., syn. Elixir proprietatis. Then the unofficial work would come in and be made official either medically or pharmaceutically, according to the accepted value. The Journal from time to time might be made the medium of publication, and annually a supplement to the Pharmaceutical Pharmacopœia might be published.

Sheffield. G. Ellinor.

Errata.—On p. 376, col. i., line 5, in Mr. Baildon's remarks, for "the Council in its opposition had been just to Scotch members" read "the Council in these propositions had been just," etc. On p. 382, col. ii., line 33 from bottom, for "bryonys" read "bryonies," and line 16 for "*Anacharsis*" read "*Anacharis.*"

S. P. S., Z., "Live and Let Live," and *D. H. Davies.*—Without insisting upon limitation of the correspondence upon the subject to persons connected with the Society, it seems at least reasonable that the discussion on both sides of the question should be confined to registered men, and authenticated by the names of the writers.

E. B. P.—Glycerine Jelly.—Dissolve 1 ounce of transparent soap in 4 ounces of glycerine with the aid of heat. While still warm add 20 ounces of glycerine. When cold, perfume to taste, and pour into glass jars. Other recipes for glycerine jelly will be found in *Pharm. Journ.*, [3], ix., 463, etc.

A. M.—The variation in the quotation was no doubt intended.

Angus.—Apply for the information to the Secretary, Mr. Ferrall, 11, Harcourt Street, Dublin.

N. P.—We are unable to identify the substance.

R. B. Betty.—We are unable to give you any information respecting the maker of the preparations in question.

H. C. Glanville.—As to the deterioration which extracts of aloes undergo during evaporation, see a paper by Mr. Aitken, *Pharm. Journ.*, [3], xiii., 501. With respect to your letter, the subject discussed in it is one upon which there is a general consensus of opinion among the readers of this Journal, but we do not think any useful purpose will be served at the present time by once more raising the question in these columns.

Communications, Letters, etc., have been received from Messrs. Bernardi, Maxwell, Harris, Allen, Clive, Lees, Campbell, Martin, Bennett, Mens Sana, etc., Alpha, P.F.

SOME OF THE DRUG EXHIBITS AT THE COLONIAL AND INDIAN EXHIBITION.*

BY E. M. HOLMES, F.L.S.,

Curator of the Museum of the Pharmaceutical Society.

It would obviously be impossible in the course of one evening to review the whole of the vast mass of material included in the drug exhibits at the late Colonial Exhibition. It will be practicable only to notice a few of the more important drugs and to briefly allude to others of possible interest for the future, offering such comments as may perhaps prove suggestive to the pharmacists of this country and useful to the cultivators or exporters of drugs in the colonies.

I may perhaps be allowed before entering into details to make a few general remarks, suggested by frequent visits to the Exhibition and by a careful examination of the crude drugs there exhibited.

In the first place the quality of the products exhibited indicated that the requirements of the London drug market are not well understood in the colonies. I say advisedly the London drug market, because it is generally acknowledged that London is the principal market for drugs in the world.

In the majority of cases drugs had been evidently collected with the least possible trouble and apparently in ignorance of the fact that the price realized will depend in great measure on the care bestowed in preparation for the market. Thus the bitter orange peel exhibited in the West Indian Court possessed neither the form nor colour required in the drug trade. Cinnamon was also shown, from several colonies, which would not compare in flavour or appearance with that from Ceylon, with which it must compete if it is grown for the drug or spice market. Beeswax affords another instance in point. Although it is easily clarified there was hardly a clean specimen of good colour to be seen in the Exhibition.

In the second place, it was noticeable that the best and most important of the drugs exhibited were those prepared either by colonists who combined pharmaceutical and chemical knowledge with operative skill, or by analytical chemists in the employ of the Colonial Governments. I may instance the excellent samples of essential oils and various pharmaceutical products manufactured by Mr. Bosisto, of Victoria, and Mr. Sharp, of the Seychelles, both of whom are members of this Society; the very interesting preparations sent by Dr. Bancroft, of Queensland; and the fine series of pharmaceutical products of essential oils from Mr. Staiger, of the same colony, from Mr. McCarthy, of Trinidad, Mr. J. J. Bowrey, of Jamaica, and Mr. F. Bert, of Barbadoes, all of whom are analytical chemists.

In the third place, an ignorance of the physical appearance by which drugs are distinguished was evident from the fact that several drugs were exhibited under erroneous names. Thus the ipecacuanha shown in the West Indian Court was not the true drug, but that of *Asclepias curassavica*, which is locally used under that name. The sarsaparilla exhibited in several of the West Indian Courts was the root of *Bromelia Karatas*, although the true drug was shown in the Honduras and Barbadoes Court. This want of accurate knowledge in the colonies has probably often to be deplored by the drug merchants and brokers in this country, to whom such drugs are consigned for sale.

In the fourth place it seems remarkable that a large number of colonial products which could be obtained in almost unlimited quantity, are practically unknown in commerce in this country. Thus the oil of the purging nut, and even the seed itself, does not appear to be known here, although about 300,000 bushels of the seed are annually sent from the Cape de Verde Islands to Portugal for the expression of the oil. Crab-nut oil, which thirty-five years ago was awarded a prize medal at the International Exhibition, and which could be procured in almost unlimited quantity from both British Guiana and West Africa, is not yet an imported article of trade in this country, and many other instances could be adduced. These facts suggest the importance to the colonies of employing thoroughly competent chemists, possessing not merely a knowledge of applied chemistry, but a familiarity with the appearance and character of ordinary commercial products, whose business it should be to investigate and report on the native productions in such papers or publications as come under the cognizance of commercial men.

The lack of knowledge in the colonies of the requirements of the home markets and the absence of information in this country concerning valuable colonial products indicate the necessity for a central building in London and other large commercial towns where samples of colonial products sufficiently large for examination and experiment could be obtained, together with all published information concerning them. Such an institution, containing series of samples from different colonies, would prove doubly instructive: in the first place by showing whence the finest qualities of any product could be most easily and cheaply obtained; and, secondly, as an educational department in commercial knowledge for intending emigrants to the colonies.

I will now pass on to notice some of the drugs exhibited at the Colonial and Indian Exhibition. For our present purpose these may be grouped under the following heads:—Medicinal drugs, medicinal spices, essential oils and camphor, fixed oils and fats, gums, resins, and saccharine substances.

Of the official medicinal drugs, *i.e.*, those recognized in the British Pharmacopœia, the following possessed of tonic or febrifuge properties were shown, viz., cinchona, nux vomica, quassia, hops, bitter orange peel, chirata, cascarilla, and bebeeru.

The most important exhibits of cinchona bark occurred in the India, Ceylon, and Jamaica Courts; the principal barks shown being those of *C. Ledgeriana*, *C. robusta*, *C. officinalis*, *C. Calisaya*, and *C. succirubra*. The last-named was also exhibited from the Mauritius, Perak, and Fiji.

By far the larger proportion of cinchona bark is purchased for the manufacture of quinine, and as each bale is usually analysed before being sold the appearance of the bark is to the quinine manufacturer but of little consequence. To the pharmacist, however, it is of importance to be able to distinguish between the different varieties by their physical appearance, since one variety of bark is sometimes prescribed in preference to another. Lately a great quantity of cinchona bark in the form of shavings has been sent to this country, which it would be almost impossible to refer to any particular species. Fine bold quills for druggists' purposes often fetch a higher price in the market than they are intrinsi-

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cally worth, *i.e.*, judged by the percentage of crystalline sulphate of quinine they afford. In view of this fact, and of the low price at present paid for cinchona bark, a careful selection of well-marked varieties might prove as advantageous to the planter as it would be welcome to the pharmacist. The barks most suitable for this purpose are the Calisaya bark from Madras, which presents the same characteristic appearance as the cultivated Bolivian bark, viz., a predominance of longitudinal fissures, with comparatively few nearly circular transverse cracks; the variety of *C. officinalis*, known as *C. crispa*, which yields a peculiarly corky bark of good quality, and which is thus easily recognized from other varieties; and the red bark of India and Ceylon, having a peculiar warty appearance. But on the other hand the hybrids between *C. officinalis* and *C. succirubra* cultivated in Ceylon and elsewhere, and the variety of red bark chiefly grown in Jamaica, are by no means easily recognized. Renewed bark and shavings are still more difficult to assign to their respective species. These are therefore less suitable for the use of the pharmacist.

Nux vomica seeds were shown from Trinidad and Ceylon. It may be interesting to exporters of these seeds to direct attention to the fact lately demonstrated by Messrs. Dunstan and Short (*Pharm. Journ.*, [3], xv., p. 6), that the seeds grown in Ceylon are much richer in strychnine than those either of Bombay, Madras or Cochin China, and that as the principal use of these seeds is for the preparation of strychnine the Ceylon variety would best repay cultivation.

The specimens of quassia exhibited in the Tobago and British Guiana Courts were derived from *Quassia amara*, and not from the official tree, *Picræna excelsa*.

The hops exhibited in the Canadian Court were of very good colour and aroma, and the specimen in the New Zealand Court was of fairly good quality. Bitter orange peel, which was exhibited by several colonies, was badly dried, and consisted of quarter sections, instead of carefully dried strips of good colour as sold in this country. Chirata, bebeeru and cascarilla did not present any feature worthy of special notice, except that the latter was shown in very slender quills, as if derived from the twigs or small branches only.

Of sedative or anodyne medicinal drugs the following were exhibited:—Opium and poppyheads, coca leaves, Indian hemp and aconite. With these Calabar beans may be classed for the sake of convenience. Opium was, of course, well represented in the Indian Court, but elsewhere was observed only in the Victoria Court, where excellent specimens were exhibited by Mr. Bosisto. These have been shown by analysis to yield 10 per cent. of morphine in the crude state, and 11½ per cent. when dried. The Victorian-grown opium is protected by a duty of 20s. per pound on imported opium, but the quantity produced in the colony is not at present sufficient to meet the local demand for it. Indeed it appears doubtful, owing to the high price of labour in the colony, whether it could be produced at a sufficiently low price to compete with Turkish opium. It is a suggestive fact that the great bulk of the official or medicinal opium used in the world is supplied by Turkey, although there can be little doubt that opium of quite as good quality could be prepared in India. As at present made in the latter country opium usually contains more narcotine and less morphine than Turkish opium. This may be due to the tedious process of preparation of the drug for the Chinese market, or to the particular variety of poppy employed (var. γ *album*) which differs from that used in Turkey (β *glabrum*). In view of the immense increase of opium production in China during the last few years, and the probable growth of a taste for the home-made article in that country, the suggestion naturally occurs, whether the preparation of medicinal opium in India might not yield an important addition to the revenue of that country, and at the same time, render this country independent of the Turkish product.

The poppy heads exhibited in the Victoria Court were borne on stems more than six feet in height, which shows the luxuriance with which the plant grows in that colony.

Coca leaves were exhibited from Jamaica and Dominica, but as yet are probably grown there only as an experiment. The alkaloid contained in the leaves so readily undergoes decomposition that the greatest care will be necessary in drying and preserving the leaves, if they are intended to compete with the South American drug as recently imported.

Aconite root and *Cannabis indica* were exhibited only from India. Concerning the latter it is important to note that the strength of the drug appears to vary greatly, according to the district in which it grows. According to Dr. Watt, the flowering tops which are more or less cylindrical are possessed of much greater medicinal activity, and fetch a considerably higher price in India, than those which are simply compressed. The tincture made from the former is likely to produce alarming symptoms if given in the same dose as that prepared from the latter. This difference does not appear to be recognized in the British Pharmacopœia.

The aconite root did not appear to be sufficiently uniform in character for use in medicine in this country, although some good specimens from Nepal, collected by Dr. Grimblett, were exhibited.

Fine specimens of Calabar bean were shown in the Ceylon Court and also from Lagos and Gambia. It may be here pointed out that a variety of this bean which contained more alkaloid than the ordinary kind was imported into England a few years ago. It was more oblong in shape and had a longer hilum or scar. In the case of many drugs, and especially poisonous drugs of which a limited quantity is used, the market is often spoiled, so far as the interests of the colonies are concerned, by an over supply being sent at one time, so that the prices realized hardly pay for collection, or may even entail a loss.

Of purgative drugs, aloes, jalap, *Cassia Fistula* and senna were exhibited. Aloes was very poorly represented, a solitary gourd of Barbadoes aloes, apparently of inferior quality, being shown in that Court, while in those of Natal and the Cape of Good Hope no specimens were noticeable. It may be here mentioned that the botanical source of the opaque aloes known in commerce as "Natal" or "Hepatic Cape" has not been accurately determined and that the cause of its opacity is also unknown. Barbadoes or Curaçoa aloes is sometimes translucent at first and becomes opaque on keeping, but there is no evidence that this is the case with Natal aloes. Fine pods of the *Cassia Fistula* were shown in the St. Lucia Court. Senna leaves were shown in the India Court and in that of the Cape of Good Hope. That from the Cape had been collected in the Hopetown district,

where the plant is exceedingly abundant. The leaves appeared to be those of *Cassia obovata*, a species the leaves of which were formerly mixed with those of *C. acutifolia* in Alexandrian senna, but are now rarely found in it. This kind of senna is stated to be less active than the leaflets of *C. acutifolia* and *C. angustifolia*. Some very large leaflets from plants cultivated at Barcelona were offered in the London market a year or two since and some has this year been sent from Tinnevelly, but neither, I believe, were purchased; nevertheless, comparative experiments concerning the relative strength of these species might be useful to confirm or otherwise previous statements; in any case it might serve as a substitute for senna at the Cape. Indian bael is intermediate in character between the purgatives and astringents and may be mentioned here as occurring in the Indian Court. The fresh fruit has so delicate and pleasant a flavour that a conserve or syrup of the fruit might possibly meet with acceptance as a laxative in this country.

Of astringent official drugs there were exhibited catechu, kino, logwood, galls, and areca nuts.

Pale catechu was shown in the Straits Settlements Court in two or three forms, viz., in large and small cubical pieces and in the form of flattened discs; the latter were of a pale colour and intended for chewing with betel nut. In this connection it may be useful to recall the fact noticed by Dr. Haygarth Addison that pale catechu produces a tonic effect on the nervous system entirely apart from its astringent action (*Pharm. Journ.*, [3], xvi., p. 720). It has not yet been determined whether this action is due to quercetin or to catechin, or to some other constituent of the drug. Kino was represented by several different preparations. The official drug was exhibited only in the Indian Court. From the Seychelles an elegant product obtained from *Pterocarpus indicus* was shown by Dr. Brooks, and in the Victoria Court Mr. Bosisto exhibited an Australian kino, entirely and readily soluble in cold water, side by side with the crude insoluble product obtained from the red gum tree, *E. rostrata*. In the Queensland Court several products of the kino class obtained from various species of eucalyptus were shown by Dr. Bancroft; of these I have been unable to obtain specimens from the Executive Commissioner.

It is remarkable that the original kino, which is a product of gambier and which affords a satisfactory tincture, is not represented in the West African Court, although the tree that yields it (*Pterocarpus erinaceus*, Poir.) is a native of West Africa, from Senegambia to Angola. A product intermediate in character between kino and catechu was shown by Mr. Bosisto in the Victoria Court. It resembled kino in appearance, but was styled Australian catechu. It was an extract made from the waste chips of wattle bark, and could doubtless be made on a scale sufficiently large for tanning purposes if required.

Logwood may be noticed under the head of astringents, being used in medicine for that purpose. It is of interest also on account of its use for staining microscopical preparations. It does not appear to be generally known that microscopists distinguish different varieties of logwood, one of which gives a bluish and another a purplish-red stain; whether this is due to inherent differences in the wood or to more or less exposure to light and air is not clear. It appears, however, from the Official Catalogue of British Honduras that there are two varieties of the tree, of which the broad-leaved one is considered the most valuable, on account of the solidity of the timber and of its yielding a larger quantity of the dye, whilst the smaller-leaved tree is said to yield the better quality. Specimens from Jamaica, British Honduras, Dominica and Tobago are shown in the Exhibition. The varieties recognized in the London market are, I believe, the following, which are here placed according to their relative values:—Campeachy, Honduras, St. Domingo and Jamaica.

Galls and areca nuts were shown in variety in the Indian Court. Of the former I may observe in passing, that the galls of the *Tamarix articulata* and of *Terminalia Chebula* appear likely to prove of considerable value for tanning purposes, on account of the richness in tannic acid and the pale colour of their extract. Pomegranate bark was shown in the Jamaica Court, of a quality much superior to that ordinarily met with in commerce.

Of demulcent medicinal drugs, linseed is the most important, and was shown in great variety in the Indian Court. It is worthy of note that the cultivation has commenced in Canada, and that samples were exhibited in the Court of that colony. Hitherto nearly the whole, if not all the linseed used for flax growing has been derived from Russian ports, the product of a cold climate being apparently more suitable for growing purposes. It may be hoped that Canadian linseed, or that from the northern parts of India, will in future years replace that of Russia for this purpose. Indian linseed frequently contains numerous seeds of cruciferous weeds, particularly of species of *Brassica*, which by reason of their containing a sweet or non-drying oil render the linseed oil obtained by pressure of a less drying character, and therefore of less value commercially. The only other official drug conveniently referable to this class, worthy of notice, is buchu, concerning which it may be observed that certain varieties of these leaves, which are more highly esteemed at the Cape of Good Hope than those official in the British Pharmacopœia, are frequently sent to this country to the loss both of the shipper and of the consignee. Such varieties are always rejected by English druggists.

Of alterative drugs sarsaparilla was exhibited from British Honduras and Jamaica. The latter, however, was not the article known in commerce as Jamaica sarsaparilla (which really comes from Panama), but resembled the Honduras sort in having a thick and mealy bark, while it differed from it in the orange-red colour of the bark. The Panama drug, which fetches the highest price in the market, and is the most esteemed, has a thin wrinkled brownish bark.

The sarsaparilla exhibited by the other West Indian colonies was the root of *Bromelia Karatas*, and would not be recognized in this country as sarsaparilla.

Several colonial remedies that have recently been introduced into Europe and America were shown in various Courts. The pretty scarlet and black seeds of *Abrus precatorius* formed a conspicuous object in several of the West Indian Courts and also in that of British Guiana. *Alstonia constricta* bark, *Duboisia* and *Euphorbia pilulifera* were shown in the Queensland Court, *Piscidia erythrina* in the Jamaica, and papaine in the Seychelles and Dominica exhibits.

With respect to the non-official medicinal products of the Exhibition it is possible to regard them from

two points of view: the one being that of Colonial Governments, which are naturally anxious to obtain indigenous substitutes of equal value for expensive drugs imported from the mother country; the other is that of the pharmacists of Europe and America who may be desirous of ascertaining if any of the colonial drugs possess medicinal properties which are worthy of careful investigation or are superior in quality or value to others at present in use. The latter point of view is the only one which falls within my province to-night, the former may safely be left to the medical profession in the colonies.

The following list includes the colonial drugs which were accompanied by statements indicating that they possess medicinal properties worthy of closer investigation both by the chemist and the medical profession.

As an alterative *Siegesbeckia orientalis* is highly recommended by Dr. Daruty, of Mauritius, in infantile cachexia and as an application to gangrenous wounds. The active principle, darutyne, was shown in the Mauritius Court. The root of *Arctopus echinatus* has long been used at the Cape of Good Hope for cutaneous eruptions; *Rourea fulgens* is used for leprosy in the Straits Settlements, and lukrubau seeds at Hong Kong. For skin diseases, henna leaves are employed in the Straits Settlements and henna seeds in Gambia, and the bark of *Acacia falcata* in New South Wales, and *Melianthus major* at the Cape. For ringworm the yellow juice of *Haronga madagascariensis* is employed in the Mauritius, and that of *Bocconia frutescens* in Jamaica, and the sap of *Laplacea Hæmatoxylon* in St. Vincent; also the leaves of *Cassia alata* in India, and the seeds of *Vatairea guianensis* in British Guiana.

For asthma *Gymphocarpus fruticosus* and *Gleichenia dichotoma* are used in the Mauritius, and *Euphorbia maculata* in St. Vincent. *Atherosperma moschatum* is highly spoken of by Mr. Bosisto as giving relief in asthma and bronchitis, and *Phytolacca stricta* is used at the Cape for pulmonary diseases.

As antiperiodics the bark of *Michelia Champaca* is used in Mauritius, *Thevetia neriifolia* in the Straits Settlements, and proteacin, prepared from a species of *Leucadendron*, at the Cape, the latter drug being recommended by Dr. J. H. Meiring Beck. As a tonic in flatulent indigestion boiari root seems to find general acceptance in British Guiana.

As anthelmintics, *Quisqualis indica* is used in Mauritius, and *Leucas linifolia* in the Straits Settlements.

As resolvents, *Coleus atropurpureus* and *Plumbago rosea* are employed in the Straits Settlements.

As nervine tonics, *Eryngium fœtidum* is considered useful in Jamaica, and keng root in Gambia.

Emmenagogue properties are attributed to *Poinciana pulcherrima* in Mauritius. *Cissus capensis* and *Sanseviera thyrsiflora* are stated in the Cape of Good Hope Catalogue to give relief in hæmorrhoidal complaints.

Antiseptic properties appear to be present in *Cyperus articulatus*, used in Jamaica to stop vomiting; in *Lichtensteinia interrupta*, *Teucrium africanum* and *Cluytia hirsuta*, used at the Cape of Good Hope, the two former being employed in splenic fever. The following, from their poisonous properties, also seem worthy of chemical investigation: aramata, coroo-coroo and moraballi bark, devildora root, haiari root (*Lonchocarpus densiflorus*) and the seeds of *Cacoucia coccinea*, from British Guiana; tuba root (*Derris elliptica*) from the Straits Settlements; *Toxicophlœa Thunbergii* and *Hyænanche globosa* from the Cape of Good Hope; poison-wood from British Honduras, and *Elœodendron orientale* from the Mauritius.

Medicinal Spices.

The best exhibit of cinnamon was that of Ceylon, the specimens from Jamaica, Barbadoes, Fiji and Sierra Leone being all inferior in aroma as well as in appearance; that from St. Lucia was by no means deficient in aroma, but consisted of thick bark, and would only be marketable for making the powdered drug or for distillation of the essential oil.

The cardamoms from Ceylon were the finest in the Exhibition, but official cardamoms were also shown from Jamaica and Grenada, and round cardamoms from the Straits Settlements. The seeds of the latter are hardly distinguishable by taste from the official kind. The long grey cardamoms, known in commerce as Ceylon cardamoms, were also shown. These are said to be obtained always from wild plants by the natives. The seeds possess less aroma than the official kind and are of a slightly different character, nevertheless they appear frequently in the London drug market.

Nutmegs were shown in the Ceylon Court and also in those of Jamaica, Grenada, St. Vincent, St. Lucia and Dominica, the Grenada specimens preserved in brine being particularly fine. The nutmegs and mace in the Fiji Court were valueless as spice, being entirely deficient in aroma.

Cloves were exhibited from the Seychelles, Ceylon, St. Lucia and Dominica, the two first-named being the finest.

Ginger was shown by Jamaica, Barbadoes, St. Lucia, Dominica, Montserrat, British Honduras, the Gold Coast, and Sierra Leone. None of the exhibits presented a very good appearance, and some being in the growing state it was difficult to pronounce any opinion upon them.

Pepper was shown by Ceylon, North Borneo, and the Straits Settlements, but none of the specimens appeared to be particularly fine.

Allspice was shown by Jamaica and Ceylon, and the berries of the nearly-allied *Pimenta acris* in the St. Lucia Court.

Dill and fennel fruits were observed in the West Indian Court, and coriander fruit in that of Natal.

Mustard was exhibited in variety from India and sparingly from Natal and the West Indies.

Excellent specimens of chillies were exhibited from Natal, and both chillies and capsicum in great variety in nearly all the West Indian Courts and in British Guiana.

Canella bark was shown from Jamaica, Trinidad and the Bahamas, but none of the specimens were equal to those frequently obtainable in the London market.

Of non-official spices, vanilla was well represented in the Exhibition; the finest specimens were those from the Seychelles and Mauritius. Tonka beans, as fine as those of Para, were shown in the British Guiana Court.

Essential Oils.

Comparatively few of the essential oils used in medicine were shown, but there were many others that should possess considerable value in perfumery.

Oil of cloves was represented by some excellent specimens in the Seychelles Court. These had

been prepared respectively from green cloves, dried cloves and clove stalks.

The oils of cinnamon bark and leaf were shown both from Ceylon and from the Seychelles. The oil from the leaf possesses an odour different from that of the bark, resembling a mixture of cloves and cinnamon, and is, I believe, chiefly used for scenting soaps. Oil of cassia distilled from the leaves and twigs was shown in the Hong Kong Court, and oil of cajuput only from the Straits Settlements. An oil prepared from the fresh leaves of *Melaleuca Leucadendron*, var. *lancifolia*, Bail., exhibited in the Queensland Court, and supposed to be "similar, if not identical with cajuput," differs in having a much more disagreeable odour; that of *Eucalyptus populifolia* does, however, closely resemble cajuput in odour.

Oil of lavender was shown only by Mr. Bosisto, as a product of Victoria. Athough not equal to Mitcham oil, there is little doubt that this able and energetic pharmacist will succeed ultimately in having an excellent article prepared from Victorian flowers.

Oil of peppermint of excellent quality, prepared from plants grown in Victoria, was also exhibited by Mr. Bosisto. Some years ago it was offered in this country, but the price obtained (25*s*. per lb.) was not sufficiently remunerative to lead to a repetition of the experiment. Peppermint oil and menthol were also exhibited in the Hong Kong Court by Messrs. A. S. Watson and Co. According to information furnished by these gentlemen the oil is distilled from several kinds of mint, and is used in neuralgia and indigestion.

Oil of sandal-wood was exhibited in the India Court and also in that of Victoria (see *Pharm. Journ.*, [3], xvi., p. 820). The oil imported from India is generally so adulterated with fixed oil, and is so opaque, that English dealers prefer to distil the oil from the imported wood. There can be no reason, however, why the pure oil should not be imported direct for medicinal use, if carefully prepared in Mysore under the superintendence of a qualified chemist. Some fine logs of sandal-wood (*Santalum Yasi*) were shown in the Fiji Court, but no sample of the oil. A specimen prepared from Australian sandal-wood was shown by Mr. Bosisto. Besides the above official oils there were a large number of others deserving of notice, as capable of being used as flavouring agents, or in perfumery. Oils prepared from the rind of the lemon, lime, orange, shaddock and citron formed prominent features in several of the West India Courts. A sample of oil of limes in the Trinidad Court, prepared from what seems to be a hybrid between a lemon and a lime, was shown, together with the fruit from which it was obtained; it resembles a very fine specimen of essence of lemon in flavour and odour, but gives chemical reactions like oil of limes. The ecuelled oils both of limes and lemons were far superior in point of odour to those prepared by distillation. The ecuelled oil of lemons from the West Indies might well compete in the European market with much that is now derived from Sicily. Other essential oils that might be employed as flavouring agents are the oil of sweet basil, exhibited by the Montserrat Company and by Dr. Hollings in the Montserrat Court, the oils of pepper and mace from the Straits Settlements, and the oil of pimento from Jamaica and St. Lucia.

Some of the oils which might be made available in perfumery are the following. In the Indian Court, oil of *Pandanus odoratissimus*, having an odour like honey; oil of henna flowers, resembling in odour a tea rose; and the aromatic oil of champaca flowers. In the Straits Settlements Court, oil of balsam of Peru pods, resembling the perfume of bean flowers in odour; and the oils of *Canella alba* and cascarilla. In the Montserrat Court the Montserrat Company exhibited a specimen of oil of lime leaves, which had a peculiar fragrance of its own, quite distinct from that of neroli. Apparently the only specimen of oil of bergamot in the Exhibition was shown by the same firm. An oil of wild ginger (*Renealmia sp.*?) was shown in the Dominica Court that possessed a peculiar fragrance of its own. In the Jamaica Court several novelties in essential oils were exhibited, including those of *Critonea Dalea*, which has an odour of new-mown hay; *Hedyosmum nutans* and *Micromeria obovata*, which are not especially attractive in odour, and the oil of *Juniperus Bermudiana*, which has a perfume resembling that of oil of cedar. The oil of bay leaves (*Pimenta acris*), used in making bay rum, was exhibited in several of the West Indian Courts; it appears to be chiefly sent to the United States.

In the Queensland Court several oils derived from different species of eucalyptus were shown. Of these the oils of *E. Planchoniana* and *E. dealbata* resemble citronelle, and those of *E. Staigeriana*, *E. citriodora* and of *Backhousia citriodora* resemble the oil of lemon grass.

It is remarkable that there appears to be a much larger demand for oil of citronelle than for that of lemon grass, or verbena as it is commonly called, the former being probably more largely used for perfuming soaps. The oil of *Atherosperma moschatum*, exhibited in the Victoria Court, and that of *Nesodaphne obtusifolia* in the Queensland Court, both resemble sassafras in odour; the former, however, in a dose of a very few drops, is, according to Mr. Bosisto, quite poisonous, producing stoppage of the heart's action. Other essential oils worthy of notice are the fine specimens exhibited in the Victoria Court of the oils of *Eucalyptus amygdalina*, *E. dumosa*, *E. oleosa* and *E. globulus*. These oils, particularly *E. oleosa*, possess a remarkably solvent action on many resins that are not soluble or only partially so in alcohol, but on account of their high price could only be used for varnishes employed by artists, for which purpose they are said to have the advantage of rendering the colours brighter. According to Mr. Bosisto the oil of *Eucalyptus globulus* soon darkens in colour and becomes oxidized and resinified when exposed to light. A very fragrant essence of the flowers of *Acacia pycnantha*, prepared by enfleurage, was shown in the Victoria Court. It seemed quite equal in fragrance to the *pommade de cassie* prepared in the South of France. In the North Borneo Court the oil derived from the Borneo camphor tree was exhibited. This also might possibly be useful in dissolving some resins or in rendering them soluble in alcohol.

This oil does not appear to be so well known as the Chinese camphor oil, of which as much as 94,500 lbs. is said to have been imported into the United States during the past sixteen months. Chinese camphor was shown only in the India and Hong Kong Courts, and specimens of Borneo camphor in that of North Borneo. Under the supposition that Borneo camphor is probably not preferred by the Chinese without reason, I forwarded

some specimens kindly supplied by the Acting Commissioner at the North Borneo Court to Mr. R. Stockman, of Edinburgh University. The taste is not so unpleasant as that of Chinese camphor.

Before leaving the subject of essential oils it may be pointed out that nearly all the essential oils obtained from flowers in India are spoiled by mixing them with sandal-wood oil and after with fixed oils. Until prepared in a state of purity they are not likely to come into the demand that might otherwise arise on account of the exquisite fragrance of many of them.

Fixed Oils and Fats.

The principal official oils exhibited were castor oil and olive oil. The former was shown from nearly all the West Indian Courts, British Guiana, South Australia, Ceylon, Fiji, and the Seychelles, but only that from the last-named colony possessed the clearness and brilliancy to which we are accustomed in this country. Olive oil was shown from South Australia and New South Wales, but as yet it is only prepared in South Australia in commercial quantities. There appears to be no reason why this colony, as well as the Cape and Natal, should not in future years supply a better and purer oil than the too often adulterated product now obtained from the shores of the Mediterranean, especially if the best varieties of the olive be cultivated for the purpose.

Croton oil was shown in the Hong Kong Court, and some very fine specimens of the seeds were noticeable in that of Ceylon. Of the official fats cacao butter occurred in the Trinidad Court, but was not of superior quality. Beeswax, obtained either from domesticated or wild bees, was exhibited in nearly every Court, but for the most part the specimens exhibited were very dirty and inferior, some flat circular cakes exhibited by Mr. Fabien in the Trinidad Court being the only presentable specimens that were noticed. A large number of non-official oils were exhibited in the different Courts, some of them being obtainable in large quantities from more than one colony. This was the case with carapa or crab oil, which was shown in the British Guiana and Trinidad Courts, and is a product also of Western Africa. It has a bitter taste, and is used by the natives as an insecticide, a property which, if retained when the oil is saponified, might be turned to useful account.

The oil of *Jatropha Curcas* appears to be largely used in some parts of the Continent. It yields a purgative sweet oil of pale colour, and of a consistence much thinner than castor oil. Probably it might prove valuable as a stimulant hair oil, possessing the advantage over castor oil of being free from any disagreeable odour. It could be obtained in sufficient quantity for soap making and illuminating purposes, the plant being common in all semi-tropical countries.

The oil of various species of *Aleurites* was shown in several Courts, that from Queensland and the Seychelles being almost colourless and quite clear. This oil could be obtained in unlimited quantity, and might also be useful as an illuminating oil or in soap making, being comparatively inexpensive. The oil of *Aleurites cordata*, exhibited by Messrs. A. S. Watson and Co. in the Hong Kong Court under the name of wood oil, is remarkable for its drying properties, which have already been described in the *Pharmaceutical Journal* ([3], xv., p. 636, 637). Other Chinese oils exhibited by the same firm were those of tea seed (*Camellia oleifera*), which is used by the Chinese as a substitute for olive oil, and also as a lamp oil, oil of cabbage seed, oil of peach and apricot kernels, and oil of soy beans, used both for cooking and illuminating purposes, all of the above being obtainable in large quantities. A very pale, sweet and bland oil is obtained both in China and West Africa from the seeds of several varieties of a melon, which yield on an average about 30 per cent. of oil. Under the name of "egusi" these seeds are exhibited in the West African Court.

Numerous specimens of cocoa nut oil were shown in several Courts, that from Seychelles being very white, and a specimen in the British Guiana Court was not only very white but unusually solid, and was pronounced by experts to be the best in the Exhibition. The yellowish oil of the king cocoa nut was shown in the Ceylon Court. This is remarkable for being free from the odour of the cocoa nut, and is therefore more suitable for use in perfumery.

In the Tobago Court the oils derived from the seeds of the grugru (*Acrocomia sclerocarpa*) and cokerite (*Maximiliana insignis*) palms; in the British Guiana Court, that of the acuyuru palm (*Astrocaryum Tucuma*); and in the British Honduras Court a white semi-solid fat from the seeds of *Attalea Cahune*, known as Cahoon oil, were shown.

In the India Court a large number of oils were exhibited, but many of these from exposure to light had become rancid. The white semi-solid oil derived from the kernels of *Anacardium occidentale* was, however, noticed to be still sweet.

The oil of *Bassia longifolia*, exhibited in the Mauritius Court, is a sweet oil having the colour and consistence of butter, but has a peculiar flavour, although almost free from odour. Another solid oil in the India Court, obtained from the seeds of *Garcinia indica*, is used in India as a substitute for spermaceti ointment, and having hardly any odour and a pleasant bland taste deserves more attention than it has hitherto received.

Myrtle wax, obtained from the berries of *Myrica cordifolia* and other species, was shown in the Cape of Good Hope Court It is a hard but brittle wax.

Oleoresins and Resins.

Of those official in the British Pharmacopœia copaiba was exhibited in the British Guiana Court. The specimens were of a pale colour and good consistence, but it is remarkable that it does not appear to be recognized as a commercial variety in this country. Gamboge was exhibited in the Ceylon Court; guaiacum in that of the West Indies; benzoin, of very inferior quality, was but poorly represented in the Straits Settlements Court; and Chian turpentine in the Cyprus Court. The Ceylon gamboge is not as yet well known in this country; a consignment sent to England three years ago fetched £14 5*s.* per cwt.

A kind of elemi was shown in the British Guiana and West African Courts, but in both cases of too hard a consistence to replace the Manila drug. There was also in several of the West Indian Courts a product resembling elemi in appearance and consistence, but having a more terebinthinate odour, that in the St. Lucia Court having a pleasant odour more resembling olibanum. These products are used as incense, the dirty and inferior pieces being made into torches.

Resins suitable for making varnishes were shown by several colonies. Fine specimens of Kauri resin

were observed in the New Zealand Court. In the British Guiana Court there was a very hard resin, known as Demerara or Brazilian copal; of this there were two varieties, one pale in colour and evidently of more recent production than the other, which was more yellow and harder. This resin appears to be but little known in English commerce as yet, but I am informed that those who know how to dissolve it find that it makes an excellent copal varnish. I may remark in passing that the oil of *Eucalyptus oleosa* dissolves it perfectly and in considerable quantity. A very white and tolerably hard resin, which is said to form an excellent picture varnish, was shown by Dr. Oudaatje in the Ceylon Court. It is the product of *Doona zeylanica*. A very white specimen of copal resin was shown in the West African Court. But there were many other resins in the Straits Settlement, India, and other Courts that may be worthy of attention, a particularly fine specimen being shown in the North Borneo Court of a yellowish hard copal, soluble in eucalyptus oil.

A remarkable substance shown in the British Guiana Court, called karamanni, is deserving of notice on account of its low melting point and its great tenacity. It appears to be a mixture of the yellowish resin known as hog gum, the product of *Moronobea coccinea* and beeswax, and may be compared to marine glue for its usefulness.

Gums.

The India Court was undoubtedly the richest in gums, but many of these are collected so carelessly that their commercial value is much reduced thereby. Only one of them, that of *Anogeissus latifolia*, at all approaches gum arabic in character, but none of those as yet examined appear to be capable of entirely replacing the Soudan gum. For this purpose the gum should be easily soluble in cold water, give a clear mucilage of an adhesive character, should not be darkened by iron salts, and the froth formed in dissolving it should quickly disappear.

A very good sample of gum was shown from Gambia, which bore a strong resemblance to the Soudan gum. From the Cape of Good Hope the gum of *Acacia horrida* was shown. This resembles gum arabic in appearance, but is somewhat yellower and gives a weaker mucilage. A much better gum has, however, recently been sent from the Cape than the sort generally received from that colony.

The gums shown in the Australian Courts were of the usual dark-coloured characteristic appearance. In the West Indian Court were two gums worthy of notice. One of these, the gum of *Anacardium occidentale*, dissolves but slowly, but makes an adhesive mucilage which is used in Jamaica as a substitute for gum arabic. It is obtainable in large quantities. The other was that described under the name of white cedar gum. It does not possess adhesiveness, but a small piece gives a thick mucilage with a large quantity of water, a quality which if the gum proves to be harmless in character might prove very useful for suspending powders in mixtures, or for sizing purposes.

Saccharine and Dietetic Substances.

Of the official substances of this character, honey was exhibited by the majority of the colonies, but the finest display was that made by Canada, which exhibited two varieties, called clover and linden honey, which in point of colour and flavour left nothing to be desired.

Tamarinds were exhibited in several Courts, those from the West Indian Court being particularly fine.

Lime juice was largely represented by the exhibits of the Montserrat Company, and good specimens were also observed in the Dominica and Trinidad Courts.

In connection with lime juice, a specimen of citrate of calcium shown in the Trinidad Court may be mentioned. It is well known that both lime juice and citrate of calcium gradually lose citric acid, probably through decomposition caused by fungoid growths. Mr. McCarthy claims to have succeeded in preparing the citrate so that it will keep, if not exposed to air and moisture, without loss of the acid.

There were doubtless many food products in the Exhibition, that might be employed either as diets for invalids or in the manufacture of palatable laxatives. I will only mention a few of them. Cassava root, dried and used like arrowroot, has already been experimented with in the National Training School for Cookery at the request of Mr. G. H. Hawtayne, and the Lady Superintendent has reported very highly of its value as a variety for invalid or infant diet. Certain it is that the natives who feed on cassava rapidly put on fat. The curious preparation known as cassareep in British Guiana and the West Indian Islands also deserves notice as a harmless addition to food, possessing at the same time valuable antiseptic properties. Cassareep is prepared by evaporating the poisonous juice of the bitter cassava, which loses during evaporation the prussic acid it contains, as well as a volatile poison described by Dr. Peckolt (*Pharm. Journ.*, [3], xvii., p. 267) under the name of manihotoxin; but the antiseptic properties, due to a substance which Dr. Peckolt has named sepsicolytin, or fermentation hinderer, is retained in the cassareep. Albumen to which a small quantity of sepsicolytin had been added is stated to have been kept without deterioration for six months. The value of a harmless antiseptic for preserving food can hardly be overestimated. The advantages of cassareep as an adjuvant to diet is also worthy of investigation.

In conclusion it only remains for me to express my regret that it has been possible to allude to so few of the many very interesting exhibits related directly or indirectly to pharmacy.

I gladly take this opportunity also to thank the several Commissioners for the Colonies, who have so kindly lent a number of valuable specimens for this occasion, without which the remarks that I have made would have been almost valueless.

I desire also to record my most cordial thanks for the courtesy that I have received at the hands of these gentlemen during frequent visits to the Exhibition, in allowing me to examine specimens, and in affording all the information in their power concerning them.

[*The discussion on this paper is printed at p.* 415.]

NOTE ON TINCTURE OF STROPHANTHUS.*

BY W. MARTINDALE.

The researches of Drs. Fraser and Ringer on strophanthus, the kombé arrow poison, and the publication by the former of his paper, read at the Cardiff Meeting of the British Medical Association (*Brit. Med. Journ.*, vol. ii., 1885, p. 904), have lately attracted much attention to this drug. Unfortunately a supply of it is difficult to obtain. A paper on the species of strophanthus used in medicine was

* Read at an Evening Meeting of the Pharmaceutical Society, Wednesday, November 17.

read at the Evening Meeting here on March 10, 1886, by Mr. Holmes (*Pharm. Journ.*, 1886, p. 778). Since then a supply of the drug has been received by Messrs. Christy and Co., and a formula for the tincture has been published by Messrs. Burroughs, Wellcome and Co. (*Pharm. Journ.*, 1886, p. 304), on the authority of Dr. Fraser. It directs that 1 ounce of the seeds, first deprived of their oil or fat by means of ether, is to be percolated with rectified spirit to produce 8 fluid ounces of tincture. As pharmacists have looked with some suspicion on the employment of ether for the extraction of the fixed oils from such drugs before making pharmaceutical preparations of them, for example in the present process for making extract of stramonium and in the now discarded process for making liquid extract of ergot, I therefore wrote to Dr. Fraser pointing this out, stating my fear that some of the activity of the strophanthus seeds might be removed by the ether, and mentioning also that as there was a tendency to have decimal proportions for these preparations, I thought that a 1 in 10 tincture would be preferable. I concluded by saying that I should be glad to have a reply from him in corroboration or otherwise of the formula published by the above-mentioned firm. He replies :—

"The active principle of strophanthus is practically insoluble in ether, and therefore it is quite a suitable solvent for the oil whose presence is objectionable in the tincture.

"I have used a tincture of various strengths. Seeds alone without hairs 1 in 8 of rectified spirit was adopted because of its being the strength of tinct. of digitalis, and the dose of such a tincture is 2 to 4 minims.

"As this dose is inconveniently small, especially for children, I now generally use a tincture of half the strength, 1 in 16.

"One in 10 would not get over this difficulty. The dose of the tincture of 1 in 16 would, of course, be 4 to 8 minims.

"I have not seen the letter of Burroughs and Wellcome to which you refer."

He further writes :—

"Although the pods contain active principle, the relation of a tincture obtained from them to a tincture from the seeds has not been determined. The two should not therefore be used together. The preparation I have used in therapeutic work has always been the tincture from the seeds. I do not know what the dose would be of a tincture from the combined pods and seeds. I think also the seeds freed from their comose appendices should alone be used. In reference to the preliminary extraction with the ether, it is obvious the ether should be washed to remove spirit."

This is so far conclusive, and as the results of other therapeutic observers will have to be compared with Dr. Fraser's, when tincture of strophanthus is ordered pharmacists must supply the tincture of the seeds only, deprived of oil. Still, as the drug is scarce and costly it is well that we should examine it and try to utilize all the parts of it that possess activity. While awaiting Dr. Fraser's reply I prepared a little tincture of the bruised natural seeds by percolating one part with rectified spirit *q.s.* to produce 8 fluid parts. It is labelled *a*, is of a yellowish-green colour and has a characteristic bitter taste. I did not examine the marc of this to notice if it was exhausted.

Nearly one-half the weight of the pods now offered for sale consists of the linings of the pericarps, one-third (nearly) is seeds, and about one-fifth is hairs.

In preparing Dr. Fraser's tincture, the seeds in coarse powder were percolated with about five times their weight of ether specific gravity 0·720 (the rectified washed methylated). A deep emerald-green liquid having a claret-coloured fluorescence was obtained. It has deposited a small quantity of crystalline sediment. Evaporation of a part of it shows that the seeds yield 27 per cent. of dark green ethereal oil or oily extract, which is very bitter in taste, and only slightly soluble in rectified spirit. After the ether was evaporated from the marc this was again slowly percolated with rectified spirit, 1 to produce 8 fluid parts of yellowish-green coloured tincture marked *b* 1, but this is much paler than tincture *a*. Percolation was continued fractionally to produce a second 1 in 8 percolate, marked *b* 2, and a third, 1 in 4, marked *b* 3 ; the last two percolates are practically colourless, but bitter, and although their specific gravity is the same as the spirit used in making them, yet the marc is still bitter. The specific gravity of the first percolate is nine points higher. Mixed, these three percolates would produce a 1 in 20 tincture.

The depurated tincture *b* 1, on addition to water, of course forms a clear mixture ; but tincture *a* only causes slight opacity when it is mixed with water—very little more than the same quantity of tincture of orange peel would cause.

I also percolated a separate tincture of the powdered pericarp lining, 1 in 8 with rectified spirit, marked *d*. It is pale greenish-yellow in colour, has the same but less bitter taste than the tincture *b* 1, and is five points lower in specific gravity. The marc left was still bitter. I likewise prepared a tincture of the hairs 1 in 8, with rectified spirit, marked *c*. It has the yellowish-green colour of tincture *a*, and has a similar bitter taste, although according to Messrs. Hardy and Gallois (*Pharm. Jour.*, 1877, p. 756) the hairs only contain ineine, a crystalline principle which has not the same physiological action as strophanthin contained in the seeds ; this stops the heart's action when its solution is injected into a frog, which ineine does not.

I give these results of my experiments, expecting to elicit expression of opinion as to what formula might eventually be adopted. The present one, Dr. Fraser himself acknowledges, produces a preparation too concentrated for practical use. As the drug arrives with a variable amount of the pericarp adhering, and this generally in bad condition, and as the hairs are said to possess different properties to the seeds, I think the seeds alone should still be used, as they only can be relied upon to produce an uniform tincture. The other portions possessing activity might be economized for preparing the active principle. Care must be taken in handling the drug and its preparations, as they act as topical irritants, to the mucous membrane particularly.

Since writing the above Dr. Ringer has kindly tried the ethereal oil on frogs for me and finds that although not inert it does not possess much activity, not nearly so much as a 1 per cent. solution of the arrow poison.

Mr. T. R. Bradford, of University College, to whom I gave samples, also writes :—

"I have performed some experiments with the tinctures of the seeds, pod, and hairs, and I find them all active; but that obtained from the hairs is the weakest, and that from the seeds is the strongest in arresting the movements of the frog heart. They are also all of them powerful muscle poisons, particularly the pod tincture, but of course to decide this more experiments would be necessary."

The Pharmaceutical Journal.

SATURDAY, NOVEMBER 20, 1886.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

PUBLIC ANALYSTS AND DISPENSING.

WE have received a copy of the report of the Public Analyst to the Vestry of Paddington for the quarter ending the 22nd of September last, in which reference is made to the results of an inquiry into the accuracy of the dispensing of drugs, which had been undertaken at the request of the Sanitary Committee. For the purpose of this inquiry prescriptions were written by the medical officer, twenty-two in number, and these were taken to druggists to be made up in the usual manner, both the medicine and the prescriptions being then handed to the analyst. Upon examination it was found that no ingredient had been omitted in any instance and that there had not been any substitution of one drug for another. The question as to adulteration in the stricter sense having been thus satisfactorily disposed of, attention was then directed to the actual weights of the ingredients as compared with those ordered, in order to ascertain whether there was any such deficiency or excess as would bring the case under the Weights and Measures Act. This was found to be a work of very considerable difficulty in consequence of the complex character of the mixtures in which the actual operative drugs were associated with flavouring materials, such as syrup of orange. ginger or tolu, glycerin, peppermint water, etc. In only nine instances were the quantities of ingredients found to differ at all from the weights prescribed. The greatest difference observed was in a draught containing potassium iodide, where there was one grain in excess of the twenty grains ordered. In reference to this discrepancy it is very fairly remarked by the analyst that the substance in question is not easy to weigh with absolute accuracy on account of its deliquescent character and its capability of altering in weight by absorbing moisture rapidly, while at the same time it is not a medicine of such a nature that a variation to that small extent would make any serious difference to the patient. In two other mixtures containing potassium iodide, the weights found were exactly the same as those ordered, and we think that this should be the case always. The explanation suggested by the analyst for the observed discrepancy does not appear to be well founded, for if the deliquescent character of the salt were the cause of discrepancy, it would be most likely to lead to a deficiency instead of an excess. A more probable explanation of the observed discrepancy might, we think, have been found in the capacity of the bottle containing the medicine. Bottles of stated capacity are often found to deviate more or less considerably from the proper measure, and if the bottle used in this case had been rather too small to hold one fluid ounce, the result would have been such as the analyst observed. This point does not appear to have been investigated, but we think it is worth directing attention to. The other differences in weight did not exceed one-eighth of a grain. Thus in two mixtures containing quinine sulphate there were found a deficiency of one-eighth of a grain, and an excess of one-tenth of a grain on quantities of 7½ grains and two grains. Differences in excess to this extent might easily arise from the state of hydration of the quinine sulphate, since the salt is very prone to effloresce and lose its water of crystallization. Differences in deficiency, however, must be due to inaccurate weighing or weights, or more probably be a consequence of the variation in the capacity of bottles, to which reference has already been made. In a third quinine mixture the quantity found was exactly correct. Tincture of quinine was also found to be in conformity with the British Pharmacopœia, and in six pills ordered to contain in each three grains of quinine sulphate the quantity was found to vary only from 2·9 to 3·1 grains in each pill, the six pills containing a total of eighteen grains quinine sulphate as ordered. In commenting upon this result the analyst again very fairly points out that the material for making pills is not weighed out for each separate pill, and that the method of making pills is of such a nature that slight differences in weight such as those observed may readily occur in individual pills. He further adds that it is naturally to be expected from a class of traders such as chemists and druggists, who are not allowed to trade until they have passed certain examinations as to their fitness, that a higher standard would obtain than is usually found elsewhere, and that it is very satisfactory to find this expectation borne out by facts.

The other medicines in which there was any discrepancy between the prescribed quantities of ingredients and those found on analysis comprised a gargle containing potassium bromide in which there was an excess of one-twentieth of a grain upon ten grains. In a lotion containing silver nitrate there was an excess of one-hundredth of a grain upon four grains. In a draught containing potassium bromide there was a deficiency of one-tenth of a grain upon twenty grains. In a draught containing ammoniocitrate of iron there was a deficiency of one-eighth of a grain upon seven grains and a half; and in a draught containing ammonia carbonate there was an excess of one-tenth of a grain upon fifteen grains. In

other mixtures containing ferric chloride, tannic acid, chloral hydrate, nitrate of silver, etc., the quantities were found to be in exact accordance with the prescriptions. In fact it was only in three instances out of the entire number of twenty-two medicines dispensed that there was any deficiency, and then it was so slight as to be unimportant; in the other six instances where there was a discrepancy it was in excess, but as already pointed out the deviation was not in itself sufficient to affect the patient and it might have been only apparent as a result of variation in the capacity of the bottles used.

We have much pleasure in referring to the results of this inquiry, not only because they are in themselves satisfactory and calculated to sustain the credit of dispensing chemists for the exercise of proper care in the discharge of their important duties as dispensers, but also because the report of the analyst bears evidence of impartiality and of a desire to take into account all the conditions that may have an influence in the dispensing of medicine. So far from there being any reason for objecting to such inquiries conducted in this spirit they may, we think, be welcomed as a means of justifying the claim of the educated pharmacist to the confidence of the public. It is also very satisfactory to find that the analyst who has conducted the inquiry now referred to has taken into consideration the diverse conditions under which the dispensing of medicine is carried out, and that at the conclusion of his report, in stating the comparatively large extent to which that work is still in the hands of medical practitioners, he should have recognized the propriety of medical dispensaries being subjected to control by the Inspector of Food and Drugs in the same manner that the shops of chemists are. From a public point of view it seems scarcely needful to insist upon this further than by quoting from the Report the statement that from medical dispensaries held at the medical man's own house no inspector can procure samples for analysis. If any mistake is made in dispensing and any evil results to the patient, the whole matter lies in the hands of one man and may never become public.

Several years have now passed since it was demonstrated under Government auspices that the jalap plant could be profitably cultivated in the Nilgiris. In 1880 an official memorandum was issued announcing this success and offering a limited number of tubers to persons who might be willing to undertake the cultivation with a view of supplying the demands of the Madras Medical Department for jalap with the home-grown drug. Six years having elapsed an order was a few months since transmitted from the Medical Department to Mr. Lawson, the Government botanist, for 1500 lbs. of the drug; but on applying to the persons to whom tubers had been given it was found that only one had persevered in the cultivation and he was only able to supply 400 lbs. It has therefore been determined, until private enterprise proves equal to the need, to resume the cultivation of jalap plants in the Government plantations, so as at least to meet an average annual demand for 1300 lbs. for Madras, and also to enter into negotiations with the other Indian Governments to supply their wants. The Government botanist estimates that the jalap, in a condition fit for the druggist's use, may be profitably delivered in Madras at four annas per pound.

* * *

According to Dr. Schweinfurth the *Acacia fistula*, which grows in dense groves in Nubia, is known among the natives as the "whistling tree." It owes its name to the fact that a gall insect selects for the site of its operations the ivory-white shoots, which the development of the larva distorts and causes to swell at the base into a bladder-like gall, about one inch in diameter. The insect upon emerging leaves a circular hole, and the wind playing upon the shoot is said then to produce a flute-like sound.

* * *

At a meeting of the Aberdeen and North of Scotland Society of Chemists and Druggists, held on the 13th inst., it was resolved unanimously that the Society should "overture" Sir John Lubbock to include the shops of pharmaceutical chemists, chemists and druggists, physicians, surgeons and veterinary surgeons in all the provisions of his Shop Hours Regulation Bill.

* * *

In addition to the cases already mentioned in which members of the pharmaceutical body have been elected to positions of municipal office, we are now informed that Mr. Frederick Bird, Member of the Pharmaceutical Society, has been elected an Alderman of the City of Coventry, and that Mr. Henry Milton, Associate of the Society, has been also elected a member of the town council. Mr. Arthur Deck, Local Secretary of the Society and Superintendent of Examinations at Cambridge, has again been elected an Alderman and deputy Mayor for that Borough.

* * *

This year the conversazione of the Chemists' Assistants' Association will take place at the Portman Rooms, Baker Street (the premises formerly occupied by Madame Tussaud), at half-past seven p.m., on Wednesday, the 24th inst. The first part of the programme will consist of music, and the latter of dancing. We are requested to state that those who are not members of the Association and are desirous of being present can obtain tickets (3*s*. 6*d*. each) from the Stewards, or from the Honorary Secretary of the Conversazione Committee, Mr. A. J. Phillips, 180, New Bond Street.

* * *

The next meeting of the School of Pharmacy Students' Association will be held on Thursday, November 25, when a discussion on the Pharmacopœia will take place, and a Report on Organic Chemistry will be given by Mr. W. H. Ince.

* * *

A general meeting of the Liverpool Chemists' Association, at which all the members of the trade in the district are invited to be present, will be held in the Royal Institution, on Thursday evening, the 25th inst., when the advisability of holding the meetings of the Association in the afternoon instead of in the evening will be discussed.

Transactions of the Pharmaceutical Society.

EVENING MEETING.

Wednesday, November 17, 1886.

MR. MICHAEL CARTEIGHE, PRESIDENT, IN THE CHAIR.

The second ordinary meeting of the session was held on Wednesday evening, November 17, having been specially adjourned from the preceding week, in order to allow of the attendance of the representatives at the Colonial and Indian Exhibition of the different colonies, through whom the Pharmaceutical Society has become the recipient of a large number of very valuable additions to the Museum, many of which were exhibited. The chair was taken by the President, Mr. Michael Carteighe, at eight o'clock.

At the request of the President, the Curator of the Museum gave an abstract of a paper on—

Some of the Drug Exhibits at the Colonial and Indian Exhibition.

BY E. M. HOLMES, F.L.S.

The paper is printed on page 405, and gave rise to the following discussion:—

His Excellency C. A. Moloney, C.M.G., Governor of Lagos and President of the Gambia Commission, said his only knowledge of pharmacy was that derived from taking cinchona, which, or the quinine derived from it, was a necessity of life in West Africa. The paper was most interesting to him, and would be so, he was confident, to all interested in West Africa, who would be much indebted to Mr. Holmes for his efforts to develop the resources of that undeveloped part of the world. As regards medicinal plants, West Africa was at present a *terra incognita*, and he fully appreciated Mr. Holmes's remarks as to the ignorance which unfortunately prevailed as to the proper method of preparing the contributions sent to the Exhibition. At the same time he could not admit that West Africa was to blame, it being a comparatively new country, in which there were no means of affording the instruction which was so necessary for its progress. There was no Botanical Garden or Museum of any kind, and he was glad of the opportunity of pointing out the necessity for such institutions in the West African colonies. In the absence of such advantages, much might be done by the medical staff, but so far he was afraid they had not shown generally sufficient interest or zeal in bringing about such desirable results as they might have done in association with that Society, though probably this was very much owing to their not knowing how to go about it. If a result of this meeting were the drawing up of such simple instructions in the direction of utility as would act for a guide to such gentlemen abroad, it would be very advantageous not only to West Africa, but to the whole European world. He must remark on the contributions of medicinal plants from the Gambia sent by Mr. Allegre, though unfortunately they had not come in a very useful form scientifically: yet for his zeal and interest West Africa owed him much. The economic botany of West Africa was comparatively unknown, and its agricultural development was in its infancy; its growth would be mainly dependent on the establishment of either agricultural branches of the Government, nursery gardens or some allied institutions in Government hands. Private enterprise had been tried, but it had, it was to be much regretted, signally failed, and the results were comparatively nil. In reference to allusions in the lecture, he would say that Calabar beans could be supplied in any quantity if required. With regard to kino, he himself sent to the Forestry Exhibition in Scotland two years ago a very fair specimen of the extract, but he heard nothing further of it, and therefore presumed it was not wanted. The *Jatropha Curcas* was grown largely in the Cape Verde Islands, and it grew wild in West Africa, but no particular attention was paid to it, although in the Cape Verde Islands the export of its seed was about 300,000 bushels a year. The melon seeds were used not only for extracting oil from, but also largely as food: he presumed the lecturer referred to egusi seed. The trade in gum was quite in its infancy. For some years there had been a considerable export of it from Sierra Leone, and to a small extent from the Gold Coast, and he was rather surprised, when he was Governor of the Gambia, to find to the right and left of that enormous river the export of gum from Senegal represented by millions of money annually, and that a little further south, at Sierra Leone, there was also a large export; but none from that particular district. From the Gold Coast, further south, the export had been very limited, but the field was very extensive and deserved every encouragement. Now South of Lagos, his present Government, there was an immense field for the export of a fossil gum, known as Ogea. He had directed attention to this for some time past but it had had no commercial result as yet. About two and a-half years ago he had a few hundredweights sent to England, which was passed through a prominent manufactory, and when he inquired the result he was told that it was very difficult to introduce a new article, but after some questions he found that it might prove worth from £80 to £120 a ton, and that large quantities could be readily taken. It was only a question of enlightening the natives and bringing about a European demand. In the absence of such an Institution as he had referred to, much might be done to enlighten the natives if professional medical men in West Africa would condescend to associate more with the "native doctors," who really possessed all the local information as to medicinal plants. He had seen their stalls, almost as large as that room, covered with little bundles of roots and leaves, of which they had a perfect knowledge, but they were very conservative, and unless paid for it had no wish to impart information.

Mr. G. H. Hawtayne, Executive Commissioner for British Guiana, said he also was merely a Government official, and kept as clear of drugs as he could, but he had had much pleasure in giving Mr. Holmes the specimens he wanted, and the Agricultural Society of British Guiana would look forward to beneficial results both to the colony, to the gentlemen who dealt in these things, and to the patients who were the ultimate receptacles for them. As in Africa and the West Indies nearly all the lore with regard to drugs was amongst the black people, and twenty years ago there was a great deal of practice with these local remedies; but the knowledge was dying out with the people, and it would be well to secure what information could be obtained from the survivors before it was too late. There was an immense deal of ignorance mixed up with it, the people were very superstitious, and no doubt many of the effects were due to the fancy of the patient. The Obi man was the great drug man still in many places. There were several new things from British Guiana, which he hoped would be capable of development, and when he returned he should be glad to hear from Mr. Holmes if there were any further information or specimens he wanted.

Dr. Watt said it was impossible to comment on the whole of this interesting paper, and he would confine himself chiefly to the question of Indian hemp. He understood that the efforts in England to extract the hemp had not always been successful; different results were reported, preparations of different strengths were made, and the results were not always fully understood. The explanation of this was mainly in the particular kind used. The hemp industry was mainly concentrated in Eastern Bengal, though it existed in other provinces. The drug was known in the trade under two names, flat and round ganja, and the difference between the two was very great, although both were obtained from the same plant. The round ganja was taxed about one-fourth more than the other, and in fact was one of the most heavily taxed articles in India; every maund of about 80 lbs. paying a direct tax of £35 to £40, whilst the licence fee for selling it either wholesale or retail was also very heavy. There was also this remarkable fact that in Bengal the con-

sumption was about 6000 maunds and the revenue from it about £200,000, whilst in Bombay, where the consumption was 9000 maunds the revenue was only £10,000. It varied between these two extremes in all other parts of India. The law was passed some ten or twelve years ago, but it seemed to have escaped the notice of many of the governors. There was a large export of this article from Bombay, close on 4000 maunds, mainly to England, but what became of it he did not know. Liverpool took 500 maunds last year, London 1500, and so on. It came here free of duty, the result being that you could buy in London a pound of it for less than one-twentieth of what you would have to pay in India, and he suspected that a great deal of it was shipped back to India again and escaped the Customs. The plant grew wild all over India, and yielded bhang. Bhang consisted of the broken-up leaves, capsules and young twigs, which contained a narcotic that no doubt was practically much the same as that obtained from ganja. Bhang was entirely consumed in the manufacture of liquor and intoxicating sweetmeats; the green liquor being known as "hashish," the Persian word from which we get the English word "assassin." A man who got drunk on hashish was called a hashisheen, and from this came the word assassin, which was introduced at the time of the Crusades. Bhang was taken and boiled with ghee, or clarified butter and sugar, and then made into square sweetmeats. The ganja, on the other hand, was always smoked, either in a pipe similar to an opium pipe, or a small quantity was put on a little open furnace, when a number of people reclined on sofas round the room and all got drunk together. There was still another preparation called charas, which came mainly from Ladak and Cashmir. The plant at a certain stage of growth exuded a gum or resin on the stems, which was collected in a very curious way. A number of men were stripped naked, their bodies well oiled, and they were then set to run violently through the fields; their bodies thus became coated over with this resinous substance, and when they came back to the manufactory they were scraped. This charas was also used for smoking. There was still another form of the substance, the mode of obtaining which was still more curious. This was called mummia, and was referred to in Professor Church's revised edition of Johnson's book. He had recently made inquiries into this matter, and found that mummia, although in some parts it was flavoured with ganja, was really a much more nasty preparation. It was made principally in Nepaul, and there the wretched people selected for the purpose were made to eat a particular kind of plant which had the effect of producing an eruption. This was scraped off, and used very much like ghee; it was really a preparation of human fat. The two previous speakers had referred to the advisability of investigating the native practice of medicine; as a medical man he had given some attention to that subject, and he found that in India there was very little to learn. A great many of the preparations used were very much of the type of mummia, and were in fact the most loathsome things that could be imagined. There were in India some two thousand plants of a medicinal nature more or less used by the people, but not more than forty or fifty were worth the least attention. It had been said that many of the specimens in the India Court were very imperfect, and no doubt they were; many were of no interest to anyone but the native doctors, who never by any chance used drugs until they were eaten through and through with insects. They stored them until they were perfectly rotten, and in many cases it was impossible to get drugs in any other way than by going to these people. He had forgotten to mention one or two facts with regard to ganja. It was made from the female flower-heads of the plant, and it was a most remarkable thing that if you left one single male flower in a whole field cultivated for ganja not a single particle would be produced. The bhang was obtained entirely from the wild plant, but ganja could not be made from it, because in that state the male plants grew with the female; of course by male and female he meant plants with pistillate and staminate flowers. Long before the flowers were produced the native ganja doctor came round to the cultivator, and having agreed on his fee, crawled away underneath the tiny little plants, and with a knife slipped every male plant out of the field. He had often followed the ganja doctor, though without being able to discover, even with a microscope, how he distinguished the plants, but it was marvellous how successful he was, and it was rarely necessary to go after him to remove a male plant. The female plants were allowed to reach maturity, when they were cut down and taken to the manufactory, where they were trodden under foot to produce the flat and round forms. The earth was hollowed out and the plants were all laid with their heads in the hollow and rolled with the feet; he believed that in some way the rolling shook out something in the round form which made it much stronger than the flat; it was more condensed, and a given weight contained more of the extract. Mr. Holmes had referred to pale catechu, meaning, he supposed, gambier, which was eaten all over India; but there was another substance which was also used, real pale catechu, or acacia catechu. They had also a form of cutch which was quite as pale as that shown obtained from the acacia catechu, and that also was more extensively eaten than that exhibited. The red cutch was never eaten at all. He did not know exactly the chemical difference, not having examined them with sufficient accuracy to determine, but there was a difference, and the process of preparing the two kinds was quite different. In Pegu the tree was cut down, the bark removed and the hard wood split up into little fragments; these were put into large iron caldrons and boiled down until a thick decoction was obtained; this was then thrown into moulds made of the teak wood leaf and allowed to harden. A layer of leaves was put over the top and another coating thrown on, and thus the ordinary red cutch was obtained. In Northern India, another preparation was made. The plant was treated in the same way, but it was boiled in earthen caldrons and to about one half the extent; the pots were then taken off the fire and a number of twigs put into each, on which the substance crystallized much in the same way as sugar candy on a thread. The twigs were then removed, the crystals shaken off, again put into hot water and made into a sort of mucilage; it was then thrown into moulds and made into cakes like gambier, only larger. This was a more carefully prepared article. The pale cutch of Northern India was in fact very much like gambier and took the same place in pharmacy and as an article of food. Cardamoms were also largely grown in India. The seeds of melons were also used for making oils to a large extent, and so were tea seeds. With reference to the gums, he might say there was a resin in India which was used for a curious purpose. It was from the *Shorea robusta*, known as the saal tree, and was extensively used for soldering broken pots. Any metal pot that got cracked was joined together again with saal resin, and he had seen such vessels in use on a roaring fire years after they had been mended in this way. He should think this resin was worthy of attention.

Mr. McCarthy, F.I.C., F.C.S. (Assistant-Commissioner, Trinidad), said he could not add much to what had been said by Mr. Hawtayne with reference to West Indian products. As an analyst he had had great difficulty in dealing with some of the non-official preparations used by the Obi people. In India the doctors might descend to the nasty practices which had been mentioned by Dr. Watt, but the Africans who came over to Trinidad were well up in the use of drugs, and in cases of poisoning he had great difficulty in dealing with them, and in fact, he had had to go in for a little vivisection, to clear up some of the questions which came before him. He would suggest that the Pharmaceutical Society

should communicate with the different Colonial Governments, and ask them to participate in a movement, with the object of looking up these drugs. He was satisfied that each Colonial Government would give a vote with that object; it was what he had been trying to get the Government to do for some years while in Trinidad, and if that Society were to make a move through the Colonial office, he was sure the Governments on the other side would meet them half way. It was a nut that wanted cracking, and he was sure there were several things there which would be of material benefit, not only to the Pharmacopœia but to the unfortunate patients. There were twenty drugs of which he could tell them nothing, although they were extensively used by the Africans. Ninety per cent. of the black people never went to a druggist's shop; they used these roots, and the Obi men used them with deadly effect sometimes. The Pharmaceutical Society was to be congratulated on having such a persistent beggar as Mr. Holmes, and he had been very happy to have been able to assist him in any way.

Mr. Bosisto, President of the Victorian Commission, said he had a good deal to do with the Australian blacks some forty years ago, having lived in the midst of about two thousand of them; they had native doctors amongst them, and he made every effort to discover what they used for the various complaints which these unfortunate people had about them, but he could detect nothing of any consequence at all. They had a very great liking for human kidney fat, and in his young days white men had to take care they were not used for this purpose. It would take too much time to mention all the medicinal plants of Australia, but it had not such a grand field of medical products as India and some other countries. There were the eucalypti, a number of acacias, and some melaleucas, particularly the *M. Leucadendron*, which gave an oil resembling cajuput oil. There were also a great many which yielded aromatizing oils, but he did not think they were of any great value in commerce. Then there was the *Atherosperma moschatum* bark, in common language called the native sassafras bark, but it was not a sassafras. It contained a very fine bitter, and also a volatile oil of high specific gravity, two drops of which would almost stay the action of the heart, and this was well worth attention, and should be brought before the medical men of Great Britain. Many years ago he brought it under the notice of some of the leading medical men in this country, who reported well of its action on diseases of the heart, but it seemed to have been lost sight of again. There were 150 species of *Eucalyptus*, which yielded a vast variety of essential oils that contained many aromas, more particularly one, a native of Queensland, and which was also grown in Victoria, *E. citriodora*. He thought if the colonists would pay more attention to it, it would yield a good profit. There were many other aromas, but they were too far away from population to be brought into commerce. People in England would always speak principally of the *E. globulus*, but the fact was that was considered in Australia to be the worst of the whole lot. *E. dumosa* and *E. amygdalina* were the chief species of value for medicinal purposes. He had had the pleasure of presenting to the Society some essential oils of the order *Myrtaeeæ*, which he guaranteed were true to species, and therefore when any of the young men present examined them he hoped they would pay attention to the labels, and not look upon them all as *E. globulus*. He should be pleased to hear from time to time whenever any information was required from Australia with regard to any medicinal or utilitarian plants, and he hoped that if he were not spared to visit England again, they would remember that they had an old pharmacist in Australia who took an interest in the young men of this country who were taking up pharmacy, and if he should ever meet any of them there he would do his best for them. Although he was retired and getting into the sear and yellow leaf he still took an active interest in all that pertained to pharmacy, and in taking leave of the Society, after having had the honour of being present on several occasions, he begged to thank the President, the Council and the members for the kindness and attention he had received at their hands.

Mr. Shand, Official Representative of the Ceylon Planters' Association, said he was not a scientific man, but a practical agriculturist, and the drug in which he was principally interested as a producer was cinchona bark. He wished the honourable representatives from West Africa and British Guiana, who laid stress on the utility of this bark, could, without any prejudice to themselves, consume a great deal more of it, because so much was now produced in Ceylon that the markets of the world were completely glutted. Cinchona seed was first brought into Ceylon in 1861 as an experiment, and fortunately it fell into the hands of an excellent scientific man, the late Dr. Thwaites, head of the Royal Botanic Gardens, who from the first recognized the adaptation of the plant to Ceylon, and urged on the planters the desirability of cultivating it. They were all so wedded to coffee at that time that to a great extent they neglected this matter, and for several years the cinchona cultivation was only carried on experimentally. In the years 1874 and 1875 they exported 4,000 lbs. of bark, and in the two following years only 15,000 or 16,000 lbs.; what led to the great rush of cinchona cultivation was a little enterprise with which he himself was connected. In 1874 he was manager of a group of estates, a small portion of which had been accidentally devoted to cinchona for the following reason. In Ceylon they suffered periodically from the ravages of rats. There was a jungle tree, the nelu, which periodically died down, and when it did so the rats which had been in the habit of feeding on the pith came into the clearings and attacked the coffee. Almost the first cultivation of cinchona in Ceylon was on a small plot of about two and a half acres where the coffee had been completely spoilt by the ravages of rats. In 1874 the cinchona trees were eight years old, and it fell to his lot to harvest it. The result was most wonderful; from that two and a half acres he reaped 15,000 lbs. of good cinchona bark. Not much was known then about the preparation of it, and the only process they knew that was likely to render it marketable was the quilling process, which had now to a great extent been superseded. He took great pains in that matter, getting cinnamon peelers, who formed a special caste in Ceylon, and the result was a fact almost unprecedented in any agricultural enterprise, for that one harvest resulted in a yield of £600 sterling per acre. That naturally led to what was commonly called a "boom" in cinchona agriculture. He himself came home the following year and telegraphed out at once to his brother to purchase 1000 acres suitable for cinchona. The history of the cultivation was like that of many others, accompanied by disappointments, for although Ceylon planters had flooded the markets of the world, they had not all been successful. If all the cinchonas planted in Ceylon had reached maturity there would be ten times the quantity in the market, and all present would allow there was quite enough, because the unit of cinchona for which when he began he used to get 2*s*. had now fallen to 2½*d*., and did not show much prospect of rising. What he complained of was that though he had to suffer very severely in the prices realized for the bark, when he went into a chemist's shop in London to buy a quarter of an ounce of quinine he had to pay an enormous price for it. He did not know if anything so commercial were within the range of the Society, but if it were he wished they would pay a little attention to it, because it was held out as a great inducement in the beginning,—Never mind how much you send, there will be the grand result of conferring an inestimable boon on humanity, because you will place cheap quinine within the reach of the very poorest people. He hoped for the sake, at any rate, of the cinchona growers in the East, that every effort would be

made to disseminate the use of it throughout Great Britain. Cardamoms had been mentioned, and he was sorry to say that they also in Ceylon had been so completely successful that their success led to failure, the price having come down to one-third of what it was two years ago. This would show that they were a go-ahead people in Ceylon, and what he wanted to know was what other drugs they could supply the English markets with. They had suffered very much in the cultivation of coffee from having all their eggs in one basket, and he was very much afraid they were inclined to go to the same extent in tea. He was quite sure that there were many drugs which could be profitably carried out as adjuncts to other enterprises. On one point he was a little in opposition to Dr. Watt, for he must say he attached great value to the native remedies which were in the hands of native doctors. He had derived benefit from them himself, and had thought that the scientific gentlemen who came out from medical colleges to the East made a great mistake in not exchanging ideas with their native brethren, and in looking down upon them too much. In the use of vegetable oils, especially in rheumatic affections, he had derived great benefit. Very often natives possessed remedies and secrets which were still unknown to the Pharmacopœia. Mr. Holmes had been described by Mr. McCarthy as a persistent beggar, but he must say that if so he had deceived him, because he came to him a day or two ago in the guise of a borrower. Still he must say, after the privilege he had had of being there that evening, he should be most happy to present to the Museum the samples which were to have been returned, and as long as his connection with the Ceylon Court lasted, if there were anything else Mr. Holmes would like to beg or borrow he should be most happy to present it to the Museum.

Mr. Umney drew attention to the very fine samples on the table of vanilla which came from the Seychelles, and it might be interesting to inform the meeting that Dr. Brook, whose name had been so favourably referred to in the paper, had much benefited in the harvesting and curing of his vanillas by a report which appeared in the *Pharmaceutical Journal* some years ago. It would seem therefore that even on this side they could be of great service to gentlemen in the colonies. What made the Seychelles exhibit of more interest, also, was that some two or three years since he sent out a pharmaceutical chemist, who for many years was with the old firm of Jacob Bell, and it was through him, under Dr. Brook's direction, that these essential oils had been placed on the table, and when in the Museum he felt sure they would be well worthy of examination. There were essential oils of green cloves, dried cloves, green stems and dried stems, and chemically there was very little difference between them. He was sorry to say that in the drug market they did not always appreciate these goods when they came in, for only last week a large parcel of essential oil of cloves was offered at the drug auction in Mincing Lane, and with very great difficulty a purchaser was found, because it was thought to be adulterated, coming from abroad. Another exhibit was that of turtle oil, which he looked upon as one of the most nauseating things which could be taken. Dr. Brook assured him that the natives took it in the place of cod liver oil, but its power of repeating probably could not be equalled. He had tried to introduce it, but no one would take it up.

Mr. David Howard said there were on the table some of the most beautiful specimens of cinchona barks he had ever seen and they were interesting in two opposite ways. One was about the most typical specimen of what was the very finest calisaya quill bark of his younger days; another was calisaya bark, no doubt of a similar strain, from Perak; but you could hardly have two things less resembling one another, and after a great many years' experience he should have called it a very inferior sample of red bark. Yet he had very little doubt that the analysis would be very satisfactory. One could by no means judge entirely by the eye. Again, there were two samples from Jamaica; they were very familiar to him, one of the very finest strains of succirubra bark he had ever met with, and a very fine specimen of calisaya bark. But in appearance the calisaya bark looked like a very nice sample of red bark, and the succirubra looked like a very fair sample of calisaya. Yet botanically, and as far as tests went, there was no doubt they were each a most excellent strain of its own kind. Mr. Holmes had mentioned the very high prices given for fine quill barks for pharmaceutical purposes, and it was not entirely a mistake to do so. Of course to the manufacturer anything which would give quinine was valuable. He did not much mind how much cinchotannic acid or resin he had to deal with if he could get rid of it; but on the other hand for galenical preparations there was no doubt that fine quills were infinitely better than barks that might be much richer in alkaloid. He did not see any specimens of succirubra, which was now the official bark, but there was the renewed bark, a most interesting and valuable specimen. With regard to the crispa he might say that the knotty appearance was not essential to the true crispa. In some varieties it grew with an exceedingly thin epidermis. This knotty tendency was noticed by Jussieu a good many years ago, but so far as it went it was a disadvantage. The cork did not contain any quinine, as far as could be discovered; only mere traces were found, and he believed they were derived from small portions of the real bark, which it was difficult to remove. The crispa with a fine thin epidermis was really the best. Having forsaken his hereditary pharmacy for chemistry he might put in a word in favour of applying chemistry to some of these new drugs. There was a beautiful sample of coca leaves, and there could not be a better example of how chemistry and pharmacy should work together than the history of coca and cocaine. When it was first brought over it was on account of the great value the natives attached to it, and the great benefits they found to arise from it; but curiously enough its first introduction into English therapeutics was comparatively a failure, and it did not appear to have the merits ascribed to it. He believed it was simply because they had hardly discovered what its merits were. It was assumed it was simply a beneficial drug to stay hunger, without having any idea how it was. Then chemistry came in and cocaine was extracted. It was at first a curiosity, but then its anæsthetic property was noticed. He would point out, therefore, that it was entirely owing to chemistry that it had become possible to utilize this property, since a heavy dose of coca leaves in the eye would not be wholly desirable before an operation. It appeared to him that many of these comparatively unknown drugs should not be merely dealt with galenically, but chemically also. If you could get a definite principle from them to operate with you might, as in the case of coca leaves, trace the actual cause of the value which had been discovered by the natives by long practice, and having got the real cause of the value it might be applied far better to pharmacy under altered circumstances than by merely trusting to the information of native doctors. They were no fools, and had found out by long experience and wonderful skill a great deal more than we gave them credit for, but by taking their experience, and bringing modern science to bear upon it, the best results would be obtained, and it would thus become possible to dispense with some of the elegant forms of pharmacy of which they had heard. The question of new drugs wanted a great deal of study, and a great deal of hard work, but like all other things you never got any good results without hard work, and you never did hard work without some results.

Mr. Charles Christy said that recently some remarkable specimens of gums had been received from India, but up to the present time there was no gum which had come under his notice which would supersede that from

the Soudan, known in commerce under the name of "Turkey sorts." This sold, before the breaking out of the Soudan war, with difficulty at 35*s.* to 40*s.* a hundredweight, but at the present moment it was worth £10 to £11. What was wanted was some gum to replace it, and it seemed a very strange thing that they had not yet been able to find one. What was wanted was a sweet gum, which could be used medicinally as a mucilage. The gums hitherto brought forward were more or less of a bitter nature, containing a large amount of tannin, and the consequence was when used for dyeing purposes, if the dye contained any mixture of iron it turned black. He hoped the gentlemen from the different colonies would bear this in mind. They were getting gums from Australia, but none of them that he knew of were of the sweet character which could be used in pharmacy. The nearest thing to it was the produce of Senegal. The vanillas from the Seychelles were much finer than were generally seen in commerce.

Mr. STOCKMAN said he had been carrying on some investigations on the Borneo camphor which Mr. Holmes kindly sent him two or three months ago, but he could only speak at present in a very general way of its action, chiefly in comparing it with ordinary laurel camphor. There was no doubt that the earliest camphor brought to this country was Borneo camphor, and the earliest experiments about one hundred and fifty years ago were probably carried out with this substance, but they had got so mixed up that at the present time it was quite impossible to say which kind was used. Lately, owing to the difficulty of getting Borneo camphor, some experiments which were made in Germany were made with an artificially prepared substance, as it only required two atoms of hydrogen to be added to ordinary camphor to make Borneo camphor. But those experiments were few in number and incomplete, and he believed the investigation he was now carrying on was the first which had been made with Borneo camphor. Physiologists usually began with frogs, and with them the action was very much the same as that of common camphor. The nervous system was chiefly affected in the following order :—first the brain, the animal receiving the camphor becoming after a while stupid without any pre-existing excitement, the camphor therein differing from alcohol which it resembled in many ways ; after the brain had become paralysed the spinal cord was affected, and finally, perhaps after seven or eight hours, the ends of the motor nerves, and the animal died from paralysis of the heart. Of course frogs could respire through the skin, and death did not occur from paralysis of respiration as it did in higher animals. The peculiarity about camphor was that although it paralysed frogs it acted as a stimulant on the mammalia class, cats or dogs. As long as you gave a small dose the two kinds of camphor acted in the same way, which caused the animals to become very much excited and disturbed. He took some himself and found it pleasanter to the taste than ordinary camphor, and the action was very much the same. It was only when poisonous doses were given that the difference between the two became marked. On giving a large dose of ordinary camphor, say 40 grains, or perhaps less, the animal after a short stage of excitement took convulsions, epileptic in character, and died suddenly. On the other hand, when you gave so large a dose of Borneo camphor, the animal after a short stage of excitement became more and more stupid and passed into a comatose state. The respiration would fall from forty a minute to ten, the breathing being deeper and labouring, every breath lasting five or ten moments, and being drawn with difficulty. The heart remained very much unaffected until death was about to take place. The temperature fell very markedly, perhaps 10° Cent., and the animal became perfectly cold. Reflexes during this time were very well marked, and at the end of two or three days it died apparently from failure of the heart. That was about all he could say so far, but he intended to carry on his investigations with specimens obtained from the Indian and Colonial Exhibition on a much larger scale, and hoped to be able to publish his results in perhaps three or four months.

Mr. KEMP (Bombay) said he had been much interested by the remarks on Indian drugs, but the science of modern therapeutics he really believed was in a very early stage, although the materia medica of India was very ancient ; many articles had dropped out of use, and might be taken up with great profit for modern investigation. It was said that sandal-wood oil as imported from India was much adulterated. He was not aware that sandal-wood oil was exported from India in any quantity, but it was certainly produced in considerable purity, the only adulterant being moisture. It could be obtained in considerable quantities and good quality, if care were taken in selecting specimens. It was principally distilled in the Mysore territory. In Australia it was preferred in many cases, whether from its superior cheapness or from its quality he could not say. It was not exported in the crude state in which it came into the market, but was either re-distilled or carefully filtered. With regard to the *Cannabis indica* he had no personal knowledge, but when in India he had had repeated applications from persons in this country for it, as he understood to supply the Coolie markets of the West Indies, and other colonies where it was used in large quantities, and he understood that was its destination. The kind in demand was the round top, generally imported in bundles of 1 lb. each, which was exported from Calcutta and possibly through Bombay from Bengal. The Bombay cannabis, Dr. Watt has said, was of the flat kind, which abounded in stalks and probably that was one reason for its inferiority. Mr. Holmes had also mentioned oil from melon seeds, and he might remark that although melon seeds were obtainable only in small quantities in India, they yielded about 25 per cent. of oil and were very good for feeding purposes. The *Jatropha Curcas* was used to a considerable extent in India, and he should like to see it come more into the market. Another drug not mentioned was the *Ipomea cærulea*, one of the convolvulus family, the seeds produced a resin resembling that of jalap, if not identical with it, and it yielded about four or five per cent. He imagined it would be a profitable source of jalapin. He hoped the scheme of the Institute would be taken up and thoroughly carried out, for really, London being the central market of the world for drugs, there was a better opportunity for studying the Indian materia medica here, both in a theoretical and practical form, than there was to any ordinary person in India, and this would be still more the case if the Institute were established. The difficulty in India was to communicate with the depositaries of the native medicines owing to the multifarious languages they spoke, and the different accounts they gave of the different drugs, and the way in which they locked up their medical knowledge in their own breasts. Dr. Dymock, in his recent work, had done a great deal to overcome these difficulties, and his was one of the most accurate and interesting books published on the subject. He had often heard him refer to the great assistance he had derived at various times from Mr. Holmes.

Mr. THOMAS CHRISTY said it was very interesting to see these valuable exhibits, but after all Mr. Howard had really touched the vital point :—How were they to be turned to account? On an occasion like the present he might be allowed to say that although the young men coming on might be able to work at these things the next thing was to get them used ; and if you took the two leading papers connected with the medical profession, the *Lancet* and the *British Medical Journal*, you might look at them for a whole month and would hardly find reference to medicine in them. There were descriptions of surgical operations of the greatest value, but there was nobody in this country now who would venture to write upon medicine. He had had a very important communication from one of the leading medical men of the day, in which

he said he had only twenty cases, and he dare not write upon them. He said he would only allow him to go so far as to say that he was so impressed with the value of cocaine that he was determined to try it in firing horses. He injected the cocaine once and the horse flinched a little the first time, but he did not flinch afterwards, and therefore he had now adopted it for this purpose. He might mention that, but he should not like him to say anything further.

Mr. LEOPOLD FIELD said there was only one point which came within his ken as a practical soap and candle maker, and that was the remark made by Mr. Bosisto with regard to the eucalyptus. For the last two years his firm had been trying to get hold of something besides the globulus, but found the Australians unwilling to let them have any, and he did not believe there was one gallon of the dumosa oil to be obtained in the market.

Mr. BOSISTO said they never sent a pound weight of *E. g'obulus* oil into the market.

Mr. FIELD said it was labelled so at any rate.

Mr. BOSISTO said he must emphatically contradict that. He had only one label, and that label was registered.

Mr. FIELD said he did not allude to Mr. Bosisto personally at all. The oil they obtained always came to them in iron tins holding about fifty-six pounds, and it was labelled *E. globulus*, and sometimes by way of change *E. amygdalina*, for the two things seemed exactly the same. They had had had one sample of *E. dumosa*, which was vastly superior, and they had tried to get it again and again, but they had never been able to obtain a similar oil. They had now sent out an extensive order hoping it would induce the distillation of this oil. Naturally their only knowledge was derived from those standards which came under their notice, and if they were supplied with the wrong article, how could their knowledge be correct? With regard to the various scents which the eucalyptus and its isomers were capable of assuming, they were of the greatest value and interest to the soap maker. The lemon-scented iron bark, which he believed was the citriodora, was to him a most interesting substance, and no doubt might if worked into soap give the public very great satisfaction, inasmuch as the odour appeared to be pleasanter than lemon grass, and not so sickly as that of citronelle. All the odours the various eucalypti were capable of assuming had the peculiar property common to camphoraceous odours, and no doubt the soap maker would be able to utilize them largely. But it all pointed to the necessity there was for some competent authority in these subjects, and especially of having a museum where these things should be distinctly and correctly labelled. He was not aware that they derived their samples from Mr. Bosisto's firm ; they had got them through the London brokers, and did not know where they came from. He knew they had got very different things under the same name, and that what they really wanted they could not obtain at all.

Mr. HALL (of Messrs. Edward Cook and Son) remarked that essential oils were of great interest to soap makers. He was also interested in the beautiful specimens of white cocoa nut oil from Trinidad. It would be very desirable to have a cocoa nut oil without any scent, bnt at the same time it should be of a white colour. Most of those oils could be used by soap makers, but they only came into their hands when produced in such large quantities as to be cheap.

Professor BENTLEY said it was too late to touch upon this very long and interesting paper ; but he was glad to express his thanks to the gentlemen from the various colonies who had been present and given such extremely interesting information.

Mr. WINK had listened with great pleasure to the paper, especially to the remarks with regard to opium. From what he had seen there and at the Exhibition of what had been grown in Victoria, it seemed to him to be of an excellent quality and almost too good for the British Pharmacopœia. It seemed to have the character of Persian opium, being entirely free from the capsule, and would no doubt yield a large amount of extract.

Mr. HOLMES, in reply, said he thought the gums referred to by Captain Moloney were resins, though they were called gum in commerce. The gum Mr. Christy alluded to was a gum soluble in water, and that was much wanted at present—one which possessed adhesive properties and which would not darken when a little iron of salt was added to it. There was no question that the resins or gums to which Captain Moloney alluded were much more largely used than adhesive gums, and were very important articles. Mr. Shand had greatly excited his curiosity with regard to the oils that cured him of rheumatism, and he should be very glad to know what they were. With reference to the cinchona crispa, there was a specimen in the Museum, sent from Madras and analysed by Dr. Paul, which gave very good results, quite within the requirements of Pharmacopœia. He merely alluded to that variety as exhibited to pharmacists because no one could make any mistake about it. Mr. Howard's remark that sometimes specimens came over without that peculiar corkiness interested him very much from a botanical point of view ; because anyone who had observed the common birch tree would know that when young it had one of the smoothest barks, though later on it developed cork abundantly. The same might be the case with the cinchona crispa. At all events the corky form was easily recognized, and there could be no mistake about it, because no other cinchona was at all like it. With regard to the coca leaves not being valued when they first came over, he thought it arose in a great degree from the fact that the leaves were of a very bad quality. When the price went up very much better leaves came over. He would direct Mr. Charles Christy's attention to the gums from West Africa in the Gambia Court, which had very much the appearance of gum arabic, and also to some of those from Mexico. With respect to the *E. globulus* he should be glad to show Mr. Field at any time the specimens named true to species which Mr. Bosisto had kindly presented to the Museum, and he would be then able to judge of the kind required. He believed that the *E. globulus* in the English market had come to a certain extent from Nice, and also from San Francisco, but where else he did not know.

The PRESIDENT then said that the meeting was indebted to Mr. Holmes for a very interesting paper, and he also desired to tender the thanks of the Society to the various gentlemen who had been so good as to come and give them much very valuable information. The opportunities for colonial growers and scientific men meeting together were so few that he was glad on this occasion to have been the means of bringing a few together.

The vote of thanks was passed unanimously.

In consequence of the lateness of the hour a paper on "Tincture of Strophanthus," by Mr. W. Martindale, was taken as read, and the meeting adjourned. Mr. Martindale's paper will be found on p. 411.

Proceedings of Societies in London.

CHEMICAL SOCIETY.

At a meeting of the Chemical Society held on Thursday' November 4, W. Crookes, F.R.S., Vice-President, in the Chair, Messrs. H. Crompton, G. Dyson, T. B. Tyson and S. Williamson were formally admitted Fellows of the Society, and a number of Certificates were read for the first time.

The following papers were read:—

The Action of Chlorosulphonic Acid on Naphthalene-a- and β-Sulphonic Acids. By HENRY E. ARMSTRONG and W. P. WYNNE., B.Sc.

The Action of Bromine on (Schaefer's) Betanaphtholsulphonic Acid. By HENRY E. ARMSTRONG and F. W. STREATFEILD.

The Action of Bromine on the Naphthalenesulphonic Acids. By HENRY E. ARMSTRONG and W. P. WYNNE, B.Sc.

α-Nitro-, α-Bromo-, and α-Chloronaphthalenesulphonic Acids. By HENRY E. ARMSTRONG and S. WILLIAMSON.

The Hydrolysis of Sulphonic Acids. By A. K. MILLER, Ph.D.

The Action of Bromine on Toluneparasulphonic Acid. By A. K. MILLER, Ph.D.

Phosphorus Tetroxide. By T. E. THORPE, F.R.S., and A. E. TUTTON, Associate of the Normal School of Science, South Kensington.—The authors have examined the product formed by combustion of phosphorus in a limited supply of air, with especial reference to the statements of Reinitzer (*Ber.*, 1881, xiv, 1884) that when dissolved in water, under certain conditions, it gives a solution of a light-yellow colour, and that after dialysis this liquid is found to contain a body of perfectly neutral reaction, and coagulates on being heated to 80° after addition of a few drops of a mineral acid. The authors, having repeated Reinitzer's experiments, are unable to confirm the existence of this so-called colloidal modification of phosphorus oxide. The yellow colour of the solution is due to the presence of the phosphorus suboxide of Le Verrier as an extremely finely divided powder, which can be removed from the liquid by repeated filtration. The colourless solution has a strong acid reaction, shows no turbidity on heating to 80°, and gives all the reactions of phosphorous acid. When the mixed products of combustion of phosphorus are heated *in vacuo* to about 290—300°, phosphorus suboxide is formed, together with a sublimate of colourless, transparent, rhombic crystals. These crystals sublime *in vacuo* at 180°, and are extremely deliquescent; they dissolve in water with formation of a solution of orthophosphoric and phosphorous acids, and on analysis give numbers agreeing with the formula P_2O_4. From the mode of action of water upon it, which is analogous to that of water upon N_2O_4, the authors are inclined to believe that this substance is the true tetroxide of phosphorus, and not the anhydride of the so-called phosphoroso-phosphoric acid, or hypophosphoric acid, discovered by Salzer.

Conversion of Ditolane-azotide into Diphenanthrylene-azotide. By FRANCIS R. JAPP, F.R.S., and COSMO INNES BURTON, B.Sc.

A Chemical Study of Vegetable Albinism. Part III. Experiments with Quercus rubra. By A. H. CHURCH, Professor of Chemistry in the Royal Academy of Arts.—In previous papers (Trans., 1879, 33; 1880, 1) the author has called attention to conspicuous chemical differences between the white and green foliage of seven distinct plants; in the present communication he describes the result of his study of the foliage from a large albino bough on a fine old specimen of the scarlet oak of North America in the Royal Gardens, Kew, pointing out that they confirm and extend his previous conclusions. Leaves from the albino bough and from a contiguous green bough, collected on August 17, 1880, gave the following results:—

	White.	Green.
Water	72·69	58·08
Organic matter	24·65	40·33
Ashes	2·66	1·59
„ from leaves dried at 100°	9·73	3·79
K_2O } in ashes from dried	51·28	25·62
P_2O_5 } leaves	14·64	17·05

The ashes from a larger quantity of leaves collected on July 30, 1886, were analysed with the following results:—

	White.	Green.
Ashes from dried leaves	8·33	3·85
100 parts ashes contained:—		
K_2O	49·38	29·10
CaO	8·25	24·50
MgO	6·52	9·55
Fe_2O_3	0·82	1·24
Mn_3O_4	2·08	2·36
P_2O_5	14·25	15·80
SO_3	7·18	10·05
Cl	4·25	1·25
SiO_2	3·15	4·25
	95·88	98·10
Deduct oxygen for chlorine	0·96	0·32
	94·92	97·78
CO_2, Na_2O, etc., by difference	5·08	2·22
Total nitrogen	3·94	2·78
Albuminoid nitrogen	2·65	2·41
Non-albuminoid nitrogen	1·29	0·37

The respiration and transpiration of the two kinds of leaves were also studied.

Mr. Warington said that the key to the difference in composition between the white and green leaves lies apparently in the fact that the former do not assimilate carbon, but live practically a parasitic life. The same root-sap being primarily supplied to both kinds of leaves, the white must be richer in sap-constituents, as they contain a larger proportion of water. This fact, however, only partly explains the great preponderance of potash and other sap-constituents in the white leaves. It must be also recollected that the sap of the green leaves has done far more work than the sap of the white leaves, its active constituents have indeed been consumed for the formation of tissue. The green leaves contain far more organic matter than the white; but this corresponds to only a small part of the work done. The green leaves have, in fact, furnished organic matter for the nourishment of the whole tree, and the organic substances transferred from the leaves to form woody tissue have doubtless been accompanied by the necessary sap-constituents. The sap of the green leaves is thus to a great extent exhausted sap. One constituent, however, preponderates in the green leaves, viz., lime. Salts of calcium occur largely as encrusting matter in old leaves; these salts have accumulated more in the green leaves, as a result of greater evaporation from the surface, and probably, from the removal of the carbon dioxide which held them in solution. In the white leaves there has been less evaporation, and a production instead of removal of carbon dioxide.

The Synthetical Formation of Closed Carbon-chains. Part II. Some Derivatives of Tetramethylene. By W. H. PERKIN, Jun., Ph.D.

The Action of Halogens on the Salts of Organic Bases. Part II. Tetramethylammonium Salts. By LEONARD DOBBIN, Ph.D., and ORME MASSON, M.A., D.Sc., Chemical Laboratory of the University of Edinburgh.

Glycyphyllin, the Sweet Principle of Smilax glycyphylla. By EDWARD H. RENNIE, M.A. (Sydney), D.Sc. (London), Professor of Chemistry in the University of Adelaide, South Australia.—*Smilax glycyphylla* is a plant which grows in abundance on the shores of Port Jackson, and is common on the coasts of the northern parts of New South Wales and the southern parts of Queensland; the sweet principle extracted from its leaves has already been partially examined by Dr. Wright and the author (Trans., 1881, 237). The author now corrects the formula previously given to $C_{21}H_{24}O_9$; glycyphyllin separates from aqueous ether with three, and from water with four and a half molecules of water of crystallization. On hydrolysis it yields *phloretin* and *isodulcite*:—

$$C_{21}H_{24}O_9 + 2H_2O = C_{15}H_{14}O_5 + C_6H_{14}O_6,$$

and is therefore closely allied to phlorizin, with which it is proposed to carefully compare it.

Provincial Transactions.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The second meeting of the ninth session was held in the House of the Pharmaceutical Society, 36, York

Place, on the evening of Wednesday, November 10, at 9.15, Mr. William Duncan, President, in the chair. There was a large and crowded attendance.

The minutes of the former meeting having been read and approved, the Chairman called upon Mr. Peter MacEwan, F.C.S., London, to deliver a lecture on "Drugs as Imported."

In the course of his address Mr. MacEwan described the condition and appearance of a large number of well-known drugs as they appear in the London drug market. He also described the appearance of the drug warehouses and the various operations to which the crude drugs are subjected in preparation for the public drug sales, and concluded by saying that to the pharmacist there was no more interesting sight in London than the warehouses and drug sales at Mincing Lane.

On the motion of the Chairman, seconded by Mr. Boa, a cordial vote of thanks was awarded to Mr. MacEwan.

The discussion which followed was taken part in by Messrs. Boa, Henry and W. L. Howie.

The Botanical Excursions.

The Chairman then called upon Mr. J. Rutherford Hill to read the report on the Association's Botanical Excursions during the summer months.

The report stated that the excursions, which took place before business hours, had been attended with very encouraging success, and it was strongly recommended that they should be continued during the next summer. It had been decided to form a herbarium of local plants for the use of members of the Association and the collection had been begun in a humble way. The collection was on exhibition at the meeting. It would have been much larger had not all the plants collected at one of the excursions been accidentally destroyed. Along with a donation of indigenous plants from the north-eastern and eastern coast district of Scotland from Mr. G. D. Bowie, the herbarium includes representatives of forty-two orders, fifty-one genera, and fifty-eight species.

Owing to the lateness of the hour a description of the herbarium by Mr. Thomas Stephenson had to be postponed till the next meeting, when the herbarium will be again on view.

The Prize Competition.

The Secretary then read the report of the Prize Committee on the Association Prize Competition which took place on the evening of Friday, October 29. Eight candidates presented themselves for examination and the result was found to be as follows:—

1st Prize, value £2 2*s.*, Mr. Blair Hill.

2nd Prize, value 12*s.* 6*d.*, Mr. George Shaw.

3rd Prize, value 7*s.* 6*d.*, Mr. John Archibald Heslop.

The prizes were then presented to the successful candidates by the Chairman, who congratulated them on their success and urged them to prove themselves worthy of the honourable position they had attained.

Saccharin.

Mr. W. L. Howie showed a sample of saccharin in connection with which Mr. Hill showed a solution containing 1 part of saccharin in 500 parts of distilled water. The solution had been standing for about seven months and had developed a distinct odour of oil of bitter almonds. At the same time the sweet taste had to a considerable degree disappeared and the solution had acquired a slight bitterness. He thought saccharin should be very carefully tested before it was used indiscriminately for sweetening purposes, as it was evident that in this case some decomposition had taken place. Mr. Hill concluded by moving a vote of thanks to Mr. Howie, which was heartily accorded.

It was intimated that the next meeting would take place on the evening of Wednesday, November 24, when a paper will be read by Mr. A. Robbie, on "Apprentices." There will also be a discussion on Sir John Lubbock's Shop Hours Regulation Bill, in connection with which notice of motion has been given by Mr C. F. Henry.

OLDHAM CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

At a meeting of the members of this Association, held in their room, Church Institute, on Thursday evening last, Mr. H. C. Blanche, L.D.S., read an excellent paper on "Dental Pathology." Mr. Blanche commenced by describing the various tissues of which a tooth is composed, and then proceeded to explain the manner in which the tooth is inserted in the mouth. The various diseases to which the teeth are liable were next enumerated, and the best mode of treatment of them fully discussed, including that of caries, periostitis, exostosis, etc. Mr. Blanche then described the method of filling teeth with amalgams, and afterwards demonstrated as far as practicable the means of extracting the different teeth of the human subject, in which he stated that it was not, as some supposed, "pulling a tooth out," but rather that of pressing. The use of the anæsthetic cocaine, the manner of using it with the syringe, etc., etc., came in for a fair share of attention. The paper was well received by the members. After the reading of the paper, Mr. C. Granville Wood proposed a vote of thanks to Mr. Blanche, which Mr. J. F. V. Wilkinson seconded, and being carried, terminated the meeting.

Mr. James Lees occupied the chair.

Obituary.

FREDERIC JOHN FARRE, M.D.

The death of Dr. Frederic John Farre on the 10th inst., in his eighty-third year, has deprived the Pharmaceutical Society of Great Britain of one of its older Honorary Members. Dr. Farre graduated as M.D. at the University of Cambridge in 1837. In the following year he was admitted a Fellow of the Royal College of Physicians, of which he afterwards became successively a Censor, a Member of the Council, and Vice-President. Amongst his various public appointments he was at one time Lecturer on Materia Medica at St. Bartholomew's Hospital. As a member of the Pharmacopœia Committee of the College of Physicians Dr. Farre took part in the preparation of the Pharmacopœia Londinensis of 1851, and it was in continuance of similar duties that he was brought into somewhat close communication with some of the leaders of the Pharmaceutical Society of that day as the result of an incident not without interest at the present time. About two years before the publication of the last London Pharmacopœia a number of circulars had been addressed from the College of Physicians to individual pharmacists with the object of obtaining from them such suggestions for the consideration of the Pharmacopœia Committee of the College as their practical experience might enable them to make. The subject was brought under the notice of the Council of the Pharmaceutical Society, which after discussion expressed an unanimous opinion that the kind of assistance and information required by the College would be more likely to be obtained by means of special communications between the College and the Society. This view was adopted by the recipients of the circulars, who sent replies to that effect to the College. The College did not entertain the suggestion at the time, but in 1854 Dr. Farre was authorized to discuss with the President of the Pharmaceutical Society (Mr. Henry Deane) "the best mode of procuring information on pharmaceutical subjects in connection with the Pharmacopœia, especially the experience of pharmaceutical chemists," the direct result of the conversation being the appointment of a Pharmacopœia Committee of the Pharmaceutical Society to report on

any proposed alterations referred to it by the Pharmacopœia Committee of the College of Physicians and also to collect information respecting non-official drugs and preparations. In 1865, Dr. Farre, with the assistance of Professor Bentley and Mr. R. Warington, edited an abridged edition of Pereira's Materia Medica, which was specially adapted to the British Pharmacopœia that had been issued in the previous year. In 1856 Dr. Farre was elected an Honorary Member of the Pharmaceutical Society and, although a physician in large practice, was an occasional attendant at the evening meetings of the Society and took part in the discussions. In 1865 he contributed to this Journal an interesting paper on the "Growth and Preparation of Rhubarb in China."

LOUIS MIALHE.

We regret to have to report in addition the death on the 1st inst. of Dr. Louis Mialhe, who was also elected a Honorary Member of the Pharmaceutical Society in 1856. Dr. Mialhe was a Member of the Academy of Medicine, and formerly an Assistant Professor of the Faculty of Medicine of Paris. He was a trained pharmacist, and for many years was one of the editors of the *Journal de Pharmacie et de Chimie.* Some communications on the action of mercurial salts, written by him, appeared in the first series of this Journal. Pepsine, albumenoids and purgatives were other topics upon which he published communications. He also published a Traité de l'Art de Formuler.

Notice has also been received of the death of the following :—

On the 23rd of October, Mr. John McNay, Chemist and Druggist, Thornhill. Aged 65 years.

On the 29th of October, Mr. John Humble, Chemist and Druggist, Birmingham. Aged 77 years.

On the 2nd of November, Mr. Joseph Mitchell, Chemist and Druggist, Barnsley. Aged 64 years.

On the 4th of November, Mr. James Upton Eldridge, Chemist and Druggist, late of Great Yarmouth. Aged 77 years.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Pharmaceutical Education and Examination.

Sir,—Your timely and highly acceptable remarks in last week's Journal on provincial pharmaceutical education are not a day too soon, and it is quite time this most important question was thoroughly grappled with by those who have been engaged in its solution for years.

I regard with considerable gratification the attempt Mr. Barclay is making to solve the problem in his address before the Midland Counties Chemists' Association, feeling assured his efforts will not be in vain. It may not, however, be out of place if I venture to give my own views based on an experience of nearly quarter of a century in pharmaceutical education. It is indeed a matter of surprise how any intelligent, well-wishing pharmacist can contend in these days of progress and enlightenment, as some of your correspondents have recently done—notably Mr. Feaver and Mr. C. E. Palmer—that a scientific and technical training under certain regulations is superfluous and a compulsory curriculum unnecessary. My opinion is at total variance with theirs. My full conviction is that some such scheme as that propounded by that worthy pioneer of pharmaceutical education, Mr. Schacht, to whom all honour be due, is a sheer necessity, whether it be viewed from the pharmacist's interest or from the public standpoint, and I sincerely hope the Council of the Pharmaceutical Society will not allow itself to be misled by such erroneous and erratic views as are expressed by them, believing them to be but the sentiments of a few. I remember when Mr. Schacht's scheme was first mooted several years ago, a large meeting of the chemists and assistants of this town was held to discuss it, and much opposition was manifested, there being a decided majority against it, but after the scheme had been thoroughly explained by its advocates an almost unanimous vote was given in its favour. From that time until now there has been a fixed resolution on the part of the members of our local Association to afford every facility for the carrying out of a course of study in conformity with the proposed curriculum, and the outcome has been a school of pharmacy, which, I rejoice to say, is in a most efficient and satisfactory condition. Upwards of twenty students are at the present time attending, with marked regularity, the various classes conducted by gentlemen possessing either the Minor or Major qualifications. I am satisfied the school is upon a solid foundation, being under the control of the local Council, and that it will prove of inestimable benefit to many who are still unborn in the ranks of pharmacists. That good, honest work has been already done ample proof has been given by those who have recently passed their Minor.

It is, as you say, cause for profound regret that so many provincial schools of pharmacy have proved failures. My opinion is that the failure is not to be attributed to any opposition to the proposed curriculum nor to the apathy and indifference of assistants and apprentices, but to the lack of interest many employers take in the education of those who are placed under them. If every employer would but feel what a responsibility rests upon him in an educational sense and would use his influence with his helpmates, I feel confident we should hear very little about failure in our local schools. Happily in Sheffield, almost to a man, we are in unison on this point, and I believe this is the main cause of our success. It may give some little inconvenience, doubtless does, to most, but we are content to know we are helping forward a great and noble work. There is a higher sense than that of a mere pecuniary one (to which Mr. Palmer attaches so much importance) in which a pharmacist may distinguish himself in the economy of human life, viz., a determination to leave the calling of pharmacy better, morally, socially and educationally, than he found it.

Sheffield. William Ward.

Unqualified Men.—A Suggestion.

Sir,—I think the time has come when the general public can comprehend, if it is placed before them in a plain, straightforward manner, the difference between qualified and unqualified men, and the suggestion which I have to offer is this : that the druggists in every town should combine and cause to be printed and circulated in the town, at intervals of three or six months, a bill in terms somewhat as follows :—

"*Notice.*

"In consequence of the increasing number of unscrupulous men who impose upon the public by assuming the position and performing the duties of chemists and druggists, without being duly qualified and registered as such, the chemists of this town beg to caution the public against these men, and publish herewith a list of the only men in this town whose names appear on the Register of Chemists and Druggists in Great Britain."

This notice could be modified or enlarged as is thought fit.

Each chemist would bear his proportionate share of the cost, which would not be much.

The Local Secretary in each town seems to me the proper person to start this scheme, by canvassing each man as to his opinion of the suggestion.

I think the Pharmaceutical Society, by associating itself with such practical measures to put down unscrupulous competition, would become at once more useful and more popular.

I make this suggestion with much diffidence, and should like to see expressed in your columns the views of our most prominent pharmacists on this point.

Oldham. James Lees.

Laudanum *v.* Opium.

Sir,—Your correspondent "Cantiana" is much to be commended for so promptly supplying what he considers to be an elucidation of the query "What is Laudanum?" He is eager to promulgate his knowledge, but alas! like the "Lubbockian philanthropy," also founded in Kent, his attempt is a perversion of intellect, as the information he conveys is about as valuable as that to be found in a time-table five years old. Every boy in a druggist's shop knows that the term "laudanum" has relation to the drug opium in a liquid form. Even the greasy aproned and greasy headed bacon-slicer at "the Stores" knows it, as he not unfrequently does duty for the renegade "Minor" at such establishments. On the other hand they cannot tell the meaning of the word.

Assuming the statements of Messrs. Powell and Jones to be correct, viz., that Sydenham named his vinous preparation of opium "Laudanum," I come at once to the natural conclusion that Sydenham had a reason for it. Being a scholar he acted as most scholars do, when either in doubt, engaged in derivation, or in the work of nomenclature. He consulted his dictionaries and he named his vinous opium from a gum, which Pliny states entered into the composition of the pomander, which the philosophers inhaled at their symposia in order to soothe their mental organisms from undue excitement.

From this it may be gathered that the name laudanum, altered from ladanum, was transferred from one gum to a vinous liquid having as its basis another gum, because of the similarity of the action of the former to the latter. Correctly speaking ladanum is not opium, and by a similar process of reasoning, which "Cantiana" will perhaps allow, opium is not ladanum, because—

With the Greeks . .	ληδανον or λαδανον	=Cistus Creticus* (Dioscorides). =Cistus Ledon. (Cistaceæ).† A transparent gum gathered from the plant.
With the Persians . .	Ládan	=the same.
With the Latins . .	Ladanum Ledanum	=the same.
With the French . .	Ladanum	=the same.

In England by usage and custom laudanum derived from ladanum (λαδανον, Gk.) ought properly to apply to vin. opii (Syd.); when asked for in shops tinct. opii is understood. A medical man writes tr. opii because he does not require any of the heterogeneous mixtures comprehended in the term "laudanum."

As to opium, Dioscorides, the Greek physician, famed for his work on materia medica, specifically applied the term "Οπιον" to the juice of the "papav. somnif." (Papaveraceæ), and as he also, like Sydenham, rejoiced in the dictionary, he got his name ὀπιον or opium from ὀπος, the milky juice drawn by incision from the poppy.

Finally, and in attempting to resolve the ultimate particle: Supposing a Grecian was asked to derive his own word "ληδανον" in his own language, I opine he would say it was a contraction from "λη(θη)δανος" (lethedanos), a word signifying "causing forgetfulness."

This latter word has been proposed as the derivation of laudanum. It stands upon a weak foundation, but evidently bears some connection with the subject I have endeavoured to explain.

Joseph Abbott, L.D.S.R.C.S.I., F.S.S.
98, *Queen Street, Exeter.*

Sir,—I had no idea that there could be any doubt as to what laudanum is, or (to my mind at least) should be, until I saw the question raised in the Journal by your Sheffield correspondent. With chemists throughout my county, the tincture of opium made strictly according to the British Pharmacopœia is understood to mean laudanum. A few years ago a chemist was fined for selling as laudanum a preparation which did not contain the required quantity of opium and spirit in the article termed tinct. opii, B.P. And however excellent the preparation of Dr. Sydenham may be, and notwithstanding John Pechy, Esquire's translation of ancient renown, I should not, for my part, take them as a standard authority, but, with all its defects, stick to the British Pharmacopœia, Pereira, Squire and the like.

Stoke Ferry. W. H. Newsam.

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* 1. The gum.
† 2. The plant.

Unguentum Simplex.

Sir,—I do not understand why unguentum simplex is ordered as one of the ingredients in ung. resinæ, rather than more wax and almond oil with benzoated lard at once. The little white wax in ung. simplex cannot make much difference.

It seems to me labour lost to make ung. simplex first, and then have the ingredients melted over again when I go to make ung. resinæ, with some more of two of them added. For these are the formulæ of the two respectively:—

Ung. Simplex.

†White wax	2 ounces.
Benzoated lard	3 ounces.
*Almond oil	3 fluid ounces.

then

Ung. Resinæ.

Resin	8 ounces.
†Yellow wax	4 ounces.
Simple ointment	16 ounces.
*Almond oil	2 fluid ounces.

I have been thinking of the above question since making some ung. resinæ about a fortnight ago, and I can see no solution of it yet,—no reason to justify the above extra trouble incurred in making unguentum resinæ.

Would not the following formula make an unguentum resinæ precisely the same as that of the B.P. ?—

Resin	8 ounces.
Yellow wax	4 ounces.
White wax	4 ounces.
Benzoated lard.	6 ounces.
Almond oil	8 fluid ounces.

Perhaps some of the readers of the Journal would have leisure to look into this matter.

Llandyssul. Apprentice.

P. F.—The preparation is a proprietary one, and the formula has not been published.

W. Fenton.—Cases of infringement of the Pharmacy Act that are brought within the cognizance of the Council must of necessity be dealt with confirmably to the provisions of the law, and not upon merely sentimental considerations.

J. M. Clague.—The circumstance that you mention was not overlooked, and the failure referred to was that which took place some years ago.

"Live and Let Live."—The procedure that it has been thought necessary to follow has been applied to persons writing on both sides of the question. We do not think that any further justification is required.

Alpha.—The ammonium chloride and mercuric chloride form a double salt.

Conscientious.—The point that you appear to raise, as to whether your apprentice comes within the exemption from the application of the Shop Hours Regulation Act, provided in the 9th section, is a doubtful one, and the answer might depend upon the precise circumstances of the case.

P. H. Marsden.—(1) *Æthusa Cynapium.* (2) *Torilis Anthriscus.* (3) *Pastinaca sativa*, probably; fruit and a stem leaf should always be sent with umbelliferous plants. (4) *Equisetum maximum.* (5) *Jasoine montana.* (6) *Galeopsis Tetrahit.* (7) *Brassica Napus.* (8) *Achillea Ptarmica.* (9) *Pulsatilla Tormentilla.*

Iridin.—No authoritative information as to the exact composition of either of the powders has been published, but a statement as to the composition of one of them may be found in the *Pharm. Journ.*, [2], xi., 496.

Medicus.—It appears very probable that the preparation is one that would require to be stamped, but you are recommended to submit a copy of the label and advertisements to the authorities at Somerset House.

Communications, Letters, etc., have been received from Messrs. Tyrer, Clark, Conroy, Hart, Abbott, Parry, Stewart, Dott, Prescott, Baldock.

"THE MONTH."

Prevention of Secondary Fermentation.

Various phenomena of fermentation have been the subject of communications during the past month, and although these may have a primary importance for the alcohol-producing industries, they are not without their bearing upon some of the conditions and operations of pharmacy. The disastrous effect which may attend brewing and similar operations through the occurrence of secondary fermentations, due to the presence of *ferments de maladie* in the yeast used, has been demonstrated by the researches of M. Pasteur, and considerable attention is now paid to securing and maintaining pure cultivations of this indispensable material. The method recommended by M. Pasteur, which consists essentially in the addition of pure yeast to a previously sterilized liquid, is somewhat difficult of application in the alcohol industry, and Messrs. Gayon and Dupetit have therefore attempted to solve the problem by the addition of antiseptic or other substances that are capable of hindering the development of "sick" ferments without acting prejudicially on the sound ones. They report (*Compt. Rend.*, ciii., 883) that they have obtained moderately favourable results with tannin in the proportion of half to one gram to the litre; but unfortunately tannin does not prevent the development of *Mycoderma aceti*. Bismuth salts, however, effect the purpose completely. The subnitrate in acid solution, added to a fermentation of saccharified maize and beet root, prevented the formation of acid to the extent of 80 per cent., as compared with another fermentation to which no bismuth had been added, the sugar saved being utilized in the production of 7·36 per cent. more alcohol. Under the influence of the bismuth subnitrate the fermentation is said to go on regularly, and bacteria and other foreign organisms disappear from the yeast. In the proportion used in this experiment, however, bismuth subnitrate is not efficacious unless the liquid has a certain initial amount of acidity. The problem therefore remains to discover an agent equally efficacious and more economical than bismuth.

Products of Pure Yeasts.

In his *Etudes sur la Bière*, M. Pasteur affirms that if the different forms that exist in yeast were separated by careful culture, many of them would be capable of producing beers with special flavours. Some confirmation of this is found in the results of an analysis by Herr Borgmann of two samples of beer in the brewing of which two varieties of purified bottom yeast had been used (*Zeits. f. anal. Chem.*, xxv., 532). It was found that they both differed markedly in their constituents from a sample of ordinary beer, and notably in containing about half the quantity of glycerine relatively to the alcohol. They also differed from one another, the beers produced by the two yeasts not only varying as to their constituents, but being distinctly unlike in flavour.

Dextrin and Starch Ferment.

It is now pretty well understood that pure cultivations of the ordinary alcoholic ferments (*Saccharomyces species*) are ineffective in producing fermentation in solution of dextrin alone, and although, according to Geschwändler's experiments, dextrin, in the presence of invert sugar, may ferment sluggishly to the extent of 40 per cent. of the whole, which result appears to be confirmed by ordinary experience in brewing, it seems quite possible that the explanation in both cases lies in the presence of foreign organisms in the yeast used. The existence of organisms capable of proving more energetic alcohol producers than ordinary yeast in some directions has been known for some time, and Messrs. Gayon and Dubourg report (*Compt. Rend.*, ciii., 885) that they have just discovered in a species of *Mucor* a ferment which has the double property of hydrating dextrin and even starch and then inducing fermentation in the product of the saccharification. But, very curiously, it does not, like *Mucor circinelloides*, referred to by one of the authors some time since, possess the property of inverting cane sugar. The fermentative effect of the mould on dextrin was proved by adding it directly to a solution of the commercial article and to beer from which the alcohol had been distilled off after the ordinary fermentation had entirely stopped; in the latter case fermentation recommenced and went on regularly until all the dextrin had disappeared. It would appear therefore that an addition of this *Mucor* to ordinary wort would result in the production of a more alcoholic beer; but it does not follow that this result would be advantageous, since some brewers deliberately provide for certain proportions of dextrin in different beers, both on account of flavour and to secure material for the slow continuous fermentation, on the cessation of which beer becomes "flat." On starch paste the mould acted less energetically, but there was first a partial liquefaction, then evolution of carbonic acid and formation of alcohol, the material acquiring an agreeable ethereal odour. It therefore differs from the mould (*Eurotium Oryzæ*) used by the Japanese in the preparation of "koji," which whilst it secretes a diastase capable of inverting cane sugar is powerless to extend the change to the production of alcohol.

Sunlight and Fermentation.

Although the chemical action of sunlight now finds a utilitarian application to a vast extent in the art of photography, there are other directions in which the work it is capable of doing is still very imperfectly understood. Two years ago, Mr. Williams referred to this point in his Presidential Address to the Pharmaceutical Conference (*Pharm. Journ.*, [3], xv., 133), and instanced how chemical manufacturing operations are sometimes influenced by or even dependent on sunlight. In a recent communication to the Academy of Sciences (*Compt. Rend.*, ciii., 881) M. Duclaux records the observation that in many respects the action of sunlight is exactly analogous to that of a ferment. He has found that sunlight, aided sometimes, but not always, by heat, breaks up complex molecules into more simple groups, in just the same way as microbes do. Water and carbonic dioxide always form part of the products; there are also other compounds, capable of further oxidation, but relatively stable in the presence of the influence that produces them, that appear as a residue of the decomposition due to sunlight, and it is interesting to note that these compounds are always the same as those in the residue due to the breaking up of the complex molecule of the same substance by ferments. In the case of the sugars, saccharose is not attacked by microbes; neither is it affected by sunlight when in neutral or alkaline solutions, which may be exposed to sunlight for three months without undergoing alteration. But in even a slightly acid solution it is readily inverted by sunlight. Whilst the solution remains acid no further alteration takes place; if, however, it be made alkaline, the glucose is then, in the

presence of atmospheric air, rapidly destroyed by sunlight, with the production of carbonic, oxalic, formic and acetic acids and alcohol, the alcohol sometimes amounting to one-fifth of the weight of the sugar decomposed. A similar action takes place, but more slowly when air is excluded. As in the case of ferments, the production of alcohol by sunlight is not special to glucose, but has been observed also with lactose and lactates. Further, it has been found that the same substance may undergo more than one form of solar decomposition, according as the oxygen is derived from the atmosphere or from a salt of gold, platinum, mercury, or copper. Thus, calcium lactate, which when exposed to sunlight and air gives alcohol and calcium acetate, gives calcium butyrate when the oxygen is derived from a salt of mercury. It will be apparent that these observations might have a direct practical application in the keeping of some pharmaceutical preparations.

Diastase.

With a view of studying the properties of diastase and the variations in its action under different conditions Herr Lintner has experimented on the various processes that have been recommended for its isolation. He reports (*Journ. prak. Chem.*, xxxiv., 378) that in preparing an active crude diastase he obtained the best results by digesting one part of green barley malt with two to four parts of dilute (20 per cent.) alcohol during twenty-four hours or more, the alcohol being added to allow of longer maceration without acetification. The extract is then precipitated with absolute alcohol, using not more than two and a half times its volume to avoid throwing down mucilaginous matter with the diastase. The yellow flocculent precipitate is then separated and thoroughly desiccated by trituration with more absolute alcohol, then with ether and by drying *in vacuo* over sulphuric acid. In this way the crude diastase was obtained as a light yellowish white powder, of great activity, which it retained for more than a year. But in this condition it contained 16 per cent. of ash. Some was therefore purified by precipitation from water by absolute alcohol six times, which removed 6 per cent., and then by dialysis, which reduced the ash to 4·79 per cent. This was the greatest degree of purity attained, and analysis of diastase in this condition showed that, contrary to the statements of Payen and Perloz, it is a nitrogenous substance, and that *ceteris paribus*, the activity of a sample was, as a rule, proportional to its richness in nitrogen. Allowing for ash, Herr Lintner gives the following figures as representing the percentage composition of diastase as compared with that attributed to other ferments :—

	C.	H.	N.	S.
Diastase	46·66	7·35	10·42	1·12
Pancreatic ferment.	46·57	7·17	14·95	0·95
Invertin	43·9	8·4	9·5	0·6
Emulsin	43·5	7·0	11·6	1·3

Herr Lintner considers that these figures show that the chemical ferments form a special class of protein substances, characterized not only by their fermentative, but also by their chemical and physical properties. Diastase gives almost all the reactions of albuminoid bodies, but not the biuret reaction of peptone ; a characteristic reaction of diastase not shown by other protein bodies is a momentary deep blue coloration when treated with alcoholic tincture of guaiacum containing hydrogen peroxide. The author is disposed to look upon diastase as an oxidation product of one or more protein substances in the grain ; but that it is not derived from all of them is shown by the fact that the barley richest in proteids does not in malting yield the most diastase.

Retrograde Peptone.

In a communication to the Russian Physico-Chemical Society (*Chem. Zeit.*, Nov. 17, p. 1432) Dr. Michailow has recorded the observation that under certain conditions peptone undergoes a retrograde conversion into albuminoid substance. Without giving exact details he makes a preliminary statement that this retrogression takes place when a concentrated solution of peptone is made alkaline and kept at a blood heat temperature. Part of the albuminoid substance, which is thus obtained in solution, partakes of the nature of globulin, and part that of albumen. The depeptonization is stated to be accelerated by hydration processes and by some ferments. In a second communication on the behaviour of dead and living albuminous tissue to ferments, Dr. Michailow stated that the albuminoids of living tissue are less readily attacked by a weak ferment (pepsin) than those of dead tissue, and that, in fact, the former only succumb to the action of a strong ferment (tripsin).

Crystallization by Diffusion.

The utilization of the phenomenon of diffusion as a means for obtaining solids in a crystalline form is the subject of a communication by M. C. Guignet (*Compt. Rend.*, ciii., 873), who describes four methods that between them apply to a large number of substances, some of which have not previously been obtained in crystals. The first depends upon the diffusion of a solid in a liquid, and consists in the addition of one solid to a saturated solution of another, the separation of which, in the crystalline form, it determines if it also be soluble in the liquid. Thus paraffin added to a saturated solution of sulphur in carbon bisulphide causes the separation of sulphur in fine octahedra from the solution, and inversely the addition of sulphur in powder to a saturated solution of paraffin in carbon bisulphide determines the separation of paraffin in long shining needles. The second method involves a chemical reaction between the added solid and the substance in solution. Sodium hyposulphite in crystals added to a saturated solution of ammoniacal copper sulphate gives rise to a formation of ammoniacal copper hyposulphite in fine violet needles, and other ammoniacal hyposulphites may be obtained in an analogous manner. When crystallized sodium sulphate is added to a saturated solution of barium chloride the crystals, whilst preserving their general form, gradually become opaque ; but upon one being broken it is found to represent a kind of geode, or nodule, filled with crystals of barium sulphate. Sodium phosphate added to a saturated solution of magnesium sulphate gives crystalline magnesium phosphate. The third method depends upon the slow diffusion of one liquid into another. If on the top of a saturated solution of a solid be poured first a layer of the solvent and then a layer of another liquid of less density, which is capable of mixing with it and is also a solvent of the solid, but to a less degree, the two liquids diffuse gradually into each other, and the solid is deposited in distinct crystals. If a saturated solution of sulphur in carbon bisulphide be covered with a layer of the solvent, and then with a layer of oil, absolute alcohol, glacial acetic acid, benzine or petroleum spirit, a deposit of sulphur in very fine octahedra may be obtained on chips of wood placed vertically in the liquid. But if

a layer of petroleum spirit come directly upon the saturated solution the sulphur is obtained in long needles, which after a time change into chaplets of octahedra. A saturated solution of lead chloride in hydrochloric acid, covered by a layer of acid and then of water, gives a fine crystallization of lead chloride. The fourth method consists in the slow diffusion of saturated solutions of substances between which chemical reaction takes place through a separating layer of water. In this way crystals of barium sulphate and crystals of lead sulphate, identical with crystals occurring in nature, are obtainable from solutions of sodium sulphate and barium chloride, and solutions of sodium sulphate and lead acetate, whilst lead ferrocyanide is obtained from solution of potassium ferrocyanide and lead acetate in long pale yellow needles.

Hydrastine.

In the root of *Hydrastis canadensis*, besides berberine, a second alkaloid, hydrastine, is known to occur. An investigation of it has yielded interesting results to Messrs. Freund and W. Will (*Berichte*, xix., 2797). Hydrastine was found to be most conveniently obtained by exhausting the finely powdered root with ether, dissolving the residue left on evaporation in hot alcohol and filtering; on cooling the hydrastine crystallizes out almost pure. Analysis of the base and of an iodomethyl compound confirmed the formula $C_{22}H_{23}NO_6$. Upon oxidation by means of potassium permanganate or dilute nitric acid, the base split up, a crystalline acid separating which proved to be identical with opianic acid. From the filtrate a crystalline base was separated, melting at 115° C., and very soluble in ether, alcohol and chloroform, which so closely resembled cotarnine, the base yielded together with opianic acid by the oxidation of narcotine, that it might have been considered identical had not an analysis shown that its composition was different. This resemblance of hydrastine to narcotine, from which it differs in its empirical formula only in containing one atom of oxygen less, was increased by the fact that the base resulting from its decomposition forms a crystalline hydride corresponding to hydrocotarnine. It has been alleged that the root also contains two other alkaloids, to which the names "xanthopucine" and "canadine" have been given; but the authors failed to detect any other base than berberine and hydrastine. They separated however a crystalline neutral substance, apparently a kind of lactone, which when treated with nitric acid formed a crystalline nitrogen compound; this is to be the subject of further examination.

Testing of Chloral Hydrate.

Herr Kremel recommends, as a most delicate test for the purity of chloral hydrate, to dissolve an exactly weighed quantity of the compound in water, add soda solution in known excess, and after a few minutes titrate back with normal hydrochloric acid, using litmus as an indicator (*Pharm. Post*, Oct. 30, p. 738). One gram of chloral hydrate requires for decomposition into chloroform and sodium formate 6·04 c.c. of normal soda solution, whilst chloral alcoholate requires only 5·17 c.c.

Anæsthetic Effects of Ointments.

Some curious experiments on the relative anæsthetic effects of various narcotic and anodyne ointments, the results of which must be taken for what they are worth, have been reported on by Dr. Toporoff (*Lancet*, Nov. 13, p. 938). The plan adopted appears to have been to cleanse and moisten the skin, and then to rub a drachm of the ointment into a selected spot over an area of an inch and a half in diameter during ten minutes. After the lapse of another ten minutes, and again at the end of half an hour, the tactile sensibility was tested by an electrical current, the varying strength required being represented in degrees of a scale. Belladonna and lard ointment (1 in 8) diminished the tactile sensibility to an extent represented by a mean of 0·6 at the end of ten minutes, and of 1·1 at the end of thirty minutes; when lanolin was substituted for lard the effect was reduced, being represented by the figures 0·55 and 0·99 for the two periods respectively. Chloroform ointment (1 in 8) gave a similar result, the figures being for lard 0·66 and 0·8, and for lanolin only 0·3 and 0·62. Ointments prepared with powdered substances, such as morphine hydrochlorate and potassium bromide, not only produced no decrease of sensibility in thirty minutes, but an increase of sensibility, for a short time at least, the augmentation being less with lanolin than with lard. This is thought to be explained by the observation that friction with either lard or lanolin alone invariably increased the sensibility, that with lanolin to the greatest degree at the end of ten minutes, but its effect passing away more quickly than that of lard. The inference drawn, therefore, is that the increase of sensibility noticed after application of ointments containing powders was due to the basis, the powder producing no effect one way or the other. As might be expected, the effects varied in different parts of the body, but so far as the experiments can be trusted, they appear to show that an anodyne ointment with a basis of lard would be more active than with one of lanolin.

Blood as a Diet.

Some years ago it was stated that in France medical men were prescribing fresh-drawn blood as a dietetic remedy to anæmic patients and that the public abattoirs were being attended freely by ladies anxious to obtain their diurnal draughts of warm bullocks' blood (*Pharm. Journ.* [3], v., 431). The practice afterwards crossed the Atlantic, but does not appear to have obtained there to a great extent, and now it has cropped up in Russia. A Dr. Grigorieff reports a series of observations on the effect of the addition of defibrinated blood to the diet upon the metabolism and assimilation of nitrogenous matters (*Lancet*, Nov. 13, p. 937). He experimented upon four persons, two of them being in good health and two suffering from dyspepsia and in an enfeebled condition, defibrinated calves' blood being added to their diet for three alternate periods of three days each. The results were similar in all the cases and showed that the metabolism and assimilation had been invariably increased by the blood diet, though not to the same degree in each case. Dr. Grigorieff thinks that on the whole the diet is likely to prove useful in some cases, but he admits that culinary skill should be called in to aid in overcoming natural distaste to such an article of diet as defibrinated blood.

Organisms in Water.

An observation recorded in a paper on the Multiplication of Micro-organisms, communicated to the Royal Society by Dr. Percy Frankland (*Proceedings*, vol. xl., p. 526), presents a striking analogy to what sometimes occurs when an epidemic breaks out for the first time in a particular locality or a plant gets a foothold in a new soil. Dr. Frankland has found that

whilst organisms have little tendency to multiply in water from deep wells in the cold, yet as soon as the temperature is raised to 20° C. the multiplication of organisms in this kind of water far exceeds that observed in river waters. This apparent anomaly of a greater multiplication of organisms in water containing only a trace of organic matter than in water containing a considerable quantity of it is thus explained by the author. It must be remembered that this water is at the outset almost wholly free from micro-organisms, and that it has never before been inhabited by such living entities. It is only reasonable to infer, therefore, that those of its ingredients that are capable of nourishing the particular micro-organisms which at last flourish in it have been previously left wholly untouched, whilst in the case of a river water the most available food supply for such organisms must have been already largely explored by the successive generations that have previously inhabited it.

Oil on Water.

The conclusions arrived at from the results of a series of practical experiments as to the use of oil for smoothing broken or troubled water have been made known in an interesting memorandum circulated by the Admiralty, in which the attention of officers is called to the fact that a very small quantity of oil skilfully applied may prevent much damage to ships and boats by modifying the action of breaking seas. From this memorandum it appears that the effect of oil is greatest on waves in deep water, the effect being more or less uncertain on a surf, or on waves breaking over a bar, where a mass of liquid is in actual motion in shallow water; in fact nothing can prevent the larger waves breaking under such circumstances. The heaviest and thickest oils have been found the most effectual. Refined kerosene is of little use, but crude petroleum may prove serviceable when nothing else is obtainable. All animal and vegetable oils and waste oil from the engines can be used with great advantage. A small quantity of oil suffices to produce the desired effect if applied so as to spread to windward. The method recommended for ships at sea is to hang small canvas bags containing one or two gallons of oil over the side of the vessel so as to dip into the water, the bags being pricked with sail needles to facilitate leakage of the oil.

Liquor Magnesii Bromidi.

The formula for an aqueous solution of magnesium bromide that has been used in the Philadelphia Hospital, especially in the insane department, as a sedative on the nervous system, has been furnished by Mr. England (*Am. Pharm. Journ.*, Nov., p. 531). It consists essentially in neutralizing the dilute hydrobromic acid of the U.S.P. (sp. gr. 1·077 and containing 10 per cent. of HBr) with magnesium carbonate and filtering. It is said to form a clear transparent light yellowish odourless liquid, bitter and brackish to the taste, sp. gr. 1·122, and miscible with alcohol in equal volumes without precipitation. The dose is one to two fluid drachms, each fluid drachm containing about seven grains of magnesium bromide.

Preparation of Alkaline Metals.

Mr. Castner, of New York, describes (*Chem. News*, Oct. 29, p. 218) a process for the preparation of the alkaline metals, which consists in reducing the hydrate or the carbonate of an alkali in a fused state by means of a carbide of a metal or an equivalent substitute. Such a substitute he prepares by coking a mixture of tar and iron previously reduced to a state of fine division, so as to form a heavy metallic coke having about the composition of 70 per cent. of iron and 30 per cent. of carbon, equivalent to the formula FeC_2. This mechanical mixture is ground and added to the fused mass, and is said not only to promote the reduction at a moderate temperature, but by avoiding the use of lime and excess of carbon to allow of a yield of 90 per cent. of metal instead of 30 per cent., as by the old process.

Tannin in Tuberculosis.

It has been found by Messrs. Raymond and Arthaud that tannin is of value in the treatment of tuberculosis (*Lancet*, Nov. 20, p. 1003). Having observed that when tannin had been administered to animals for a month they were more refractory to the effects of the tubercular virus, it was used in more than fifty cases of human tuberculosis in doses of 30 to 60 grains daily. In less than a fortnight half the patients showed an increased weight.

Sodium Fluoride.

Sodium fluoride has lately been employed by Dr. Louis Kolipinski, who has found it a useful agent in the treatment of headache in children, and has obtained favourable results with it in three cases of epilepsy.

Hyoscine Hydriodate.

The value of hyoscine as a cerebral sedative is discussed at length by Dr. J. Mitchell Bruce (*Practitioner*, Nov., p. 321). He finds the hydriodate to be the most advantageous salt for use in medicine, and makes a solution of it of the strength of one two-hundredth part of a grain of the salt in a minim of distilled water. The best results are obtained by hypodermic injection. A dose of one two-hundredth part of a grain can be given once a day in this way without any risk of unpleasant effects in ordinary cases of noisy insomnia and delirium; but in cases of high delirium it has been repeated within four or six hours with safety and advantage. In connection with the fact that hyoscine sometimes gives rise to unpleasant symptoms in relation to respiration and circulation, it may be mentioned that in a case where one-thirtieth of a grain of hydrochlorate of hyoscine had been taken by mistake, and the patient was seized with convulsions, loss of speech, illusions and hallucinations, chloral, in 10 grain doses every quarter of a hour proved successful as an antidote.

Solanin.

The therapeutic action of solanin has formed the subject of an investigation by Dr. Geneuil. It is stated to slow the respiration, and to diminish the sensibility of the bronchial mucous membrane; but on the digestive organs it acts as an irritant, producing loss of appetite and a tendency to nausea or even vomiting. No effect on the pupil has been observed after its administration, although the pupils of children poisoned by *Solanum nigrum* have been found dilated (*Med. Chron.*, p. 135).

Vegetable Tumours.

In a paper by Mr. Roger Williams on vegetable tumours in relation to bud formation (*Lancet*, Nov. 20, p. 973), he describes the growths as essentially abnormal bud evolution caused by altered nutrition, whether consisting of woody nodules, continuous tumours, or exostoses, or excrescences presenting a surface thickly studded with shoots and stunted branches. He considered excess of nutriment to be the chief etiological factor in the production of these growths. Like animal tumours they originate in remnants of undifferentiated embryonic tissue.

The Pharmaceutical Journal.

SATURDAY, NOVEMBER 27, 1886.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE SOCIETY'S AFFAIRS IN SCOTLAND.

IT is with very great pleasure that we are enabled to state that there is now every prospect of an amicable settlement of the Scotch difficulty which has for some months past been a matter of much vexation to all who take an interest in the welfare of the Society. According to a notification given by Mr. WATT, of Haddington, a meeting of Members and Associates of the Pharmaceutical Society resident in Scotland was held last Wednesday at the Society's offices in Edinburgh, to receive the report of the deputation sent up from Scotland to confer with the Council last July, also to decide on the course to be taken with regard to the resolutions respecting the North British Branch which were adopted at the November meeting of the Council, and to appoint a Committee to carry out the decision arrived at by the meeting. The proceedings referred to in this notice have already been fully reported in the Journal, and it will therefore be unnecessary to say anything further concerning them but what took place at the meeting last Wednesday in Edinburgh. On that occasion the chair was taken by Mr. WATT, and after the usual preliminaries Mr. STORRAR, the Secretary to the Scottish deputation, read a report of the conference with the Council, expressing great satisfaction at the friendly way in which the deputation was received. This report was adopted unanimously, and after some discussion Mr. NAPIER, of Portobello, moved that the meeting should agree generally with the resolutions come to by the Council of the Society as to the future management of its affairs in Scotland, and thank the Council for the time and consideration it had devoted to the subject. This was seconded by Mr. GILMOUR, and carried unanimously. It may, therefore, be inferred that the long-standing disagreement between Scottish members of the Society and the Council has thus been disposed of and done away with. This settlement, like all amicable arrangements of matters in dispute, involves mutual concessions, but they are on both sides of such a nature as we think will satisfy the somewhat complicated requirements of the case as regards Scottish sentiment, no less than the conduct of the Society's affairs in Scotland. In the course of the discussion that took place it was suggested as preferable that each year one third of the members of the Branch Executive should remain in office, but on this question being put to the meeting, a large majority was in favour of an annual election of all the members. It was also thought by some that making the Chairman of the Branch executive Treasurer also would entail a limitation in the selection of a chairman, but the necessity of having in that position a person resident in Edinburgh would be as great in the one case as in the other, for, indeed, residence on the spot would seem to be an almost indispensable qualification. The Committee appointed to carry out the decision of the Committee consists of Messrs. J. MACKENZIE, Edinburgh, J. NESBIT, Portobello, W. GILMOUR, Edinburgh, D. B. DOTT, Edinburgh, and C. F. HENRY, Edinburgh, Mr. MACKENZIE acting as Convener.

MR. BARCLAY ON PHARMACEUTICAL EDUCATION.

THE address delivered by Mr. BARCLAY last Tuesday at the inaugural meeting of the Midland Counties Chemists' Association will certainly serve as a useful contribution towards the solution of one of the most difficult problems affecting the interest of chemists and druggists. It presents a correct and temperately stated view of the position of pharmacy in the provinces; it fairly recognizes the true nature of the difficulties with which chemists and druggists have to contend in the necessary occupation of gaining a living; and, while pointing to the possibilities of the future as regards a better state of things, it does not fail in stating what is necessary in order to arrive at it. Mr. BARCLAY will not be open to the reproach that he thinks and acts only in the interest of what are called by some of our correspondents "West-end pharmacists," but he, nevertheless, does not hesitate to say that the best thing we can do to bring about the possible improvement he looks forward to is to promote the higher education of the chemist and druggist. It is by that means he hopes to see dispensing—the legitimate occupation of the pharmacist—brought within the scope of his daily routine; it is by that means he looks for the recognition of chemists and druggists as being suitably qualified for the work of public analysts. He does not acknowledge the validity of the objection often urged against "higher education" on the ground that it will keep out of the business persons who have not been so educated, but he admits that if there were such an excluding influence it would be to the interest of the chemist in business no less than of the public. In all these respects Mr. BARCLAY'S views appear to be in harmony with those held by the promoters of education, who have for years been striving to establish a compulsory system by which such an influence would be exercised. The evidence he has brought forward as having been gathered from the experience of various provincial towns shows only too plainly that there is nothing to be hoped for from

the voluntary system. From all quarters the report is the same, that associations formed to offer facilities for study have soon languished and collapsed. Such benefit as they have produced has not been due to any system that could be relied upon for permanent and continuous efficacy, but solely to the chance presence of a few men among the assistants in a place who took a lively interest in the work of education. When that personal stimulus was removed the indifference of those who should be students again came into operation, and the attempt to carry on educational classes has almost invariably broken down. Could there be more conclusive evidence of the indispensable necessity of a compulsory system of education, which would leave no room for such indifference, but would peremptorily exclude from the business all those who did not agree to conform with its demands upon them?

But while thus agreeing with the spirit of the endeavours that have been made to establish a system of compulsory education for pharmacists, Mr. Barclay does not agree with the scheme that has been proposed by the Council, and he suggests in place of it one of a somewhat different character. He goes at some length into a statement of the reasons which have led him to this conclusion and then describes the plan which he thinks would be more suitable for the purpose of ensuring the efficient scientific teaching of youths intended for the business of pharmacy. In this statement there is matter for careful consideration, and we trust that it will meet with the attention the importance of the subject demands. In the discussion that followed Mr. Barclay's address, it is remarkable to find little more than a verbal acquiescence in the views propounded. Scarcely one of the speakers appears to have been impressed with the importance of scientific training, and the absolute necessity for it as a means of raising the business of pharmacy from the condition in which it now is. On the contrary, an educational curriculum was in one case looked upon only as a means of killing a dying trade, in another it was regarded as being incomplete without a correlative protecting provision, as a *quid pro quo*, as if educational training were a useless imposition incapable of being made the foundation upon which a really trustworthy protection of pharmaceutical interests could alone be based.

THE MEDICAL COUNCIL AND THE PHARMACOPŒIA.

At the opening of the recent meeting of the General Medical Council last Tuesday week, Sir Henry Acland in his Presidential address called attention to a report that would be presented on the Pharmacopœia, with important suggestions for its future management and progress, remarking at the same time that no part of the duties of the Council demands more philosophical attention than the transitional state of knowledge in regard to remedial agents and the science of pharmacy. It appears to have been from consideration of the subject from this point of view and on account of the work done by the Pharmaceutical Society for the Pharmacopœia, that Sir Henry Acland regarded it as a duty on his part to comply with the request that he should deliver an address at the opening of its present session, and it may be gathered from the report of the Pharmacopœia Committee of the Medical Council that his view of this important subject is being further developed, for the report of the Pharmacopœia Committee presented on the 17th inst. contained the draft of a plan for preparing an annual report on the revision of the Pharmacopœia which had been submitted by Professor Attfield at the request of the Chairman of the Pharmacopœia Committee, and subsequently approved by the Committee. The substance of this plan will be found at page 431, and we also learn from the report of the Committee that an arrangement had been made with the Professor to prepare such an annual report, and to carry out such other work connected with this subject as is therein suggested. The *British Medical Journal* in mentioning this says the precedent is good, and perhaps in time some more of the large income of the Council may be diverted from its present course to the encouragement of investigations of some use to the profession. At any rate, there is room for improvement in the present Pharmacopœia, much as it is in advance of previous issues, and the system now adopted by which an annual report will be made will very much facilitate the preparation of new editions in the future.

The Conversazione of the Chemists' Assistants' Association last Wednesday evening was in every respect a decided success, and the large attendance both at the Concert and at the Ball by which it was followed fully justified the decision that had been taken to engage more spacious and convenient rooms for the occasion. The Portman Rooms proved to be well adapted for the purpose, though there were about 420 ladies and gentlemen present, including the President of the Pharmaceutical Society and several members of the Council and Board of Examiners. A number of interesting objects were exhibited, comprising pharmaceutical relics lent by the Society, some old engravings, portraits and manuscripts lent by Mr. Ince, autographs of eminent pharmacists lent by Mr. Saul, an ancient mortar and jars lent by Professor Redwood, J. Bell and Co. and Mr. Robbins. There were also specimens of new drugs and chemicals lent by the Society, Messrs. Hopkin and Williams and Christy and Co.; microscopes, photographic novelties and an electric exhibit lent by Mr. Collins, Messrs. Marion and Co., and Mr. S. W. Maquay. In the Concert, with which the evening was commenced, several singers of considerable artistic merit took part, especially Miss Maud Heather and Miss Minnie Kerton, Signor Bonetti and Luigi Arditi, Messrs. J. D. Myers and R. Groome. Dancing commenced at half-past ten and was kept up to a later hour than we have a record of, though we can safely say that all present passed a most pleasant time at this successful reunion, which reflects great credit on those who had undertaken the arrangements for it.

The General Council of Medical Education and Registration.

Proposed Annual Reports on the British Pharmacopœia.

At the meeting of the General Medical Council on Wednesday, November 17, Dr. Quain presented the following report of the Pharmacopœia Committee, which was adopted:—

"The Pharmacopœia Committee have to report to the Council that the first issue of 20,000 copies of the work has been disposed of, and that a reprint has been issued consisting of 3000 copies, from the stereotyped plates, of which 730 have been already sold. The opportunity has been taken during reprinting of introducing into the body of the work such corrections as were found to be necessary. It may be noted that a list of these corrections can be had, without charge, from the Registrar, or from the publishers, by those who have purchased copies of the original issue.

"The Committee further report that they have arranged with Professor Attfield to prepare an annual report on the revision hereafter of the Pharmacopœia. The following is the plan submitted by Professor Attfield for carrying out this intention, and approved by the Committee:—

"Broadly, a Reporter should, I think, present (annually) to the Pharmacopœia Committee of the Council an abstract of the published researches and opinions which are or may become of importance in connection with any future revision or edition of the Pharmacopœia—researches, opinions, etc., published by therapeutists, pharmacologists, pharmaceutical chemists and chemists and druggists, scientific and analytical chemists, and botanists.

"Secondly, while leaving purely original experimental researches to the workers in the various public and private laboratories where such researches are conducted, a Reporter should perform such experiments as may be necessary for the application of those original researches to the exact purposes of the Pharmacopœia.

"Thirdly, as regards suggested improvements of official processes, whether synthetical or analytical, a Reporter should, when necessary, obtain experimental confirmation or otherwise, of the suggestions, before reporting them to the Committee.

"All this work. both literary and experimental, should be done regularly year by year; for the large and numerous areas of knowledge laid under contribution in revising a Pharmacopœia are fast getting too extensive to be properly investigated in any short period preceding the issue of a new Pharmacopœia.

"As for the classification of the Annual Reports, I think it should pretty much follow the division of matter in the Pharmacopœia itself. That is to say, questions of general construction and literary arrangement, and questions relating to weights and measures, to chemical and general nomenclature and notation, to the uniform disintegration of drugs, to temperature, etc., may be treated first. Then would follow the consideration of new remedies and compounds proposed for addition to the Pharmacopœia and of old remedies and compounds proposed for omission from the Pharmacopœia. Any suggested alterations in the names of official articles and preparations would next be discussed. Suggested alterations respecting any of the alphabetically arranged articles or monographs in the text and appendix of the Pharmacopœia—nearly 1000 in number—would form the concluding portion, and, indeed, the bulk, of the Annual Reports—alterations relating to (*a*) leading names and associated synonyms, (*b*) definitions of articles of the materia medica, (*c*) descriptive characters of those articles, (*d*) mode of preparation of compounds, (*e*) characters and qualitative and quantitative tests of those compounds, (*f*) doses, and (*g*) additions to, omissions from, and alterations in, the cross-references.

"There may also be some matters of importance to be considered which do not fall within either of the foregoing classes of subjects, as, for one example, the question as to whether or not any changes—and, if any, what changes—can be effected in a future British Pharmacopœia to better adapt it to Indian and Colonial requirements.

"The Annual Reports should, of course, contain clear references to all sources of information; so that the Committee, future Editors, and all persons interested in the subject could readily refer to all data.

"Finally, the hands of the Reporter or Reporters would be strengthened, and the Reports would come before the Committee with greater weight, if draft reports, before presentation, were carefully considered by the three Editors of the British Pharmacopœia, 1885, who for this purpose should be regarded as Consultants. The designation of a Reporter would be, probably, Reporter on the British Pharmacopœia to the Medical Council; the instructions to any such officer being, I presume, to report annually, on some such lines as the foregoing, to the Pharmacopœia Committee of the Council."

Proceedings of Societies in London.

CHEMICAL SOCIETY.

At a meeting of the Chemical Society on Thursday, November 18, W. Crookes, Esq., F.R.S., Vice-President, in the chair, Mr. A. Wentworth Jones was formally admitted a Fellow of the Society, and a number of certificates were read for the first time. The following were also elected Fellows of the Society:—Messrs. B. F. Davenport; W. R. Dodd; L. Hislop; A. B Lyons; J. B. Readman; A. Rée; V. P. Richard; F. T. Shutt, and E. F. Smith.

The following papers were read:—

Researches on the Relation between the Molecular Structure of Carbon Compounds and their Absorption Spectra. Part VIII. A Study of Coloured Substances and Dyes. By W. N. Hartley, F.R.S, Royal College of Science, Dublin.—The author refers to a paper by Dr. Otto N. Witt, published in 1876, in which it is stated that the tinctorial characters of benzenoid compounds is conditional upon the simultaneous presence in the molecule of a colour-producing group and a salt-forming group of atoms: a group of atoms of the former kind being designated a *chromogen*, and of the latter a *chromophor*. He has studied the relation of the hydrocarbons to the more complex compounds which are colouring matters derived therefrom. It is shown that benzene and the derived hydrocarbons have the property of selecting and absorbing certain rays of the spectrum, and may thus be regarded as coloured bodies, the colours of which are too subtle for the eye to perceive them. By certain reactions, two or more benzenes may be linked in such a way that the rate of vibration of the new molecule is reduced so that it absorbs rays within the regions of visibility. That which has been called a chromogen is an invisibly coloured substance, and that which is termed a chromophor is an atom or group of atoms capable of so reacting as to reduce the rate of vibration of the molecule, with the result that it absorbs rays of no higher refrangibility than the violet. Under certain conditions oxygen and nitrogen are chromophors, hence also hydroxyl and nitroxyl. The spectrum measurements of a number of nearly related dyes and colouring matters are given, together with diagrams indicating their molecular vibrations. The modification seen in the curve of benzene when an alkyl radicle displaces hydrogen consists in three out of the four absorption-bands being merged in one, and the rate of vibration of the absorbed rays is less. When a body like triphenylmethane is examined, the absorption curve has much of the general character of that of benzene, but

the modifications which it has undergone are much like what one might expect from its constitution. First, there is one broad band of absorption with just an indication of a second being merged in this. Secondly, a great increase in the amplitude of the vibrations. Thirdly, the rate of vibration of the absorbed rays is greatly reduced. When magenta, Hofmann's violet, and iodine-green are examined it is seen that the curves are modifications of that of triphenylmethane; they follow each other closely, but the molecule of greatest mass transmits least light, and the light is composed of rays vibrating with least rapidity, thus indicating a greater amplitude and less rapidity of vibration of the molecule. Azobenzene and a number of its derivatives of very varied constitution exhibit curves remarkably similar. It is remarked that when absorption takes place in the visible region the ultra-violet rays are generally completely absorbed.

Spectroscopic Notes on the Carbohydrates and Albuminoids from Grain. By W. N. Hartley, F.R.S., Royal College of Science, Dublin.—According to C. v. Naegeli ('Theorie der Gährung') fermentation is a process which may be described as the transference to fermentable matter of the molecular or rather intra-molecular vibrations of the different constituent substances entering into the composition of living protoplasm (which remains itself unchanged in composition), and hence the equilibrium of the molecules of the fermentable matter becomes so disturbed as to cause their resolution into simpler molecules. The author has had recourse to spectrum observations, in order to obtain, if possible, some information as to the mode and rate of vibration of the molecules of the bodies which initiate and participate in fermentative changes. It is pointed out that animal albumens of various kinds examined by M. L. Soret are distinguished by absorption-bands produced by small thicknesses of dilute solutions, while the albuminoids invertase and diastase, and the water in which yeast has been washed, afford solutions which are very diactinic, and as far as could be ascertained do not exhibit absorption-bands. Moreover, gelatine is very diactinic when quite pure, and so also are the carbohydrates starch, cane sugar, and glucose. It does not therefore appear that there is anything in the mode and rate of vibrations of invertase which is incompatible with a transference of its vibrations to glucose, nor of the vibrations of diastase to starch; hence it is possible that some material within the yeast cell may communicate its motion to the sugar outside of it, and so resolve the complex molecule into simpler molecules. Putting the theory of fermentation on one side, it is of interest to know that the facility with which the ultra-violet rays traverse solutions of the carbohydrates is quite in accord with what we know of their constitution, notwithstanding the complexity of their molecules. It is further no less interesting to know that the albuminoids associated with the carbohydrates are evidently of very different constitution from those found in the animal organism. It is pointed out that gelatine dry plates very rarely receive impressions of rays of higher refrangibility than 2146, and this is due to some slight impurity in the gelatine, since some specimens of gelatine transmit the line of zinc 2024.

Mr. Spiller, referring to the differences in sensibility of gelatine plates to the most refrangible rays commented on by Professor Hartley, said that owing to the difficulty experienced in getting silver bromide emulsion to set and dry sufficiently rapidly in summer time, it had sometimes been the practice of makers to add a minute proportion of chrome-alum: this might account for some of the differences observed.

Professor Hartley said that he had long thought that the soluble bromides had not been completely washed out, but as plates prepared with special care for him by Messrs. Mawson and Swan had also manifested the differences described, he now thought that they were probably due to actual differences—some minute impurity—in the gelatine used at different times in preparing the plates.

Preliminary Note on the Electrolysis of Ammonic Sulphate. By Herbert McLeod, F.R.S.—When a neutral solution of ammonic sulphate is electrolysed in a U-tube provided with platinum plates as electrodes, nearly pure oxygen is evolved at the positive pole and hydrogen at the negative. For one volume of gas from the positive pole, a quantity varying between 4·7 and 5·4 volumes is evolved from the negative pole. A small amount of ozone is produced. On mixing together the electrolysed liquid at the poles a strongly alkaline liquid is obtained, containing a considerable quantity of "active" oxygen. When the liquid is first neutralized with sulphuric acid, then treated with excess of baric chloride, and the baric sulphate filtered off, the liquid deposits baric sulphate on boiling, an indication of the presence of persulphuric acid in the solution. When sulphuric acid that has been electrolysed is exactly neutralized with baric hydrate, the precipitate filtered off and the liquid boiled, baric sulphate is precipitated; at the same time the liquid becomes acid and a further quantity of baric sulphate is thrown down on the addition of baric chloride.

In reply to a question by the President, Professor McLeod said that Faraday, in the experiments which gave results differing from those now described, had used an alkaline solution of ammonium sulphate in ammonia.

Dr. Messel asked if the deficiency in oxygen might be due to the formation of hydrogen peroxide. In experiments on the electrolysis of sulphuric acid solution (with a current of 60 ampères), he had at all events observed the characteristic colour on application of the chromic acid and ether test.

Professor McLeod said that he had always failed to detect hydrogen peroxide.

The Preparation and Hydrolysis of Hydrocyanides of the Diketones. By Francis R. Japp, F.R.S., and N. H. J. Miller, Ph.D.

The Action of Salicylic Aldehyde on Sodium Succinate in presence of Acetic Anhydride. By Gibson Dyson, Demonstrator of Chemistry, Normal School of Science, South Kensington.—By heating a mixture of 10 grams sodium succinate, 15 grams salicylic aldehyde, and 13 grams acetic anhydride, in a sealed tube for forty hours, at a temperature of 140° C., the author obtained a substance having the composition $C_{18}H_{10}O_4$, to which he has given the name "*Dicoumarine.*" It is an extremely stable body, insoluble in water, ether, alcohol, benzene and chloroform, but soluble to a slight extent in hot glacial acetic acid, from which it separates on cooling in acicular crystals. It dissolves in a hot solution of sodium hydrate, but is reprecipitated unchanged on addition of an acid. By acting on its alkaline solution with sodium amalgam, hydrodicoumaric acid, $C_{18}H_{14}O_5$, is formed. This acid, when heated at 130° C., gives off a molecule of water, yielding an anhydride (hydrodicoumarine) $C_{18}H_{14}O_4$ (m. p. 256° C.); hydrodicoumaric acid also combines with bromine to form addition products. By further reduction of hydrodicoumaric acid, an acid having the composition $C_{18}H_{18}O_6$ is obtained. This *dihydrocoumaric acid* yields an anhydride, $C_{18}H_{14}O_4$, melting at 222–224° C. Zwenger (*Annalen*, Sup., viii., 32), by reducing a saturated alcoholic solution of coumarine with sodium amalgam, obtained hydrocoumaric acid, $C_{18}H_{18}O_6$, which yields an anhydride, $C_{18}H_{14}O_4$, melting at 222° C. The constitution assigned by Zwenger to his acid is the same as that given by the author to dihydrocoumaric acid; the two acids are, however, not identical. Both acids yield an anhydride $C_{18}H_{14}O_4$, melting at 222° C. It is probable that we have here another case of isomerism similar to that observed by Perkin to exist between α- and β-coumaric acid.

The Reduction of Nitrites to Hydroxylamine by Hydrogen Sulphide. By E. Divers, F.R.S., and T. Haga.—On decomposing silver nitrite with hydrogen sulphide, hydroxylamine is formed as chief product. Mercurous

nitrite, supposed hitherto not to exist, has been prepared by the authors, and will be described in a future communication; it also yields hydroxylamine on treatment with hydrogen sulphide. In a preliminary note reference was made to the production of yellow crystals of unknown nature, together with metallic mercury and hydroxylamine, on treating mercurous nitrate with nitric oxide. Having since prepared mercurous nitrite, the authors have now learned that these yellow crystals were this salt; and having ascertained that hydrogen sulphide converts it partly into hydroxylamine, they further recognized that the apparent formation of this base from mercurous *nitrate* and *nitric oxide* had really been its formation from mercurous *nitrite* and the *hydrogen sulphide* used to remove the mercury from the solution, as mercurous nitrite is soluble in nitric acid with but partial decomposition. The green solution prepared by mixing alkali nitrite with copper sulphate also yields hydroxylamine when treated with hydrogen sulphide. Alkali nitrites alone treated with hydrogen sulphide and then acidified yield no hydroxylamine. The formation, here described, of hydroxylamine from the nitrites of the silver-mercury group of metals is the only indisputable evidence there yet is of the conversion of an inorganic nitrite into hydroxylamine.

Note on Some Double Thiosulphates. By J. B. COHEN, Ph.D., Assistant Lecturer on Chemistry, Owens College.

Preliminary Note on the Action of Triphenylmethyl Bromide on Ethyl Sodio-malonate. By GEORGE G. HENDERSON, M.A., B.Sc., Assistant to the Professor of Chemistry, University of Glasgow.

Action of Silicon Tetrachloride on Aromatic Amido-compounds. By ARTHUR HARDEN, B.Sc., Dalton Scholar in the Owens College.—The author finds that primary amines react with silicon tetrachloride, forming diamines of the formula $SiCl_2(NHR')_2$. He has prepared such compounds from aniline, orthotoluidine, isoxylidine and betanaphthylamine. Pyridine and quinoline form the additive compounds, $2C_5H_5N.SiCl_4$, $2C_9H_7N.SiCl_4$.

CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting of this Association was held on November 17, Mr. H. H. Millhouse, President, in the chair.

The minutes of the previous meeting were read and, after a slight alteration had been inserted, confirmed. Several gentlemen were then proposed for membership.

The Chairman next called upon Dr. C. Rathbun, D.D.S., to read a paper entitled "The Latest Methods of Preserving Apparently Worthless Teeth and Roots."

Dr. Rathbun, who met with a very cordial reception, commenced by referring to specimens of dentistry found in the pyramids and in the excavations at Pompeii and elsewhere, showing that dental appliances were not unknown in the earliest times. He then proceeded to give a brief history of the different devices and appliances extant for replacing lost natural teeth, confining his remarks more particularly to those appliances inserted on the natural roots. The whole range of artificial crowns inserted on natural roots was gone over; commencing with the human tooth or carved ivory, inserted by means of a wooden dowel; down to the very latest and most perfected methods of crown, bar and bridge work. The advantages and disadvantages of the different methods of crowning the teeth were fully explained, by means of models, a large selection of all the best varieties of crowns, mounted on natural roots, being passed round for inspection. The speaker called attention to the fact that it was imperative that all operations on roots or broken-down teeth for the insertion of artificial crowns should be preceded by a thorough system of treatment, whereby any trouble arising from the presence of dead or dying nerves in these teeth should be prevented. In the case of an abscessed tooth or root, the abscess, whether acute or chronic, must be thoroughly broken up and removed, as no permanent success could be expected from work, unless the teeth and roots were in a perfectly healthy condition. The manner of restoring broken-down teeth with gold and silver was then gone into, by means of which, by the aid of gold screws inserted at different angles in the remaining portion of the crown, if the nerve were still alive, or by gold pins inserted in the roots, if the nerves were absent, the operator was enabled to restore the tooth to its former shape and usefulness. As regards the most successful variety of crowns, the speaker was most decidedly in favour of the so-called Morrison or Richmond crown, the peculiar advantages of which consisted, not only in its having, in common with other crowns, a pin inserted in the root, for the attachment of the artificial crown; but also in its having a gold ferule completely covering the end of the root, the same being very accurately fitted and passing about one line under the gum, the crown being placed in position by means of liquid cement. The end of the root was thus completely covered and all decay prevented, the objectionable taste and smell caused by the collection of particles of food and other foreign substances in the joint formed by the union of the crown and the root being by this means entirely prevented. The speaker went on to show that where one or more natural teeth had been lost, the adjacent teeth could be crowned, and a bar or bridge carried across the intervening space to serve for the attachment of artificial crowns, to take the place of those missing. In cases where the teeth were in danger of being lost through disease, as in the case of pyorrhœa alveolaris, loose teeth could be held firmly in place by means of a bar of gold or other metal being built from the tooth in question into the sound teeth on either side. The chances of preserving such a tooth by means of subsequent treatment were immeasurably increased, by reason of the fact that the tooth being held firmly in its natural position, the chief factor in the trouble, namely the irritation caused by constant movement of the organ, is removed. The speaker closed by exhorting his hearers to preserve their natural teeth, as even a moderate number of those useful organs, though a part of that number might be only healthy roots surmounted by artificial crowns, were infinitely preferable to the best artificial dentures, both for mastication and for speech. The too common operation of extracting teeth for the cure of tooth-ache or abscess was generally entirely uncalled for.

A discussion followed, in which Messrs. Rushton, Bird, Dymond, Strother, Worsley, Farr, Taylor, Williams, and the Chairman took part.

Dr. Rathbun having replied to the discussion, a vote of thanks to him, proposed by Mr. G. W. Phillips, and seconded by Mr. A. A. Deck, was carried with acclamation.

The Chairman then announced the Conversazione, and the meeting terminated.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The second general meeting of the thirty-eighth session was held at the Royal Institution on Thursday evening, November 11, 1886, the President, Mr. A. C. Abraham, F.C.S., in the chair.

The minutes of the previous meeting were read and confirmed and the following donations announced:—*Pharmaceutical Journal*, from the Society; *Canadian Pharmaceutical Journal*, from the Society; *Pharmaceutical Record of New York*, from the publisher; *British and Colonial Druggist*, from the publisher; and 'The Annual Report of the Liverpool Science Students' Association.'

A vote of thanks was accorded to the donors, and the Hon. Secretary then read the following note on—

Ung. Hydargyri Ox. Rub., P.L.

BY RICHARD PARKINSON.

For years past at irregular intervals I have been put to considerable annoyance with this ointment, and should be very pleased if some brother chemist would come to my rescue in the matter and thoroughly evaporate the same at once and for ever. My experience stands thus: after a lapse of two or three weeks the ointment assumes a dirty mottled colour, especially next the side of the jar. At times I have fancied that the lard (I still adopt P.L. in this) was in fault, at others too much friction in levigating the powder, causing a chemical change, and on some occasions I fall back upon the metal knife used in stirring, not having anything else to blame; but I find these are all wrong, as my last batch was made with the greatest care in every respect on the above three points, and the result is melancholy. Squire has told us what to expect in regard to the P.L. formula; but the fun of it is, occasionally I have a beautiful ointment from the same, which keeps so to the end—say three months.

The President said his experience was that this ointment invariably became discoloured unless kept under water.

The President showed and explained "Desaga's Constant Temperature Apparatus." He explained that it consisted essentially of a jacketted copper pan, to which a return condenser was attached. To use the apparatus the jacket is partially filled with a liquid of a constant boiling point, and heat applied so that only a very little shall boil and run back from the condenser. The condenser consists merely of a thin glass tube, and is cooled by contact with the air. The following substances may be employed for the various temperatures:—

Water	97° C.
Toluol	107° C.
Xylol	136° C.
Anitol	150° C.
Anilin	180° C.
Naphtalin	250° C.

There being no further miscellaneous communications the President called upon Mr. Conroy to read his "Note on Linimentum Terebinthinæ."

Linimentum Terebinthinæ.

BY MICHAEL CONROY, F.C.S.

In our present Pharmacopœia, we are directed to make this liniment by the following process:—

Take of—

Soft soap	2 ounces.
Distilled water	2 fluid ounces.
Camphor	1 ounce.
Oil of turpentine	16 fluid ounces.

Mix the soap with the water; dissolve the camphor in the oil of turpentine; then rub these fluids together until they are thoroughly mixed.

This differs from the formula given in the previous Pharmacopœia, by the addition of the two fluid ounces of water. The old formula gave a very unsightly and unsatisfactory preparation, and the addition of water is, undoubtedly, an improvement. Much discussion has, however, taken place in reference to the quantity of water ordered, and it has been very clearly shown that, if a liquid preparation be required, it is necessary to increase the quantity of water to four fluid ounces.

In the discussion alluded to, some difference of opinion was expressed as to whether the liniment, when made strictly according to the Pharmacopœia, should result in a liquid, or in a solid preparation. Several have shown that by strictly adhering to the directions, a solid jelly-like body is the result; while others have obtained a liquid liniment. It has also been argued that the cause of the liniment becoming solid is due to impure oil of turpentine having been used, and one critic is of opinion that the cause of the trouble is the soap, which is sometimes made with solid fat instead of with olive oil.

As the question is one of importance to those who have to make this preparation, I have taken some pains to ascertain if either of these causes would affect the result. I had a small quantity of soft soap prepared from fine olive oil and some oil of turpentine specially rectified for the purpose. With these, the B.P. quantity of liniment was made according to the official instructions, the result being a soft jelly-like emulsion, sufficiently firm to keep its position when the pot containing it was placed on its side. Another batch was next made, using, in this instance, commercial oil of turpentine and ordinary soft soap, with precisely the same result. This, to my mind, sets at rest the question of the purity of the oil of turpentine or of the soap being the cause of the stiffening of the liniment, and I may further add that in every previous case where I have made, or have seen this liniment made, a similar result has been obtained, notwithstanding that different soap and oil of turpentine were used.

Mr. J. J. Caldwell, in a letter to the *Pharmaceutical Journal* (March 20, 1886), was, I think, the first to suggest an additional quantity of water, and he pointed out that the directions given in the Pharmacopœia for making the liniment would incline to the belief that a mistake had been made in the quantity of water ordered. He founds this opinion on the fact that the directions to "rub these fluids together" would otherwise have no meaning, since without the further use of water there are not *two* fluids. Mr. W. Baxter, Jun., in a paper published in the *Pharmaceutical Journal* of June 5, 1886, gives a table of experiments, in which he arrives at the same result as Mr. Caldwell, and I can corroborate their statement, that by doubling the Pharmacopœia quantity of water a very beautiful liquid emulsion is obtained.*

That the quantity of water contained in soft soap is variable is well known, and this to some extent may account for the different results obtained; but in my opinion the main factor in the case is the mode of manipulation. The conclusions to which my experiments lead me are that a fine jelly-like liniment can be made from the Pharmacopœia formula, provided the soap and water be well incorporated, and the oil of turpentine added very slowly with constant trituration; and secondly that the quality of the soap and oil of turpentine does not affect the result.

The President, in proposing a vote of thanks to Mr. Conroy, said it was a subject with which he had not much practical experience, but he thought that the result obtained depended very much upon the mode of manipulation.

Mr. H. O. Dutton, in seconding the vote of thanks to Mr. Conroy, said that his experience was that the liniment was a somewhat troublesome one to make, and that in using the B.P. quantities a gelatinous mass of the consistency of Mr. Conroy's sample was the ultimate result. He found that the use of more water or of less soap in its preparation produced at first a liniment of the appearance of lin. ammoniæ, but which did not appear to be so well absorbed by the skin as that made with the Pharmacopœial quantities.

A cordial vote of thanks was then accorded to Mr. Conroy for his paper, and the meeting then terminated.

MIDLAND COUNTIES CHEMISTS' ASSOCIATION.

The inaugural meeting of this Association for the session 1886–87 was held on Tuesday evening last, at the Grand Hotel, Colmore Row. The chair was taken by the President (Mr. Councillor Barclay) and there was a numerous attendance. In accordance with a previous announcement the President then proceeded to deliver an address on the subject of—

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* This emulsion thickens considerably with age.

Pharmacy in the Provinces, with Special Reference to Education.

BY THOMAS BARCLAY.

It was only at the beginning of last year that we met to hear the admirable address of Professor Redwood; we were then making a fresh attempt to form classes under highly favourable conditions; a large number of students had presented themselves for tuition, and teachers of recognized ability were induced to undertake the work.

We little thought that in so short a time we should have again to face the educational problem; but at the annual meeting recently held, the teachers reported that the number prepared to enter the classes for the coming session was so small that they wished to take the opinion of the meeting as to whether they should continue their work. The matter was then discussed, and it was decided to leave it in the hands of the officers and teachers. We met together, and after giving the question full consideration it was agreed that I, as President of the Association, should bring the whole subject before you in the shape of an inaugural address.

In acceding to their wishes I knew that I was taking a very bold step, because so many able men had traversed the ground before me, notably Professor Attfield, who has made the subject his own, and whose services in the cause of pharmaceutical education cannot be over-estimated; the names of Mr. Carteighe, President of the Pharmaceutical Society, Mr. Greenish and Mr. Schacht, also, amongst others, deserve special mention. I felt that the subject was so hackneyed by its frequent discussion in the Council, and by the continued correspondence in the pages of the Journals, that it would be difficult to say anything new, or to throw any light upon it.

To gain as much precise information as possible I issued to representative pharmacists in the most important centres of Great Britain a number of formal questions, asking for information as to whether they had any classes specially set apart for students of pharmacy? How long they had been established, and whether continuously? The qualifications of their teachers? The number that had entered for the present session? The average attendance in previous sessions? What fees were charged? And whether any subsidy was received from the Pharmaceutical Society? etc.

One hundred and twenty-five papers were sent out, and one hundred and three replies have been received. I wish to take this opportunity of thanking those gentlemen who have assisted me so readily at such short notice. Many of them did not confine their replies to the questions, but gave most useful information respecting the state of general technical education and of pharmacy in their district. The information so given I have made use of in the preparation of this address, for the question of education is so bound up with the condition of the chemist in business that to consider the one it is absolutely necessary to think of the other. At this stage it is only fair both to the teachers and students of our Association to state that the miserable condition of the classes in Birmingham is not exceptional, for in answer to inquiries I can only find throughout the whole of Great Britain that about 240 students have entered classes this session for pharmaceutical education; consequently it is no use blaming either the one or the other. We must therefore look farther afield to discover, if possible, the cause of failure. From the one hundred and three replies I find that, in addition to the large number of smaller towns and villages which were not communicated with, knowing that it would be useless doing so, there are eighty-four places out of the one hundred and three at present devoid of special provision for pharmaceutical education, including Bristol, Oxford, Cambridge, Exeter, Hull, Northampton, Brighton, Glasgow, Salisbury, York, Cheltenham, Norwich, Derby, Bradford, Bolton, Dover, Huddersfield and Sunderland.

In several of these towns attempts have been made from time to time to establish classes, which have been carried on spasmodically with more or less success, as the following letters, selected from others, illustrate :—"In reply to these queries, our local Association has been dormant for two or three years, but we intend to revive it this winter. Formerly we had a large membership, and went on flourishingly, but from many causes the whole collapsed, or rather became dormant. When there are a few men amongst the assistants who take a lively interest in the business, things go on well, but if these active men leave the town, or go into the ranks of masters, the attendance falls off; this has been the case with us on repeated occasions, but I hope that we shall have a revival with new men this time." They seem like ourselves to have another crisis in their history, but, with Micawber, they take it very philosophically, and are waiting for something to turn up.

Another says :—"There was a class here for the purpose of helping apprentices and assistants, some years ago; there was also a special room provided with a good loan library and apparatus, but it was found that very few of the persons for whose benefit it was established took any interest in it, and the affair entirely collapsed ten years ago. The collapse was entirely due to the indifference of the students to this means of education, for the fees were merely nominal."

Another says :—"Our Association has existed for about twenty-five years. We meet yearly to elect officers to do nothing, and vote thanks to them for their services. Some eighteen years ago we established a reading room, fairly well supplied with periodicals and books; we also provided teachers to prepare the students for their examinations, for which we charged 7*s.* 6*d.* per annum, making up the deficiency out of the funds of the Association. This worked very well for the first year, and died before the close of the second. The assistants, in the course of a few years, took up the question, and for a while all went on regularly; but after about two sessions there could none be found to attend the lectures, and a meeting was called for the purpose of dissolving the Association, and disposing of its property. I induced them to adjourn the meeting for two years, give up the room they occupied, and put the property in a place of safety. This was done, and last year, it being found impossible to cause any interest to be taken in the work, it was resolved to dispose of the property, and this has recently been done."

In some of these towns the apprentices and assistants take advantage of the science and art classes and other classes connected with public institutions.

Another correspondent writes in answer to the question, whether there were any classes for pharmaceutical students :—"None, but there is, I believe, a good deal of scientific billiard playing. It seems to me there is a tendency to leave everything to the universal postal and personal crammer, who is so successful in working miracles upon the untutored brain."

In other places the condition of pharmaceutical education is generally at a very low ebb, although very much credit is due to the noble band of workers, who under the most trying circumstances keep the light of education burning. In some places it will be noticed that fresh attempts have been recently made, and those engaged are, as we were last year, very sanguine as to the result; but without taking much credit to myself for being a prophet, I can safely predict that if the present condition of things continues inevitable failure must follow sooner or later.

In one large northern centre my correspondent writes—"Our local Association has been in what may be called a hibernating condition for some time past, and has only been kept alive by the determination of some half-dozen or so of us. We used to have lectures and classes in connection with our Association, which for two or three sessions were fairly well attended, but soon became smaller and

beautifully less. Classes are now carried on by private enterprise. We do not rent any premises at present, and have no laboratory." At another the same condition exactly obtains, the teaching is now in the hands of a private tutor, but is partially under the control of the local chemists; the laboratory and rooms, however, do not belong to them. In Leeds the education is obtained through the Yorkshire College, Mechanics' Institute and Literary Association, further assisted by Mr. Elborne, of Owens College, Manchester. Seventeen students have entered this session. In Sheffield the school has been revived; my correspondent says:—"It is the second year of the School of Pharmacy. The teachers are Major and Minor men in business. We had a grant from the Pharmaceutical Society of £25 last year. The fees are from 7*s.* 6*d.* to 10*s.* 6*d.* each for the entire course of eight months, or 30*s.* inclusive."

I feel personally interested in the account of the condition of pharmacy in Newcastle-on-Tyne, for it was there, when an apprentice, that I attended the classes then held by Mr. H. B. Brady, F.R.S., Mr. Barnard S. Proctor, and others. From Newcastle, my correspondent writes:—"The classes have been revived, and those now carried on have been established one year. The premises are rented at £32 per annum. The laboratory is in the Durham College of Science. The teachers are pharmaceutical chemists. Ten students have entered for the present session. Twenty-six last session. The fees charged are one guinea for each subject, and three guineas for the laboratory. £50 has been received as a grant from the Pharmaceutical Society." At Nottingham I hear the course of lectures and laboratory practice are in connection with the University College. The chemists have a room in which they have a library and a collection of materia medica specimens. Instruction is given there in materia medica and pharmacy by one of their own members.

At Owens College, Manchester, the authorities on their own account and "without the request, advice, or assistance of pharmacists," took up the subject of pharmaceutical education and arranged a course of instruction to extend over two years, six months in each year, for day or evening classes, but the average attendance each year has been much below what was expected; the reason is said to be that the course is too elaborate. I believe this is the only provincial college of any note which has by its own action made special provision for pharmaceutical students. From Edinburgh I hear, "at various times attempts to conduct exclusively pharmaceutical classes have been made both by the Council of the North British Branch and by private adventure, but they have not succeeded. The local chemists as such have nothing whatever to do with education." *Tutorial classes* have been in existence continuously for about five years, but exclusively pharmaceutical ones for about two years. The premises of the Society, including laboratory, can be used for pharmaceutical purposes by a teacher, and lecturers have ample accommodation. None of the lecturers in the school of medicine are, or have been, pharmacists; by far the most successful classes are conducted by a pharmaceutical chemist, who is recognized by the University Court as a teacher of practical pharmacy, and whose services are accepted by the Senatus. His classes have improved rapidly, *for many now avail themselves of tutorial classes who used to study privately*, although the number attending classes in Edinburgh until within about two years ago rarely reached a dozen in all.

Now, gentlemen, the picture of pharmaceutical education in the provinces is before you. I have not attempted to describe the condition of the schools in London, for it is there that the students are driven by stress of circumstances, whether they like it or not, to be posted up in such a way as will enable them to get through their examinations, and London is more highly favoured than the provinces, for they are not only provided with national picture galleries, parks, museums, etc., but they have abundance of public schools, libraries, and other advantages over the less fortunate citizens in the provinces. Now let us look for a few minutes at the business side of the subject, for as I said before the two are inseparable. It is hardly necessary to say to an audience like this, that both town and country business has depreciated to an enormous extent within the last few years, and my heart is often saddened when I think of the condition of men, who for a great number of years have steadily attended to their businesses, supplied the public with good articles at moderate prices, and in every way conscientiously performed their duties, duties which as chemists we all know to be very onerous, through having to supply articles of a dangerous nature and at the same time to conform to the provisions of both the Pharmacy and Adulteration Acts. Large numbers of this class, who formerly made a reasonable livelihood, enabling them to maintain their families in respectability, now find it almost impossible, despite unremitting attention to business, to keep the wolf from the door, and businesses which a few years ago after the death of the owner would have sold readily at a good price, for the benefit of his family, could not now be disposed of except at auction prices. As a consequence the number of chemists, in large towns especially, is continually diminishing. We in Birmingham know that several old established businesses have been closed within the last few years, and the same thing obtains in other towns. This state of things is largely due to unfair competition on the part of co-operative stores, which by a "fluke" in the Pharmacy Act are enabled to carry on the business of a chemist and druggist, although none of the shareholders are qualified. It is also brought about by tradesmen in other businesses selling patent medicines, proprietaries, and packed drugs (the latter being supplied by members of our own fraternity) at unremunerative prices, they being able to do this because it is a sort of "by-product" to them, any profit they may make being an addition to their ordinary trade, and if they get a fair rate of interest on the capital employed they are perfectly satisfied. There is, in addition to these, a large number of cutting druggists who are making it still more difficult for the chemist to obtain a living by carrying on his business as formerly. We might have expected by this time that the number of medical men who dispensed their own medicines would have been lessened. But such is not the case; in fact things may be said to be worse, for there is now an increasing number of open surgeries and provident dispensaries, where the public may be supplied with medicine, and it has been said that probably not more than one half of the chemists in the country make above 5 per cent. of their incomes by dispensing and not more than 10 per cent. by the sale of articles to be used for medicinal purposes, exclusive of proprietary medicines. The following extracts from letters bear upon the trade aspect of the question, the first being from a leading chemist in a county town of the Midlands, who writes, "We have a population of 91,000; there are thirty-three chemists' shops, kept by three pharmaceutical chemists and twenty-eight chemists and druggists. These employ two qualified assistants (Minor), twenty unqualified and five apprentices. There are forty-two medical practitioners in the town, all without exception supply their own medicines. We have one resident physician, who does not care for practice and only writes prescriptions occasionally. Years ago there were two or three physicians with very good practices; probably the railway facilities by which patients can consult physicians in larger towns and London may account for no one coming here. From the above you will understand that at the greater part of the chemists' establishments here there is no opportunity for practising the higher branches of pharmacy, consequently there is a lack of interest and no encouragement to study."

From the West of England my correspondent writes,

"All that the Pharmacy Act does is to enforce examinations to enable a man to sell a few poisons. If there be a curriculum and pass-examination there ought to be another side of the equation and protection from outsiders. What would a lawyer think if his privileges extended to "murder cases only, all the other legal work being open to the world? The chemists are in a very analogous position. As examined men we can sell poisons, but any unexamined man can deal in all the medicines of the Pharmacopœia and otherwise."

It will be seen by the foregoing that the chemist himself cannot have much pleasure in pursuing his calling, nor can the apprentice or assistant under the present state of affairs have much heart in prosecuting his studies and making the necessary sacrifices to qualify for the business.

I will now turn from the dark side of the picture and endeavour to make some suggestions by which our position may be improved. In the first place, we must make up our minds that the old state of things is gone and never can return; I mean as regards the prices of patent medicines and sundries, and that it is impossible to take out of the hands of grocers and others the sale of ordinary drugs, and to prevent oil and colourmen selling all the ordinary medicines. We must look elsewhere for an improvement in our position. We must face the competition cheerfully, and taking advantage of the knowledge gained at the expense of large advertisers who are continually testing the public taste, be prepared to supply the public with better articles at a lower price, for many of the advertisers are outsiders and know very little about the trade. We must be prepared to sell everyday articles of commerce at moderate prices, for it is not to be expected that the public will pay higher prices to us than they will pay to others for articles which they themselves know to be identical. We must be continually endeavouring to meet the public requirements by bringing out new articles which in themselves are improvements upon what has hitherto been sold. These will vary of course according to the class of trade; in a low class neighbourhood the requirements are altogether different to those of a better class of business, but the same rule obtains. I may give an example: one of my friends who has a business in a populous district where a "penny trade" can only be done is continually bringing out fresh articles to sell at from 1*d*. to 3*d*, and by this means he makes a good deal of money.

Then there is the manufacture of mineral waters, which can now be profitably conducted with a very small outlay of capital. This business is now largely in the hands of outsiders, who have no knowledge whatever of chemistry, and many uneducated men have made considerable sums of money out of it. At the same time there is no doubt the public would sooner purchase mineral waters made by chemists and druggists than by the class of men referred to.

Through the technical and science schools, chemistry is becoming more and more used in developing manufacturing industries, and although many manufacturers employ their own chemist, yet numbers of others are now requiring technical and scientific help.

I hear from my friend Mr. Rimmington, that in the Bradford schools there are about eight hundred or nine hundred pupils, most of them being instructed in chemistry. "Fancy," says he, "the state of society in a few years if this goes on."

But we do not intend to be left behind, and I hope one result will be that the Pharmaceutical Society will, before long, have a special examination by which chemists and druggists may become qualified for the post of public analyst. I think if this matter had been taken in hand earlier by the Pharmaceutical Society, it would have been advantageous to the public as well as to us as a body, for at the outset the Government had great difficulty in finding men possessed of suitable qualifications for the work.

Then we must look forward to the time, and I cannot but think if we do our duty it is not so remote as many think it to be, when the bulk of the dispensing which is now done by the surgeon shall come into our hands. This is our legitimate calling. The Pharmaceutical Society was founded in 1842 for the purpose of educating men to undertake this work, and since 1868 no person has been permitted to enter the business unless he passed a specific examination, which, in the eye of the law, gives him the right to prepare and dispense medicines. Medical men are often blamed because they continue to dispense. But we must remember that to many of them we are thought to be interlopers; their diploma entitles them to practise medicine and pharmacy, and we exist for the express purpose of doing away with what they consider is a lucrative part of their rightful profession. I believe it is, however, neither to their interest nor to the public advantage that this state of things should continue, and I hope to have an opportunity by-and-bye to show this to be the case. The best thing we can do to bring this about is to promote the higher education of the chemist and druggist; for it is only reasonable to suppose that whilst medical men are engaged in preparing themselves for medical practice, they cannot possibly devote so much time to pharmacy as those who are specially engaged in the work, and if we steadily pursue a course of teaching and examination, there will be, in a few years, as much difference between us and the general practitioner as exists now between him and the bygone apothecary. But from the unsatisfactory system of education which has hitherto obtained, we have not made this difference so apparent as we ought to have done when we consider the length of time in which pharmacy has been a distinct branch of the medical profession. This brings me again to the educational question. It is acknowledged on all hands that in order to keep pace with the advancement of science in the public and learned professions, and as pharmacists to take our right position, we must alter our present system. It is, however, said by some, that higher education and increased stringency of the examinations means preventing young men coming into the business. In reply, it may be said that it is to the interest of the chemist in business to keep others out, and it is to the interest of the assistants and apprentices now in the trade to keep others out, and it can be no hardship upon those who have not entered the business for them to be kept out, and it is certainly to the interest of the public that chemists and druggists should be better educated.

I will now therefore turn your attention to the present methods of education and examination, and then look at the curriculum which is sought to be imposed upon students, and after that submit to you a plan which I think will be more likely to meet with the approval of the trade, and be found much more practicable.

Professor Redwood, in his address to us, speaking of the present system said, "As a teacher of some experience I can state from observation that the demand for sound systematic education has been weakened instead of strengthened through the influence of compulsory examinations conducted without reference to the manner in which the knowledge to be tested has been acquired. . . I should like to see classes established in every town where there are ten or a dozen druggists, and also an association of apprentices or assistants formed for mutual instruction in and beyond the subjects of the intermediate examination; there need be little or no expense incurred in carrying out such an object if the use of a meeting room could be obtained."

Mr. Barnard S. Proctor, of Newcastle-on-Tyne, says:—"The more the examinations are split up and distributed over a period of study the more advantageous will both examination and curriculum become. Even an annual written examination would be advantageous to the student."

A gentleman who has had considerable experience as

a teacher writes me :—"From all that I have seen I am strongly convinced that it is by means of *tutorial classes*, rather than by lectures, that the best results are to be obtained in the education of pharmaceutical students; this fact is getting to be rapidly recognized in other departments and systems. Tutorial instruction is being largely developed at the present time in connection with the University of Edinburgh. The great mistake that seems to be made in *getting up* classes for pharmaceutical students is that far too high a standard is aimed at to begin with; something more humble and homely would probably meet the case much better, and be attended with greater success, and might ultimately develop into something more imposing."

It will be seen by the foregoing opinions (and others might be brought forward of the same character), in which I thoroughly concur, that the present system, if system it may be called, is not at all adapted to our requirements. I will now refer to the curriculum which has been adopted by the Pharmaceutical Council. It requires that before a youth is apprenticed to the trade he must have passed the Preliminary examination. He is then to serve not less than three years as an apprentice or pupil in the shop of a duly qualified chemist and druggist. At the end of the three years, or in the words of the scheme, "thereupon or thereafter" he is to submit to a written examination at one of the centres at which the Preliminary examinations take place, in pharmacy, pharmaceutical and general chemistry and in the translation of prescriptions. This is to be a second or intermediate part of the Minor examination. Afterwards, at an interval of not less than one year he has to prove to the examiners that he has attended at college, school or institute, a course of lectures on chemistry, botany and materia medica, and also a course of instruction in practical chemistry, and "thereupon or thereafter" he must be examined in botany, materia medica, chemistry and practical dispensing. Now it will be seen that an apprentice from the time he enters the business until the three years have expired has no necessity laid upon him to study, and therefore if we are to judge from the present state of things, for we shall not by the curriculum alter human nature, we shall doubtless find that when this second intermediate examination is to be passed the apprentice will go to some cram school to enable him to get through his first technical examination.

It will be seen that the next stage in the curriculum is a course of lectures in some central college or institute. The lectures are expected to take up five months of his time; the course of study is carefully elaborated in the curriculum, but no conditions are prescribed for the student, other than that he must attend a certain percentage of the lectures. No certificate of the teacher is necessary to prove that he has been diligent in his studies, so that after probably enjoying himself for five months, he is at liberty to present himself for the final pass-examination of the Minor at Bloomsbury Square. What do you think he will do to enable him to get through that examination? Why, what do you imagine? From our past experience of the student, he will no doubt require the cram school again to enable him to pass; so that we shall have two crams, five months' expenditure of time at some central college, a quantity of money wasted, and be very little better off than now, in point of education. I will give you the opinions of gentlemen who have a right to a hearing on this matter.

Mr. Luff says:—"There is no evidence required to show that they have been benefited by attendance at lectures, there should be a certificate from the teacher that the student is fit to present himself for examination. The present state of pharmaceutical education is the Scylla, and I much fear that the compulsory curriculum without the insurance of thoroughness of work will be the Charybdis. The bark of pharmaceutical education may be rescued from the rocks only to risk its being engulphed in the whirlpool."

Professor Redwood said at Birmingham:—"I have sometimes been almost afraid that the prospect of the curriculum might in one respect do mischief, through the influence of its formidable character, that it might deter some from studying in a less formal manner, on the ground that such informal study will not be recognized at the final pass-examination."

The Editor of the *Pharmaceutical Journal* says:—"It is essential from the outset of their career that students should know not merely what is necessary for their successful progress, but should also see before them a distinct and clearly marked course of procedure to be followed in order to obtain the training and acquire the knowledge demanded of them."

Then, again, as to the centres which will be available for the curriculum course. We had the benefit of a very able address lately in Birmingham by Mr. Greenish, President of the Pharmaceutical Conference, and he there, you will remember, showed us a map of Great Britain which was divided up, giving his idea of where such centres ought to be. The map, by the kindness of Mr. Greenish, is before you, and it will be seen that there are twelve centres for England and Wales and three for Scotland. Now this gives for England and Wales one centre to four counties, and for Scotland one to eleven counties. If there were colleges or public schools available in all such centres it would entail a great cost upon all young men for their board and lodging for five months and for travelling such long distances; but it is a question whether, with the exception of the Owens College, there is a single public institution in the whole country which is prepared to make the requisite provision for teaching pharmaceutical students without being subsidized largely for the purpose. If we take the Mason College in Birmingham as an example, we have extraordinary advantages here with Professor Tilden, who takes great interest in pharmacy and who, being in entire sympathy with us, will do everything in his power to help us; and with Professor Hillhouse, who has on several occasions attended our meetings and in other ways shown an interest in our proceedings; but they tell me that pharmacy could not be taught at the College unless a chair were endowed, and this would cost from £3000 to £4000 at least. But there are many places, as Mr. Greenish said in his address, namely, from the Thames to Portsmouth, where there is no public institution, nor is there anything for the Salisbury centre, nor for Devonshire or Cornwall. How is the money to be raised for this great scheme? I cannot see how it is practicable, and finding so many grave objections to it I have endeavoured to work out suggestions for a scheme which is of a much more humble character, but which, I think, if adopted would better meet the requirements of the trade. If we carry our minds back to the time when we entered the business we shall remember that many of us took to it because we had a leaning towards the study of chemistry, and chemists are very familiar with the conversation which generally takes place when a parent or guardian brings a youth to be apprenticed; it frequently begins something like this.

The parent says: "My son is very fond of chemistry; he is continually making experiments, and thinks he would like to become a chemist; he has got prizes for chemistry at school, and I want to know whether you have a vacancy?"

The chemist generally replies that there would be very little opportunity for his carrying on chemical experiments in the business, and explains what the nature of the business is, and the duties which the youth would have to perform. However, the youth is not to be prevented from following his bent, because he sees the bottles and the coloured globes in the window, and there is an air of mystery about the thing which fascinates him; the result is he comes to the business with very high expecta

tions of pursuing scientific studies. But what happens? His shop work, as we know, consists of dusting, the use of the mortar and pestle, and when he gets on a little the packing of various common articles and the ordinary routine work of the shop, which has no scientific bearing whatever, and it is only towards the close of his apprenticeship that he is called to dispense, if this happens to be needed. Now I take it that this is a great mistake, and it ought, if possible, in any curriculum scheme to be altered. I think the youth from the time he comes to the business should be introduced into some elementary science class, and undergo a *curriculum in his first year*; *by this means he would pass from his school work to the science class, and thus continue his studies without a break.* These ought to gradually extend, and by education and examination should culminate with his final examination for the Minor, unless, as would no doubt be the case oftener than now, he determined to take the Major. In case he entered for a four or five years' apprenticeship, instead of three, it should be compulsory upon him to take the classes for the first two years of his apprenticeship, and the third year's course the year previous to his taking the Minor. There would be a break of one or two years, but there is little doubt that through the studious habits formed by his school training, and the two years of study after it, he will continue a student even during the interim, and it should be considered the duty of his teacher to direct his studies during that period. We all know that it is no use giving general directions to a youth to study; if he is to succeed he must have work cut out for him, so many pages of a book to be learned, and a teacher to examine him upon it, and this scheme is consequently eminently more suited for training students than the curriculum.

In looking at this matter it would be well to see what is being done under the Science and Art system. It is impossible to do more than give a general outline of the course of study. It will, however, be incumbent upon those who have the responsibility to isolate the first two years' course from the last year's, so that the student who takes the first two years successfully may be able without difficulty to take the final year's course previous to his entering for the Minor. This could readily be done by making the first two years' course elementary, but covering the whole of the ground, and in the final year the whole of the subjects to be treated more comprehensively. It must, however, be borne in mind that the student will not always pass his examination at the first attempt, and it is not unlikely that many of them will have to study each year during the five, to enable them to get through the examination, for if they fail in one year, it will be necessary for them to go back the one year, in order to be ready for the next year's examination.

System.—During the year ending May, 1885, the report shows that there were in Great Britain 5649 classes in 1542 schools, under teachers recognized by the department. There were 78,810 individuals under instruction; of those 48,497 came up for examination, and there were 37,133 successful. Now why cannot we on something like the same lines set to work with pharmacy students, and have a three years' course which shall thoroughly cover the ground intended to be taken by the curriculum; that is, to include all the subjects necessary for the intermediate examination, and those which are to be taught during the college curriculum? The student would commence his studies when he goes to the trade, and have examinations at the end of each year, these examinations to be in writing (except the practical portion), and to be conducted in the provincial centres which are already used for the Preliminary examination. The practical examination could be carried out on similar lines to those which are so successfully practised under the Science and Art Department. The course of study to be as follows:—

Comparative Table of the Curriculum Scheme and my own.

Holiday months—August and September.

Subject.	Curriculum.	Proposal.
Theoretical Chemistry	60 lectures	30 lessons each year of 1 hour duration = 90 for 3 years, as follows:—1*st year* (30 lessons).--General physics and non-metals. 2*nd year* (30 lessons).—Heat, metals and their compounds. 3*rd year* (30 lessons).—Light, electricity and magnetism, organic chemistry.
Physics . .	20 lectures	
Practical Chemistry	3 hours daily for 5 mths. or 5 hours daily for 3 months = 360 hours.	3 hours weekly during the year (10 months) = 120 per year or 360 hours in 3 years, as follows:—1*st year*. — Preparation of gases, synthetical and analytical operations for all ordinary metals used in medicine and the arts, with preparations of only a few typical compounds. Tests only; acids, sulphuric, nitric, hydrochloric and carbonate. 2*nd year*.—Preparation of common acids and tests for all acid radicals and analysis of unknown salts and mixtures of two acids and two bases. Study of the reactions of the rarer metals. 3*rd year*.—Preparation, study and identification of common organic compounds and volumetric and gravimetric analysis. Much of this, especially those operations requiring time, can be done in the pharmacy, *e.g.*, taking of specific gravities, distillations, microscopic examinations of starches, urine, sediment, etc.
Botany and Materia Medica .	48 lectures of 1 hour,	60 lessons of 1 hour duration, or its equivalent, to extend over 3 years = 20 per year. 1*st year*.—General sketch of the organs of plants and their variability, elementary structure to end of stems = 20 hours. 2*nd year*.—The morphology and histology of flower-stalk; inflorescence and parts of phanerogamous flowers, kinds of fruit, ovule, seeds = 20 hours. 3*rd year*.—Systematic, practical and economic botany, study of 26 common British natural orders, and indigenous medicinal plants = 20 hours.
Materia Medica . .	40 lectures of 1 hour.	60 lessons of 1 hour duration, or its equivalent, to extend over a period of 3 years = 20 hours per year. 1*st year*.—Ranunculaceæ to Leguminosæ = 20 hours. 2*nd year*.—Rosaceæ to Aristolochiaceæ = 20 hours. 3*rd year*.—Euphorbiaceæ to end of animal kingdom = 20 hours.
Pharmacy and Dispensing .	No Provision.	10 lessons each year to be delivered on the first lesson day of the month = 30 lessons during 3 years. Proctor's 'Pharmacy' comprehends the whole of the requirements, and as there are in it 29 sections, these may be taken as a basis and made into 30 lessons to extend over the three years. Much in this, however, will have been alluded to in the chemistry and physics, with which this could be easily blended.

Home Work.—Much may be done under this head. Work for dispensing in the pharmacy, such as the preparation of difficult pills, mixtures, and emulsions, etc., as also the translation of prescriptions into English, and English into unabbreviated Latin. I would recommend that the student should give to the home work of each subject exactly the same amount of time as is specified for the lesson, that is, if the lesson is of one hour's duration, the preparation at home should occupy at least one hour.

It should be the duty of the Pharmaceutical Society, by its examiners, to issue an annual syllabus giving directions to the teachers as to the course of study, and the text books to be used, and it would be advantageous

if the authors of the text books were to divide them into sections to suit the three years' course. This, the Pharmaceutical Society, aided by its experienced professors, could readily do; it would also devolve upon them to prepare the papers to be used in the annual examinations.

It will be seen by the alternative scheme, that very little time would be required away from business by the student during the three years. It amounts only to two hundred hours in the year for the classes, and as one hundred and twenty of these are for practical chemistry based on the curriculum, there will be but eighty hours at home for preparation, although, if attention were given to practical chemistry, it would be advantageous. But in addition to the work to be prepared for the classes, there would be some additional home work. This is of such a nature as could be done best in the shop, and it must also be noticed that as the pharmacy lessons under this scheme are so disjointed and far apart, it would be absolutely necessary from time to time that recapitulation should take place to make them continuous, and the necessity for this should be enforced upon the teacher. Sacrifices will have to be made both by masters and students, but the master would be rewarded by the greater intelligence of his apprentice, and regular study would keep him out of mischief; the student also would find the money and time expended an excellent investment. The course I have sketched out would be homely, whilst the curriculum of the Pharmaceutical Council would take him from home and regular work and place him amongst a class of men, many of them idlers, which would probably lead to his becoming dissatisfied with his business. From my knowledge of the country I know that the hours of business are very long in towns, in many cases shops are kept open till nine, half-past nine, and ten o'clock at night. In agricultural districts it is earlier—eight, I think, is the customary hour,—and in the centre of large towns in the North of England, earlier still, seven o'clock is, I think, the usual hour. In some places a custom has come into force within the last few years of closing during one half-day in the week. I wish the shop hours could generally be shortened; they are much too long. The Shop Hours Regulation Act, which came into force on the first of this month prevents a young person under eighteen being employed for a longer period in or about a shop than seventy-four hours, including meal times, in any one week. Earlier closing would greatly facilitate the work of education, and reduce the heavy strain upon chemists in business.

By the scheme now proposed the local teacher would adapt the time for giving lessons to the requirements of the district. In suburbs of large towns afternoons would no doubt suit best, whilst in the centres of towns the evenings would be preferred, and in country districts the afternoons of quiet days.

Now in order to carry out this scheme, we must have a great number of teachers, because it would never do for the students to have to travel long distances to attend the classes. I find there are 1725 towns and villages in Great Britain in which chemists are engaged in business. We had, however, on the Register on January 1, 1886, 1581 pharmaceutical chemists, and 3980 Minor men, making a total of 5561 from whom the teachers could readily be found. I would suggest a modification of the plan adopted by the Science and Art Department, by which it is necessary before a teacher can go to work that he must have a local committee of five, one of whom is to act as secretary. I should say that if any examined Major or Minor man who desired to become a teacher could get five chemists to form themselves into a committee, and find a sufficient number of students to form a class, that he should apply to the Council of the Pharmaceutical Society for permission to commence, and as the Council could not suffer loss by the experiment, permission would not be withheld unless in very special cases.

It may be urged as an objection that it is impossible for one teacher to take the whole of the subjects, but I find from the statistics which have been sent me that *the most successful classes, both in point of numbers and results, are those in which there is one teacher engaged.* In some cases he has assistants, but upon him is the responsibility. The subjects are all allied to each other, and there are great advantages in the students being under one teacher for all subjects; he becomes acquainted with each individual member of his class and so can handle them much better than if he were one of a number of teachers.

I would have the local secretary of the district in which classes are held an *ex officio* member of each committee, so that he would be in touch with all the committees in the district. The Science and Art Department pays one half of the cost of apparatus for any laboratory, and the Pharmaceutical Society in this case should act similarly. I think the local committee would in all cases find the other half. I calculate that £15 to £20 would equip a laboratory such as would be required for the purpose. It would be necessary no doubt for teachers in a district to travel to several of the smaller places (I may say that this idea has been suggested by one of the gentlemen in a country district who communicated with me), or it might be arranged that the students should travel to meet him at some local centre; if the former, then the expenses of the teacher should be wholly met, or, as in the case of the Science and Art Department, a grant made towards them,—it pays two-thirds second class fare. As to the fees to be charged, I think these need be very moderate, for we have plenty of illustrations that there are numbers of men ready to teach for a very small honorarium; but I think, whatever the fee is, it should be supplemented by capitation grants from the Pharmaceutical Society to the teacher for students who make the requisite attendances and pass the annual examination; there might be two grades, first class and second class, and the grant should be more or less accordingly. The Pharmaceutical Society can well afford to do this. It has by long discussions in the Council shown how earnest it is in the cause of education; this will, however, put it to a practical test. I notice that Mr. Borland stated in the Council in 1885,—and so far as I have seen it has not been contradicted,—that in seven years there was over £18,000 cleared from examination fees, being considerably over £2000 per year. I have no doubt a number of legitimate claims would reduce that amount, but still there is ample surplus to enable the Society to deal very liberally with any teachers who might be set up under this scheme. The number of students who pass the Preliminary examination every year is about six hundred, the number of those who pass the Minor something like three hundred, so that if the capitation grant to the teacher averaged £1 for each student who passed the annual examination under him, it would not amount to a very large sum. I would publish the name of the teacher, the number of students who entered the class, the number who presented themselves for examination, and the number and names of those who passed, in the Journals every year. By this means there would be a healthy emulation. I would also give to those students who passed certificates from the Pharmaceutical Society, and would present the most successful with prizes; it would not be difficult to obtain a number of prizes for the students. There is no doubt that there would be offers of prizes from Manchester, Newcastle, Sheffield, Liverpool, Bristol, Leeds and other towns—Birmingham, I feel sure, would not be behind in this respect. Then there would be the Bell Scholarship and the Herbarium Medal to be competed for by students. It is impossible to go into every detail connected with this scheme, but I feel sure that if it were adopted we should raise up a class of students who would gradually advance the profession of pharmacy, and it would not be difficult

before long to make the Preliminary examination include elementary science, and to make the three years' course of study more comprehensive. We should also by this system raise up a large number of well-trained teachers, for the successful men would become interested in their work and throw themselves more and more into it, whilst it would speedily weed out poor teachers, for the published results would discredit them and their remuneration would be very small unless they were successful with their students. I calculate by this scheme some two to three thousand students would be constantly under scientific training. What a mine of wealth! In a few years we might possibly overtake the Germans and French, to whom we have now to look for the finer chemicals and alkaloids.

I must now close, but cannot do so without expressing my great obligations to those gentlemen, in various parts of the country, who have so readily helped me with information and suggestions, and I would especially thank Mr. F. Harris Alcock, who has given great assistance in working out the three years' course of education.

I am greatly obliged to you for your patience and kind attention and shall be glad of any criticisms or suggestions. I trust that the outcome of all our discussion here and elsewhere on this important question will result in a practical scheme which will prove to be well adapted to the requirements of the trade and the welfare of the public.

At the close of the address,—

Mr. Perry said the thanks of the meeting were due to Mr. Barclay, and that he was to be congratulated on his scheme. It was clear that unless pharmacy was to be pushed into the background it must progress in the same ratio as other leading scientific professions. Mr. Barclay had shown very clearly that the curriculum of the Pharmaceutical Council was inadequate to the needs of pharmaceutical students, for the simple reason that it left the pharmaceutical student three years unprovided for; he would get out of the run of educational work, and when the necessity arose that he must put his shoulder to the wheel to get the necessary information he would resort to the cram school. He thought also it had been shown that the scheme of Mr. Greenish was utopian. With regard to Mr. Barclay's scheme he felt warranted in saying that it would be gladly accepted by every pharmaceutical student throughout the land. He should have been glad of some such scheme when he was a student. He hoped it would receive the serious consideration of the Council of the Pharmaceutical Society. Minor details could be gone into after, for he did not himself think that thirty lessons for pharmacy would be sufficient, but the broad outlines would form a good basis on which to build a scheme. He proposed—

> "That the best thanks of this meeting be given to Mr. Barclay, and that in the opinion of this meeting the scheme proposed in the President's address is worthy of very serious consideration as an alternative scheme to the curriculum favoured by the Pharmaceutical Society"

Mr. Churchill, in seconding the motion, said that one very strong point for recommendation in Mr. Barclay's scheme was the frequent examinations, for there was not a better method of testing a student's progress than examinations held from year to year. He found that those men who were most successful were those who were always trying to learn and to improve themselves. There would be some difficulty in getting a number of students or a lecturer to visit small places, but he hoped such difficulties could be overcome for the sake of the advantages which must result from a system of annual examination.

Mr. Magor said he looked upon the curriculum as a means of killing a dying trade, and Mr. Barclay's practical scheme as one by which a young man could be educated from the moment he left school until he passed his final examination.

Mr. Dewson said the question was whether there should or should not be a compulsory curriculum. If the curriculum were made compulsory, it would be the same kind of system as obtained in France and Germany, and if it were so, the question is, should not pharmacists in Great Britain be equally protected as they were in those countries. He was of opinion that the Minor man of to-day was sufficiently educated to sell poisons and dispense medicines. If the compulsory system were to be decided on, the chemist of the future might reasonably expect extra advantages given to him. He would be put to greater expense, and that being the case something should be given to him as an equivalent. But where was the "*quid pro quo*" to come from. The Pharmacy Act of 1868 did give some chance of offering a good deal of protection, but he thought that the free trade principles of Great Britain were so strongly implanted that it would be next to impossible to get the restrictions drawn more closely round the trade of a chemist. Indeed, the probable result of further legislation would be to release the restrictions. As to the dispensing of medicines by chemists, the great majority of the population, while they did not care to go to the hospital, could not afford to pay the doctor and the pharmacist, and so long as this was so there was very little chance of dispensing ever being more in the hands of pharmacists. He only found from July to July (last) seven cases in which the Pharmaceutical Society had taken legal proceedings against persons who had infringed the Pharmacy Act. He thought this did not look like a serious intention or earnest endeavour to protect the pharmacist or the public. If a scheme became necessary, no better or more practicable one could be brought forward than the one they had heard that night.

Mr. Wakefield said he was pleased to support Mr. Barclay's scheme. He thought it ought to be before the trade as soon as possible. He would be glad to see the scheme adopted.

Mr. Williams would like the Pharmaceutical Society to be more than an educating body. It was all very well to propose a scheme for the education of the rising pharmacist, but he would prefer to know how he was to live.

Mr. Southall remarked that under this system before them the student would be educated at a lower cost than under the present system. All were agreed that the present mode of teaching was not satisfactory. The science and art classes had always been useful to young men; and he thought that if such a system were applied to the pharmaceutical student it would be equally successful. The scheme proposed, if adopted, would be of immense advantage.

Mr. Nield said that as a student he heartily agreed with the President's scheme.

Mr. Marsh Jones thought the reason that medical men did not hand over the dispensing to the pharmacist was because they had in times gone by found a great deal of ignorance amongst them. He thought that the scheme under discussion would keep a student more to the point than the curriculum.

Mr. Thompson considered that it was a scheme which would require time and thought before a conclusion as to its merits or demerits could be arrived at. If a curriculum were necessary they might safely pass a vote that this scheme of Mr. Barclay's was worthy of serious consideration throughout the country.

The meeting was also addressed by Messrs. C. J. Arblaster, Thonger, Holdsworth, Barlow and others.

The resolution proposed by Mr. Perry and seconded by Mr. Churchill was carried *nem. con.*

A vote of thanks to the President for his able address was carried unanimously, and the proceedings terminated.

Parliamentary and Law Proceedings.

PHARMACEUTICAL SOCIETY OF GREAT BRITAIN *v.* JUDD.

In the County Court of Warwick, before Sir Richard Harington, Bart., Judge, on Tuesday, the 16th inst., an action was brought by the Council of the Pharmaceutical Society of Great Britain by Richard Bremridge, the Registrar of the said Society, against Mary Ann Judd, carrying on business as a dispensing chemist, at 40, Bath Street, Leamington, for a penalty of £5 incurred by the defendant on October 11, 1886, in selling or keeping open shop for the retailing, dispensing or compounding poison, to wit, "opium" and "syrup of chloral," contrary to the provisions of the Pharmacy Act, 1868; there was a further penalty of £5 sued for, incurred by taking, using, or exhibiting the name or title of "chemist."

Mr. Granger, barrister, represented the plaintiffs, and Mr. Porter, solicitor, defended.

On the action being called on, Mr. Porter, for the defendant, applied for an adjournment on the ground that he had not received full instructions, and that the very gist of his defence was not in his possession. He had not been able to obtain the probate or even an office copy of the will of the late Mr. Judd. Unless a copy of the will was produced, he should be unable to prove the terms.

Mr. Granger submitted that the only question was one of law, and all the adjournments and all the evidence that his friend could bring would not alter the fact that Mrs. Judd was not a chemist. He should prove that she was not on the Register of the Pharmaceutical Society, and the defence would then have to show that the business Mrs. Judd was conducting was in conformity with the Pharmacy Act.

Mr. Granger then put in an office copy of the will of the late Mr. Judd, and his Honour refused to grant the application for adjournment.

In opening the case for the plaintiffs, Mr. Granger said that the action was brought to recover the penalties incurred by the defendant for contravening section 15 of the Pharmacy Act, 1868. The only exception to the powers of the statute was the 16th section, which provided that upon the decease of any registered chemist or druggist actually in business at the time of his death it should be lawful for any administrator, or executor, or trustee, to continue such business so long as it was conducted by a duly qualified assistant. He submitted that the defendant did not come within the meaning of this exception. She was the widow of a person who was a registered pharmaceutical chemist who died thirteen years ago. She was the executrix of her late husband's estate and had the whole property for her own personal benefit. Under the will the husband left the whole of his real and personal estate to his wife, Mary Ann Judd, and appointed her sole executrix of his estate. He therefore submitted that the business was her own, and as she was not a registered chemist and druggist, she could not carry on the business in conformity with the Pharmacy Act.

The first witness called was

Thomas Stroud, who said: I am managing clerk to Messrs. Flux, Son and Co., Solicitors to the Pharmaceutical Society. On October 11, 1886, I went to the shop, 40, Bath Street, Leamington. The name over and on the door was "Judd." I purchased a half-ounce of syrup of chloral, which was supplied to me in the bottle produced. The name on the label was "Judd, Family and Dispensing Chemist, 40, Bath Street, Leamington." I also had the prescription produced made up. The prescription contained opium.

In answer to his Honour witness said that the prescription was given to him by the Secretary of the Pharmaceutical Society.

This was the case for the plaintiffs.

For the defence, Mr. Porter submitted that the defendant had employed a *bonâ fide* assistant to conduct her business. The 16th section of the Act clearly applied to his client, who was trustee to her husband's estate, as it empowered an executor, or administrator or trustee to carry on the business so long as they conformed with the law.

Mary Ann Judd, the defendant, was then sworn. She said that she was the widow of William Judd, who died April, 1873. Since that time the business had been carried on by her through a duly qualified chemist. She had carried on the business solely as executrix of her husband's estate to support herself and her children. The name of Judd was on the door of the shop. Her own name did not appear anywhere in connection with the business. She took no part whatever in the conduct of the business. Her manager was Edwin Arthur Holloway, who conducted the business. The manager did not consult her as to the purchase of drugs.

In answer to Mr. Granger, the defendant stated that she received the profits of the business, and paid for the goods ordered. The manager received a stated salary, and a commission on sales above a certain sum. Mr. Holloway also had a proprietary article which he sold in his own name.

Edwin Arthur Holloway said that he was in the employ of defendant as the manager of her business. The dispensing was done either by himself or by his fully qualified assistant. He was a registered chemist, and his name appeared on the Register.

This closed the evidence for the defence.

In replying on the case, Mr. Granger said that he would admit on the part of the plaintiffs that Mrs. Judd carried on the business through a duly qualified assistant. His contention was that the 16th section applied only in the case of an executor, administrator or trustee carrying on the estate of a pharmaceutical chemist in the capacity of administrator, executor, or trustee, and not for their own benefit.

Sir Richard Harington, in delivering judgment, said: In this case I am of opinion that judgment should be entered for the defendant. The real question that has to be determined is necessarily a very short and simple one, and seems to be confined to this, whether the word "executor" in section 16 is meant to include every kind of executor, or whether it is limited to an executor who had an estate put upon him for the benefit of others and not for his own benefit. I have listened with a good deal of attention to the arguments of Mr. Granger in this matter, but I fail to see why I should enlarge the words of the statute beyond what is in them, the more especially in a case of this description, where the object is to obtain payment of a penalty from the person proceeded against for an offence or a *quasi* offence. In such cases the old rule of strictness of construction of penal statutes has been somewhat relaxed, and though the statute is to be construed fairly I am not authorized to go further than its plain words. The words of this statute are very simple and very plain, "It shall be lawful for any executor, administrator, or trustee of such pharmaceutical chemist or chemist and druggist to continue such business" (then comes the qualification) "if and so long only"—not for the purpose of winding up—but "so long only as such business shall be *bonâ fide* conducted by a duly qualified assistant." It is admitted that Mr. Edwin Arthur Holloway is a duly qualified assistant. There is no doubt about it; his name is on the Register of the Pharmaceutical Society as a chemist or chemist and druggist. There can be no doubt that "the business being conducted within the meaning of the statute" must apply to that part of the business which requires the skill of a duly qualified assistant as distinguished from that part of the business which consists in keeping the books and receiving the profits. Holloway, it appears, keeps the books besides dispensing, but the profits are handed over to Mrs. Judd. The truth is, in substance, Mr. Holloway is carrying on this business and handing over the profits to Mrs. Judd. I can see no reason for confining the

word executor to executor for a limited time only. Parliament has enacted that when a man dies it shall be lawful for the man's executors to carry on the business. These persons are the only persons on whom the duty can devolve. But if supposing instead of leaving the business to Mrs. Judd, and making her executor, the deceased had left the business to John Jones for Mrs. Judd's life, or as he might appoint, then Mr. Jones would have been the trustee, and though not the person actually interested, yet for all practical purposes, and according to the admission of Mr. Granger, he would have been entitled to carry the business on for Mrs. Judd's benefit as it is carried on now, though he might not be a chemist. What protection there would be to the public in one such person being entitled to carry on the business more than another I fail to see. Then why should Mrs. Judd not carry on the business, because she is not only executrix, but combines with the title that of residuary legatee? When you look at the substance of the whole thing the public are abundantly protected, because it is clear that Mr. Holloway is entitled to carry on the business in his own name, indeed, as to part of it, he does. In point of fact the business is for all purposes dealt with by the Act conducted by him. The public has the benefit of having its poisons mixed or dispensed by one or more competent persons, who by their registration are admitted by the law and by the Pharmaceutical Society to be competent for such purposes. It therefore seems to me that the public gets all the protection that is required. The result must be that there must be judgment entered for the defendant. But inasmuch as I am informed that this is the first case which has been raised under this section, and inasmuch as the principle involved is of importance, it is desirable that there should be an opinion of a court of authority, and not merely that of a county court, which is no authority at all. If the Society think it worth their while to go on, and obtain that opinion, I shall be willing to grant leave to appeal.

On the application of Mr. Porter defendant's costs were allowed.

Poisoning by Prussic Acid.

An inquest was held at Plymouth on Wednesday, the 17th inst., by Mr. T. C. Brian, the Borough Coroner, touching the death of Mr. Bovey, a rate collector.

Mr. Bean, surgeon, deposed that he had been called in, and found deceased dead, and that death had been caused by prussic acid.

Mrs. Bovey said that on the night of her husband's death he was greatly excited because he had fallen down and bruised his eye, and had to appear before a committee the next day. She bathed his eye and went to bed, leaving him in his office. Hearing a noise afterwards she went to him and found him dying. He had been much depressed occasionally, and complained of overwork.

John Hill: I am a chemist's assistant at Row and Co.'s, 84, Fore Street, Devonport. The bottle produced, labelled "Poison—prussic acid," I know. It is the regulation poison bottle. Turning to my book I find that on October 4 I sold half an ounce of prussic acid to Mr. G. M. Trevaskis. He is a chemist. I should not have sold so large a quantity to anyone but a chemist. In fact we rarely sell any. Mr. Trevaskis said he wanted the poison to destroy a dog. I know nothing of deceased. Mr. Trevaskis is not employed at an establishment. The sale was duly entered by me in my book according to the directions of the Act of Parliament.

By a Juror: We are in the habit of supplying Mr. Trevaskis with various kinds of medicine. He used to be in business in Union Street. He is a qualified chemist—in fact there is no better chemist that I know of.

Several jurymen were of opinion that Mr. Trevaskis should be examined as a witness.

The Coroner said he had been unable to secure Mr. Trevaskis's attendance.

Mr. Batten, one of the jury, said he had seen Mr. Trevaskis that day. He had referred to the death of Mr. Bovey, and said he supplied him with prussic acid some time since to poison a dog.

John Hill, re-called.

A Juror: Would Mr. Trevaskis be at liberty to dispose privately of the poison with which you supplied him?

Witness: I cannot tell. He may have got it as a matter of friendship for Mr. Bovey. He did not tell me he was going to give it to a third party.

A Juror: I should like to know whether deceased bought this prussic acid of Mr. Trevaskis, and if so whether Mr. Trevaskis entered the sale of it in his book. If a chemist is to be allowed to get prussic acid at a shop in this way where it is duly entered according to Act of Parliament, and then to dispose of it indiscriminately, where shall we be? Here is poison supplied to a man who is known to be of an excitable and nervous temperament.

The Coroner: But we have no evidence that Mr. Trevaskis knew Mr. Bovey was in that state. He told Mr. Batten that he let Mr. Bovey have the prussic acid to kill a dog, and Mrs. Bovey says he intended killing a dog.

A Juror, to Mr. Hill: Now, even if you had known Mr. Bovey, and he said he wanted prussic acid to kill a dog, should you have let him have it?

Mr. Hill: No; I should have said, "If you wish to destroy a dog, bring it to me, and I will destroy it." We invariably say that.

The Juror: Mr. Trevaskis, a chemist, gets a poison supplied to him because he is a chemist. Then, surely, he has no right to dispose of it to a third party without there being an entry in his book that he has done so.

The Coroner: It is not our province to inquire into that. We can only censure him for having done such a thing, and if he has committed an illegal act it is the duty of others to take the case up.

The Jury having unanimously decided that it was not necessary to call Mr. Trevaskis,

The Coroner summed up and the Jury returned a verdict "That the deceased had committed suicide by taking prussic acid whilst in a temporary fit of insanity," adding as a rider that "The jury wish the Coroner to caution Mr. Trevaskis from supplying such large quantities of poison to private persons."

The Coroner: But we have no evidence that he did supply a large quantity. Some of the prussic acid might have been taken out of the bottle between the time Mr. Trevaskis had it and his supplying it to deceased. If the word "large" is withdrawn I will communicate with Mr. Trevaskis.

The Foreman said the Jury quite agreed to that suggestion.—*Western Morning News.*

Poisoning by Laudanum.

The Hull Borough Coroner, Mr. J. J. Thorney, held an inquest on Wednesday, the 17th inst., at the Infirmary, touching the death of Charles Hare.

Evidence having been given by Mr. Henry Preston, house surgeon at the Infirmary, that death had been caused by opium or some such narcotic contained in the preparation of laudanum,

Charles Bush, employed as a chemist's assistant at 46, Waterworks Street, stated that the deceased came to the above premises on the evening of the previous Monday and asked for sixpennyworth of landanum. Witness asked what he wanted it for, and he replied, "To clean nuts." Witness said he never knew laudanum to be used for that purpose, and declined to serve him. Deceased, who did not appear to be drunk, then left the shop, returning about a quarter of an hour afterwards with a boy, and asked again for the laudanum, saying that the wife of a Mr. Stuart had sent him for it. Deceased now said that the laudanum was wanted for a horse, and witness served him, Hare taking the boy with

him. Deceased returned again about ten minutes afterwards, when he said to witness, "I have taken that stuff; will it croak me?" Witness answered, "If you have been fool enough to take it, you will croak," and went to the street door to see if he could see a policeman. In the meanwhile deceased had escaped from the shop, and witness noticed that he reeled very much, and saw him go into the March of Intellect public house. Witness told two policemen who were standing near what had occurred. Never saw deceased afterwards.

William Welsh stated that deceased came to him on Monday night a few minutes prior to nine o'clock, and asked him to go for sixpennyworth of laudanum, saying that he wanted to clean some walnuts. Deceased, whom he had known for some time, was drunk, and witness told him to leave the shop. He did so, and went in the direction of Mr. Stuart's shop. Witness saw him soon afterwards coming up the street with a bottle in his hand. He was drinking something out of the bottle. On passing deceased remarked to witness, "I have poisoned myself." That was the last he saw of the deceased.

Mr. Tadman, landlord of the March of Intellect, gave evidence to seeing deceased enter his house about 9.30 on Monday night. He held a bottle in his hand, and said, "I have come to bid you good-bye, I have poisoned myself," but witness thought it was only a bit of joking. Deceased again repeated that he had emptied the laudanum bottle, when witness advised him to go to a druggist and get an emetic. Deceased went, and on returning said, "The druggist tells me I shall be dead before twelve or one o'clock; here's my will," taking out of his pocket a piece of paper, which witness saw to be a leaf out of his pocket-book. Deceased then said, "It is all through a silly bet of twopennyworths." Witness still imagined deceased was joking, as was usual with him. Deceased did not appear to be drunk.

A police constable who took deceased to the station also said he had not been drinking.

The Jury returned a verdict of "Suicide while temporarily insane," and reprimanded the witness Bush for not using sufficient discretion when issuing the poison.—*Eastern Morning News.*

Correspondence.

*** No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Hamamelis Virginica.

Sir,—In your issue of October 23, p. 343, a correspondent makes inquiry regarding the active principles of witch hazel, and as to whether hazeline "is an active remedy, as seems to be the opinion of some medical men in England." As the writer appears to have been largely influenced by the so-called "report" of a "committee" in America, we feel it incumbent upon us to explain the peculiar manner in which this "committee" made their test. The "committee's" report was published in the *Therapeutic Gazette*, a trade journal of an American drug house, which manufactures a fluid extract of *Hamamelis*, but not a distillate. It has been a matter of general surprise that this "committee" undertook to ascertain the value of a distillate of the fresh bark and buds by directing their efforts on preparations made from "the pulverized dry root." They assert that "three kilograms of the finely powdered dry root were macerated ten days, etc., etc.," and that the odour of the product they obtained "was most likely due to the presence of a volatile oil, of which they were able to extract but a very small quantity." They certainly deserve the thanks of the pharmaceutical world for their original work on the dried root, and their discovery, as probably no one had before undertaken to demonstrate that the root contains a volatile principle; and even if this was found in the green state of the root, one would hardly expect to find a trace of a body so volatile after the root had been pulverized and dried. But we submit that this report is absolutely worthless in determining the value of hazeline. What would be thought of a report purporting to give the scientific nature and worth of cherry-laurel, rose or elder-flower water (all made from fresh petals or leaves) which was based on experiments made with preparations of the "finely-powdered dry root?" Yet the writers of the article in the *Therapeutic Gazette* pretend to estimate scientifically the worth of the distillates of the *Hamamelis Virginica* (which every druggist in America well knows is made from the bark of the fresh twigs) by experimenting with a distillate made from the "finely powdered dry root." Rather absurd, is it not?

There have been recorded, however, some physiological experiments and clinical observations with hazeline, which are of an entirely different nature, and seemingly trustworthy. The report of Dr. S. Antonio Morales Perez, delivered at the School of Medicine of Barcelona (*vide Med. Press and Circular*, Sept. 30, 1885), the favourable results detailed at some length by Dr. Sidney Ringer, in his 'Handbook of Therapeutics,' the able paper of Dr. V. Shoemaker (Philadelphia), read at the recent meeting of the British Medical Association (*vide Lancet*, Aug. 14, 1886), an article headed "Practical Experiences with some Official and Non-official New Remedies," by Dr. Robert Pollock, in the *Glasgow Medical Journal*, and the observations of Dr. Dolan, in his little treatise, 'New Remedies,' comprise but a few of a very large number of valuable contributions to which we could refer.

The active principle of *Hamamelis* is extremely volatile, and can be isolated. If it be inhaled in vapour by the workmen in the factory, they say it acts as an anæsthetic and powerful diuretic; it is also hæmostatic. In hazeline the active principle is dissolved in water, to which sufficient alcohol is added to preserve it.

The part of the shrub employed in manufacturing the distillate, hazeline, is the bark, especially that from the small twigs. The winter season, when there is no sap in the wood, is selected for the gathering. As no detriment attends the presence of the wood-fibres in the sprigs, the twigs and small brush are taken, and by crushing formed into a magma by machinery; these are then put into stills (each of about half a ton capacity) with sufficient water or dilute alcohol to act as a solvent; heat is then applied through steam jackets to the stills, under delicate regulations, by automatic reducers, until a given quantity (governed by its strength) is discharged through the worms or coolers.

Burroughs, Wellcome and Co.
Snow Hill Buildings, London, E.C.

Public Analysts and Dispensing.

Sir,—Permit me to thank you for your kind notice of my report, appearing in the last issue of the Journal.

Your suggestion that the varying capacity of the bottles might account for some of the slight differences in weight is not tenable; for knowing that bottles did so differ I took aliquot parts of the contents always.

My explanation of a difference in weight of potassic iodide was intended to be, that the dispenser, knowing that it might gain in weight by absorbing moisture, made an over-allowance for that by purposely weighing out slightly beyond the exact weight to compensate for this. In so doing the slight excess noted might have been given.

Alf. W. Stokes, F.C.S.
Public Analyst to the Vestries of Paddington, Bethnal Green, and St. Luke.

[**** The plan adopted for eliminating the influence of variation in the capacity of bottles would certainly have met the requirements of the case, but no mention was made of it in the report. We cannot imagine that anyone entitled to be considered competent as a dispenser would have recourse to so clumsy an expedient as that of making an overweight allowance for absorbed moisture.—Ed. P. J.].

Communications, Letters, etc., have been received from Messrs. Hutchings, Campbell, Gravill, Wright, Layman and Umney, Hesse, Dee, Lancashire Chemist, Minor.

NOTES ON THE PHARMACY OF CHIAN TURPENTINE.

BY HENRY CAMPBELL,
Pharmaceutical Chemist.

Attention has again been drawn to this drug by the recent publication of cases of cancer treated with it; and inquiries having been made as to the best mode of dispensing it, I beg to submit a detailed description of the method I have for some years followed (under direction of Professor Clay) in preparing an emulsion of the drug.

It will be remembered that Chian turpentine is an oleo-resin from the trunk of *Pistachia Terebinthus*.

It has no bitter taste whatever, but has a pleasant smell, which is intensified by boiling with sulphuric acid and solution of potassium bichromate, and then somewhat resembles the odour of oil of lemon.

The turpentine is received in two forms; either containing a variable (and sometimes large) quantity of sand, bits of bark, etc., or purified from these by heating with water and straining. When so purified it has an opaque appearance very different from that described in the text-books; and, in my opinion is likely to be injured by such treatment.

It has been exhibited in the form of pills and of an emulsion. The finely divided state in which it exists in the emulsion renders it more likely to be absorbed (when swallowed) than if it is given in the pilular form.

The emulsion should contain an invariable proportion of the purified oleo-resin, and must be freed from the ether used in the process.

To do this I prepare an ethereal tincture, ascertain the strength of it, convert it into an emulsion, and expose in an open vessel, with frequent stirring, until all ether has gone off.

To make the ethereal tincture :—

Put any convenient quantity of the turpentine into a wide-mouthed bottle, with an equal bulk of ether, cork tightly and shake frequently until all soluble matter has dissolved, set aside until the ethereal liquid has become bright, decant it, and evaporate half a fluid ounce in a tared evaporating dish,—at first in a current of air—finally exposing to a very gentle heat for a minute or two (the heat of warm water is sufficient if the dish be rotated).

When the ether has gone off weigh the dish and its contents, deduct the weight of the former and thus ascertain the quantity of pure oleo-resin in each half-ounce of tincture.

The standardized tincture may of course be kept for any length of time and the emulsion made from it as required.

To prepare the emulsion :—

Place in a large mortar 240 grains of pulv. acaciæ and 50 grains of pulv. tragacanth., add as much ethereal solution as contains 240 grains of the turpentine, mix, and add all at once a fluid ounce of water, triturate until an emulsion is formed, then dilute gradually to eight fluid ounces. Two fluid drachms will contain seven and a half grains of the pure drug, the usual initial dose.

Remove all traces of ether by exposure with frequent stirring in an open vessel, preferably in the cold.

The removal of all ether is important, because the dose of emulsion is gradually increased, and the treatment continued for a considerable time.

Queen's Hospital, Birmingham.

THE APPLICATION OF ALLEN'S NITROMETER TO THE ESTIMATION OF CARBONATE OF AMMONIA IN SPIRITUS AMMONIÆ AROMATICUS, B.P.

BY EDWARD D. GRAVILL.

Since the introduction of the above instrument for the determination of ethyl nitrite in spiritus ætheris nitrosi, most pharmacists will no doubt have made themselves acquainted with its practical application, and will, I think, have no considerable amount of adverse criticism to offer against its use for this purpose.

Its ready application and comparative accuracy must have to some extent induced the committee responsible for the arrangement of the present British Pharmacopœia to adopt its use for the above estimation, but I think it is a pity that more definite instructions do not take the place of the mere references occurring under the head of characters and tests of spiritus ætheris nitrosi, B.P.

The object of this note is to point out the application of this instrument to the estimation of carbonate of ammonia in spiritus ammoniæ aromaticus, B.P., as the presence of this salt in definite quantity has become of equal importance to that of nitrite of ethyl in spiritus ætheris nitrosi.

The most important test for the quality of spiritus ammoniæ aromaticus, so far as relates to the amount of neutral carbonate of ammonia it should contain, is the one given by the author of the process for its manufacture (Dr. Thresh), viz., that 1 fluid ounce, after the addition of 330 grain measures of test solution of chloride of barium, should yield, after filtration, a further precipitate when more of the reagent is added. Now 330 grain measures of the above test solution, if accurately prepared, from pure barium chloride, will decompose about 12·54 grains of normal carbonate of ammonia; so that it practically means, when he says that a further precipitate should be obtainable in the filtrate, that the full complement, or not less than 14·67 grains of this salt, should be present in 1 fluid ounce of the preparation. This test is probably sufficient for the purpose for which it is intended, but it only shows whether the preparation contains the maximum of carbonate of ammonia, and is therefore not adapted to the requirements of the manufacturer, who requires a process showing the actual quantity of this salt present, with the least possible inconvenience.

The estimation when made with the nitrometer will be found very expeditious and accurate, and, with less trouble than the foregoing test, will show the actual percentage of neutral carbonate of ammonia present, and in fact may be applied to the estimation of soluble carbonates in free alkalies in almost any other preparation. This is of importance, as the process of precipitation usually employed is rather a tedious one.

I have found it necessary in using this process to replace the saturated solution of common salt used in the estimation of ethyl nitrite by mercury, as the retention of CO_2 by the salt solution is too great to admit of concordant results.

The practical application of the process runs as follows :—

Having adjusted the mercury in the two arms of the apparatus, 5 c.c. of the sample are carefully introduced through the stopcock on to the surface of the mercury, as in the case of sweet nitre; 10 c.c. of a solution of hydrochloric acid,

one in two, are next measured into the cup of the apparatus ready for introduction, 5 c.c. only of which are allowed to enter the tube, and this in small quantities at a time. Brisk effervescence of course ensues, which is encouraged by agitation of the tube, with the consequent liberation of all the carbonic anhydride present, which displaces the mercury, and collects on the surface of the liquid in the graduated tube.

It will be noticed from the above figures that the volume of liquid introduced measures 10 c.c., so that 10 c.c. of the same liquids, in the same proportions, are placed on the mercury in the opposite arm of the apparatus; this properly adjusts the equilibrium of the liquid, and so regulates the pressure, the level of the liquids being adjusted by raising or lowering the tubes. The volume of liberated gas after standing for five minutes may be read off, and the calculation of carbonate made accordingly, temperature and pressure being of course at the same time noted.

Five c.c. of spiritus ammoniæ aromaticus, containing the full quantity of neutral carbonate of ammonia, should yield by calculation about 36·4 c.c. of CO_2 at the normal temperature and pressure. But in making this estimation, the solubility of CO_2 in the 10 c.c. of liquid must be taken into consideration, which, from experiments with pure sodium carbonate, I find amounts to about 3·5 c.c.; this volume must therefore be added to the volume of gas read off in the tube.

From 5 c.c. of B.P. spiritus ammoniæ aromaticus, prepared very carefully from Howard's volcanic ammonium carbonate, for purposes of experiment, I have been able by the above process to obtain an average of 32·5 c.c. of free carbonic anhydride; so that, with the addition of the 3·5 c.c. held in solution, the volume is brought up to 36 c.c., out of 36·4 c.c. expected. This result, I think, leaves little to be desired, and the process can be worked with the same ease and accuracy as that for sweet nitre.

In fixing a standard for spiritus ammoniæ aromaticus, B.P., I think it would be reasonable to say, that 5 c.c. should yield not less than 30 c.c. of carbonic anhydride at the normal temperature and pressure, which would correspond to about 12 grains of neutral carbonate of ammonia in each fluid ounce.

With a view to ascertain how far the instructions of the present B.P. are carried out, the following samples of aromatic spirits of ammonia were obtained from different manufacturers; the carbonate of ammonia in each of which was estimated, by the process already described, with results as under:—

Samples A., B., and C., were prepared by myself for purposes of experiment, the remaining samples were marked B.P., and should consequently contain the requisite amount of neutral carbonate of ammonia, and in fact answer the B.P. tests generally.

Sample.	Sp. gr. at 60° F.	No. of c.c. of CO_2 from 5 c.c.	Neutral carbonate in fl. ℥j.
A.	0·8958	Read off 32·6 + 3·5 = 36·10 c.c.	14·54 grs
B.	0 8960	„ „ 32·5 + 3·5 = 36·00 „	14·50 „
C.	0·8960	„ „ 32·7 + 3·5 = 36·20 „	14·57 „
D.	0·8950	„ „ 25·2 + 3·5 = 28·70 „	11·59 „
E.	0·8880	„ „ nil + 3·5 = ?	traces
F.	0·8940	„ „ 1·0 + 3·5 = 4·5 „	1·81 „
G.	0·8810	„ „ 0·8 + 3·5 = 4·3 „	1·73 „
H.	0·8960	„ „ 27·4 + 3·5 = 30·9 „	12·17 „

It appears very evident that samples E., F., and G. were made by distillation, in consequence of which the carbonate has been converted into free ammonia, or left behind in the still, undecomposed. It seems curious that manufacturers of this article will persist in using the old process, since the new method not only results in a far more satisfactory medicinal agent, but will be found a financial advantage to themselves, as it is undoubtedly a less expensive process. The deficiency of neutral carbonate in D. and H. may possibly be accounted for, by the prescribed time and temperature being exceeded in combining the carbonate with the free ammonia, which requires especial care.

Laboratory, 300, *High Holborn*.

OIL OF PEPPERMINT.*

BY ALBERT M. TODD.

In the paper which I have the honour to present you, the history of the plant will be briefly noticed, and attention directed to some characteristics of the essential oil as observed in the practical manufacture, some being of such phenomenal nature as to invite further investigation.

Mentha piperita, from which the true oil of peppermint is derived, was first introduced or noticed in Hertfordshire, England, and given the name "pepper-mint" by Ray in his 'Historia Plantarum,' published in 1704. Its commercial history dates from about the year 1750, when its cultivation was commenced in a very small way at Mitcham, in Surrey, England. Fifty years later the amount under cultivation was about 100 acres, but the growers having had, as yet, no distilleries built, still continued to convey the plant to London for the distillation of the oil.

The industry in England reached its zenith about 1850, just one hundred years after its introduction, when the area cultivated was about 500 acres, but, owing to successful American competition, it was reduced during the next fifteen years to about 250 acres. From personal observation when visiting the peppermint districts of England in 1875, I attribute the success of American competition to a more perfect system of distillation and apparatus therefor (which I will again refer to), and the more healthful growth of the plants in our country.

Distillation of oil of peppermint was first accomplished in America by a Mr. Burnett, in the year 1816, in the county of Wayne, State of New York, who collected on the banks of a little stream sufficient wild plants to produce about 40 pounds of the oil. In the year 1835, the industry was established in Michigan, in St. Joseph County, on White Pigeon Prairie, about two miles north of a village of that name, a distillery being erected the following year. Up to this time, and for ten years later, the distilling apparatus used was very crude, being the same as has been used in England, with but slight modifications, consisting of a copper kettle in which the plants were placed, immersed in water, to which direct heat was applied by a furnace from beneath, a condensing worm of the usual character being connected with the kettle by a pipe from its apex.

The year 1846 marks a new and important era in the evolution of a more perfect system of distillation and the apparatus therefor, viz., that of distillation by the diffusion of steam through the plants, which were now, for the first time, placed in large wooden vats, to which steam was conveyed by a long pipe entering at the bottom: the kettle which had been used heretofore as the still being now used for the generation of steam. Distillation was now effected in a much more perfect manner, as the scorching of plants and the consequent formation of empyreumatic products was rendered impossible. Furthermore, distillation could now be con-

* Read at a meeting of the American Pharmaceutical Association.

ducted with much greater rapidity and economy. The primitive stills had a capacity of about 15 pounds of essential oil in the twenty-four hours, the new form a capacity of 75 to 100 pounds. This system of steam distillation originated in St. Joseph County, Michigan, and was soon introduced into New York.

I might state here that nearly every improvement in the construction of the stills has originated in St. Joseph County, Michigan, and it would be of great interest to mark the further development of these improvements to their present high state of perfection, but the limits of this paper render it impossible. On some other occasion I may have the honour to give some practical and technical information relating to the methods of erecting the more perfect plants of distilleries.

Briefly as to the cultivation of the plants: in early spring the ground, having been ploughed, is marked out in furrows 2½ feet apart. In these furrows are placed the roots and runners which have multiplied from the setting the preceding year. One acre of good roots usually furnishes sufficient to set from 5 to 10 acres of new ground. These roots and runners are from one-eighth to one-fourth of an inch in diameter, and from 1 to 3 feet in length when in the healthy state. In setting, they are carried in large sacks, strung over the shoulders of the workmen, who place them in the rows so that there shall be one or two living roots or runners at every point in the row. While placing the roots with their hands, they at the same time cover them with their feet. It is quite an interesting sight, owing to the queer motions of the workmen, to see these roots planted. A good, experienced workman, in mellow ground, with good roots, can set about one acre per day. New plants appear above the ground about two weeks after setting, and are carefully hoed and cultivated until July or August, when, if the season is fair, the plants have thrown out such a quantity of runners as to render further cultivation very difficult, and indeed unnecessary.

The proper time for distillation is when the plants are in full bloom in the case of the new crop, that is, the crop which has been set the preceding spring. This usually occurs in September. What is known as the "second crop" (which has sprung up spontaneously, from being the second year's growth) matures usually in August. For distillation, the plants are cut down and allowed to dry for a while in the sun before being drawn to the distilleries. Many growers, however, believing that a loss of the oil is sustained by diffusion in the atmosphere if the plants are fairly dried, bring them to the still in the green state. As distillation can be effected with much greater rapidity from dry plants, this question of thorough drying is one in which the owners of distilleries and the producers in general have long been greatly interested. For, if the plants are worked in the green state, it will require, ordinarily, about ninety minutes for distillation, with a yield of perhaps 5 to 7 pounds of oil to the charge, whereas, if thoroughly dried, distillation can be effected in about thirty-five minutes, with a yield of from eight to nine pounds, since the dried plants will pack much more closely in the vats than the green ones. Each owner of a distillery on the average distils the crops of ten other growers with his own, charging therefor twenty-five cents for each pound of oil obtained, whereas in England the charge is made for each vat of plants, whatever the amount of oil produced.

The former method is much more equitable for the grower, since, if his crop is poor, he is not obliged to pay an exorbitant rate per pound, and the latter method is more equitable for the distiller, since it requires as much labour to distil a charge of poor plants as green and productive ones, and, as stated, much more when the plants are green.

To test the question as to whether a loss of essential oil occurred by diffusion in the atmosphere when the plants were thoroughly dried, I made a careful experiment, the results of which may be found in the September number of the *American Druggist*; the dried plants used having been exposed to atmospheric action for six months, and having been reduced by such exposure 49·4 per cent. in weight. As there are about 15,000 tons of the plants produced annually in America, the settlement of this question is of material interest to owners of distilleries and growers; saving the former greatly in manufacturing and the latter in transportation.

The average yield of essential oil varies greatly, according to the quality of the plants, depending mostly on the fact whether they are fine and well covered with leaves and blossoms (in which the essential oil is entirely contained). The difference in quality of plants is so great that, while from 2000 pounds of well-leaved plants I have distilled 18 pounds of essential oil, but 1 and 1½ pounds have been obtained in some instances from a like quantity of coarse plants devoid of leaves. The average yield, however, is about one-third of 1 per cent. from green plants.

There are now in America about 175 small distilleries, where the natural oil is distilled. The average annual production in America for the last ten years has been about 100,000 pounds of oil. The average yield per acre of the crops of the first and second year is about 11 pounds; this would show an annual area under cultivation of about 9000 acres.

As to the nature of the essential oil: regarding this there are many tests which are so generally known as not to require notice at this time. Some of them may, however, be briefly stated. Oil of peppermint, when freshly distilled, or when two or three years of age, if kept in well-filled vessels, should dissolve readily in alcohol in all proportions, making a clear solution without need of filtration. When a few drops of the oil are placed upon white paper and held over a lamp or gas jet, it should volatilize quickly and perfectly without undergoing change or leaving any residue. When 3 drops of peppermint are placed upon 4 grains of resublimed iodine (or such quantity as will thoroughly saturate, but not drown the iodine) there should be but a slight reaction, and what little vapour is produced should be almost invisible, becoming entirely so after having arisen about twelve inches above the mixture, the colour of the vapour assuming a bluish cast. The colour of the mixture in this test should be carefully noticed, which, in the case of pure peppermint, is of a brown, or brownish-black colour, the iodine dissolving slowly and imperfectly. If oil of turpentine, erigeron, fire-weed, rag-weed, or other terebinthinate oils are present, there will be quite a violent reaction (according to the quantity of the adulterant), with the evolution of considerable heat, and a red or reddish-yellow vapour will be produced, of a rank odour, partaking considerably of the nature of the adulterant, and the mixture will change to a bright violet. If the colour of the mixture is most carefully noted, a very slight quantity of such adulterants can be detected. When to 25 drops of alcohol 1 drop of nitric acid specific gravity 1·2 is added, and then one drop of pure oil of peppermint, there will be produced, within about half hour, a blue or bluish-green colour, which will remain permanent for a long time. Oil of pennyroyal and *Mentha arvensis* produce no coloration. A much more intense coloration will be produced when one drop of nitric acid, of the strength as stated, is mixed with 50 or 60 drops of the essential oil, without alcohol. Some specimens of oil of peppermint imported from Germany and England showed by this test a mixture with *Mentha arvensis*. To make this test valuable, however, to chemists and pharmacists, they should first operate upon samples of known purity and notice the depth of coloration required.

Another test for the detection of pennyroyal, which also indicates *Mentha arvensis* when in sufficient quantity, is the following:—Take 1 drachm each chloral hydrate and pure sulphuric acid, adding 12 drops of alcohol. When this solution is mixed with a like quantity of pure

oil of peppermint, a dark cherry colour is quickly produced and maintained for a long time. Pennyroyal (or oil of peppermint heavily adulterated with this oil) gives no such colour, being more of a yellowish cast, and changing to an olive green. With *Mentha arvensis* a yellowish-brown colour is produced which is maintained for ten or twelve hours, and thirty-six hours later has a slight tendency to assume a cherry colour or one intermediate between the cherry and the brown. It was noticed that, when the true oil of peppermint was mixed in equal proportions with that of the *Mentha arvensis*, a deficiency in the intensity of the cherry colour was plainly observable. Whether the significance which I have discovered in these tests, showing similar reactions in pennyroyal and *Mentha arvensis*, has a bearing on the chemical relationship of the oils of these plants, which are related botanically, is a question of interest.

I will now refer to the two physical tests, those of specific gravity and boiling point, in which the results of my experience vary greatly from the tests published in official and standard works.

The difficulty which scientific men seem to have experienced in establishing accurate tests for the purity of essential oils has been, that they could not conveniently obtain the plants from which they themselves could distil the specimens used in their investigations; and, while undoubtedly every possible precaution was taken, the result shows that they have in many instances operated upon impure samples; and although pure specimens undoubtedly were, in some instances, received, yet they had, in many cases, no positive knowledge, *per se*, which were pure and which were impure; hence too great a range of differences has been allowed in physical characteristics and chemical reactions. In correspondence with some well-known chemists, they give it as their opinion that a wide range of specific gravity, etc., might result from variations in soil and climate. On account of this we took greater pains to verify our determinations by testing samples grown under much varying conditions of soil and climate, both in Europe and America. Forty-three samples were examined, including oils produced in St. Joseph, Wayne, Ionia, Hillside, and Kalkaska Counties, Michigan, Wayne County, New York, and vicinity (all of which were produced from American roots long acclimated), also one specimen grown in America from roots imported from England, and one specimen grown and distilled in England. The specific gravity has been variously stated in the dispensatories and other standard works at from 0·840 to 0·950 at 60° F. But there were none of the samples which were pure which had a specific gravity below 0 910 at 60° F., except the two last mentioned, grown from English roots; the one grown in America being 0·9085, the one distilled in England being 0·9088. Nor were any specimens of pure oil found having the specific gravity above 0·917 which were in a perfectly soluble condition. One sample distilled by myself in 1875, and consequently eleven years old, had, on account of its age, a specific gravity of 0·924; one sample from New York 0·933, and from the same district 0·940 for another. However, those three samples were found to be not readily soluble; the latter sample, when submitted to rectification, being found to contain 9 per cent. of insoluble resin. Of five samples imported from Europe, but one was found pure; two from Germany were found to contain dementholized *Mentha arvensis*; one from London, which bore a fraudulent and forged label (as Michigan oil of peppermint, manufactured at Evart, Michigan County, U.S.), had the specific gravity 0·899. This oil, when submitted to fractional distillation, was found to contain 50 per cent. oil turpentine and no Michigan peppermint whatever. The sample imported from London as German oil of peppermint consisted chiefly of pennyroyal and *Mentha arvensis*. Allowing a slightly wider range of difference than was really intended, it is evident that whether from English or American plants, pure oil of peppermint is never below 0·908 specific gravity, nor, when fresh and soluble, above 0·917 specific gravity, so that the difference formerly allowable, that is, from 0·840 to 0·950, is reduced to one-tenth.

As to the boiling point: this is stated in the dispensatories at 365° F., and 374° F. By placing the oil of peppermint in a distilling flask, the body of which was immersed in a mercury bath, and attached to the condenser, the following times and temperatures were noticed, the distilling being divided into eight fractions. Applying the heat slowly, the slightest possible ebullition was noticed at 363° F., but so slight as to be almost imperceptible. Ten minutes later the temperature had risen to 401·5° F., at which time but 2 drachms of fluid were collected, one-half of which was found to be water. It will hence be observed that the true boiling point of the oil could hardly be placed below 400° F. Ten minutes later the temperature had risen to 406·9° F., with distillation progressing at the rate of but 6 drops per minute, and it was found, upon reducing the temperature to 406°, that the speed of distillation was reduced to 1 drop in forty-two seconds; so that the first fraction could not be recovered easily, except at a temperature higher than this. Counting from the time when the oil commenced to drop into the receiver, the distillation of the first fraction of 1 ounce occupied fifty minutes, being concluded at a temperature of 412·8° F. It would seem, then, that the true boiling point should not be placed below 400° F.

I would here call the attention of the Association to the need of a more definite and complete method for recording experiments in fractional distilation, in which not only the form of apparatus and method of applying the heat should be noticed, and the temperatures of each fraction, but also the speed at which it is effected in its various stages. This matter would form a very interesting matter for discussion. I will now call attention to one phenomenal characteristic observed in fractional distillation, and which I briefly alluded to one year ago, that is, the changes of direction from the ascending to the descending scale in the specific gravity of the different fractions. It had formerly been supposed that the specific gravities increased constantly after the first until the last fraction was obtained. The law discovered is that when the distillate is divided into a number of fractions, the specific gravities continued to rise only until about half the oil is recovered, they then strangely commence to descend until 80 per cent. or 90 per cent. is obtained, and the point is reached of the specific gravity about as low as that of the third fraction. The direction now again changes to an ascending scale, increasing with great rapidity. To illustrate this, I will give you the specific gravities obtained in the distillation of 300 pounds oil of peppermint by the diffusion of steam. The times and temperatures and other conditions will be referred to in some future paper.

The specific gravities were as follows:—

Number of fraction.	Specific gravity.	Number of fraction.	Specific gravity.
1 . . .	0·89423	8 . . .	0·91275
2 . . .	0·90650	9 . . .	0·91175
3 . . .	0·91000	10 . . .	0·91100
4 . . .	0·91275	11 . . .	0·91075
5 . . .	0·91375	12 . . .	0·91065
6 . . .	0·91400	13 . . .	0·91050
7 . . .	0·91425	14 . . .	0·91265

There now remains in the still one full fraction of 20 pounds not yet recovered; subdividing this fraction, the following specific gravities are found:—The first 5 pounds is 0·925; the next 2 pounds 0·955, and the distillation being continued as far as possible, the last portion obtained is 4 ounces specific gravity 0·970. There now remain in the still 12 pounds 14 ounces of resin, which, if mixed with 7 pounds 4 ounces last obtained, would raise the specific gravity of the last full fraction to about 0·980.

In calling the attention of Professor Flückiger, of

Strassburg, to the subject, he attributes it to the splitting up of the component parts. This, however, seems hardly possible when the aroma and chemical reactions of the fractions are investigated.

There are other tests and characteristics of interest which I would gladly notice if time permitted, but which will better form the subject of a future article.

WORMSEED, AND THE QUANTITATIVE ESTIMATION OF SANTONIN.*

BY PROFESSOR FLÜCKIGER.

The kind of *Artemisia* which contains santonin appears to be indigenous and widely distributed in the enormous steppes that may be roughly described as lying between latitude 40° and 50° N., and longitude 80° and 65° E. But if this *Artemisia* be considered, as probably is justifiable, a form of Linnæus's *Artemisia maritima*, the habitat for the species covers a very much larger area. It must, however, be left to systematic botanists to determine whether eventually the wormseed plant is to be established as an individual species, *Artemisia Cina*, *A. Contra*, *A. Stechmannia* or *A. pauciflora*. The santonin-yielding plant grows in enormous quantities in the district of the Arys, which in about longitude 68° 20′ flows into the Ssyr-Darja, the Jaxartes of the ancients. Just a little south of the mouth lie the ruins of the city of Otrar, formerly standing on one of the great central Asian trade routes, over which the Italian commercial republics carried on their traffic with the far east. Consequently even in the fourteenth century wormseed may probably have been obtained from this district by the Venetians, Florentines and Genoese. At any rate it already formed so considerable an article of consignment that it was not only called wormseed, "semi da vermi," or "semente da vermi," but more briefly, "semenzina," or "sementina," from which the medico-pharmaceutical Latin designation, "semen cinæ," originated.

In such enormous abundance does the *Artemisia* in question grow in the Tschimkent region that 1000 to 1600 tons of the stripped flower-heads, flores cinæ, have hitherto been exported westward annually, chiefly from this district, to be worked for santonin. Towards this extensive country of Turkestan, which is now nearly completely subdued by Russia, the central Russian network of railways has long been tending, and it has already approached it to within the relatively small distance of 10° of longitude, the terminus being in the important commercial city of Orenburg (longitude 55° E.). Beyond this city camels only were available for the transport of the drug, each animal being capable of carrying only about 300 kilograms, and requiring seventy-five to ninety days to travel the distance between Orenburg and Tschimkent.

In 1883 a santonin factory was erected in the city of Orenburg, by H. Mauer and Co., by which means the carriage of about 98 per cent. of the raw material to Europe was saved. Shortly afterwards, towards the end of 1884, a Russian firm, Iwanoff and Ssawinkoff took a step further and erected a factory in Tschimkent itself.

The drug attains its greatest richness in santonin in the latter half of July and in August, immediately before flowering. It is collected by the Kirghis, and delivered by them at the factory mostly in December, at the rate of about ten tons daily. There it is stored and worked up gradually, usually at the rate of from five to seven and a half tons a day. The numerous feast days of the Russians reduce the working days to about twenty in a month. The difficulty as to fuel is overcome by burning the refuse of the plant, while the necessary hydrochloric acid is to be, and the alcohol is already made on the spot. This factory will thus be in a position to work up about six hundred tons of raw material in the year, and produce at least twelve tons of santonin. About nine tons of santonin is said to have already reached Hamburg, and a sample supplied by Herr Bieber to Professor Flückiger is spoken of as being of excellent quality. The yearly consumption of santonin throughout the world is estimated at twenty to twenty-five tons yearly, and this one house expects soon to be in a position to cover the entire demand. The price of Tschimkent santonin in Hamburg at the time this article was written was eighteen shillings per kilogram.

Through the kindness of Herr Knapp, the engineer under whose superintendence the factory was erected, Professor Flückiger received some fine specimens of the wormseed plant from Tschimkent. He found them to correspond with the plants brought from Turkestan by Petzholdt, and described by Willkomm under the name of *Artemisia Cina*, Berg., which were given to Professor Flückiger by Willkomm in 1872. Neither was the Tschimkent plant to be distinguished from Weber's *Artemisia pauciflora*. The same conclusion, that these two plants represent one and the same species, is said also to have been arrived at by M. Marié.*

Artemisia pauciflora, Weber, is figured in Bentley and Trimen's 'Medicinal Plants,' plate 157; the plant from Tschimkent in Köhler's 'Medizinalpflanzen' (Gera, Untermhaus, 1885). Both figures, however, leave much to be desired.

In the summer of 1884 Herr Knapp procured for Professor Flückiger in the neighbourhood of Tschimkent a considerable quantity of the wormseed plant collected in different months, as follows:—

(1) Collected in May, with scarcely yet perceptible flower buds; the stalks abundantly provided with perfectly smooth leaflets.

(2) June; plants described as "good." In these the stalks were already less leafy.

(3) June plants, injured by hot winds.

(4) Sample collected at the commencement of July.

(5) Sample collected at the end of July.

(6) August plants, described as "harvest ripe," with root two feet long.

(7) Specimen collected in September, consisting of the blown flower-heads on the head of the bare stalk.

The times are according to the Russian calendar.

The examination of these specimens as to their contents in santonin was undertaken by Herr Ehlinger. For this purpose the flower-heads were not separated, but after the leafless woody lower part of the stalks had been removed, the more or less leafy tops of the plant were used. It was not, therefore, to be expected that the yield of santonin would be so large as from the flores cinæ of commerce, from which the leaves, pedicels and stalks are excluded. At the factory in Tschimkent from the best material as much as 2½ per cent. of santonin is obtained. After trying various processes, including that recommended by Dragendorff in his 'Plant Analysis,' Herr Ehlinger adopted the following:—Five parts of the raw material and one part of milk of lime were boiled for two hours in a considerable quantity of dilute alcohol, and the liquid poured off after cooling; this treatment was repeated at least twice more, and the alcohol was then distilled off from the united extracts. The residual liquid was then saturated in the cold with carbonic acid, filtered off from the precipitate after standing some hours, and the filtrate evaporated to dryness. The residue was triturated with animal charcoal and alcohol of specific gravity 0·935, and the paste rinsed into a retort, where it was digested with a measured quantity of alcohol. After boiling the contents of the retort were thrown on a filter, washed with hot alcohol, and the alcohol driven off from the filtrate, from which, after some hours, crystals of santonin separated. The following were the results obtained:—

* Abstract of a paper in *Archiv der Pharmacie*, ccxiv., 1.

* *Journal de Pharmacie et de Chimie*, xi. (1885), 55.

No.	Description of material.	Weight of air-dried material used.	Weight of solution obtained, dried at 100° C.	Per cent.
1.	May	175 gr.	0·265 gr.	0·151
2.	June, injured by wind.	300 gr.	1·189 gr.	0·396
3.	June, good quality . .	170 gr.	0·800 gr.	0·470
3b.	Root of No. 3. . . .	300 gr.	none	—
4.	Beginning of July . .	360 gr.	3·622 gr.	1·006
5.	End of July	130 gr.	1·710 gr.	1·315
6.	August	200 gr.	2·282 gr.	1·141
7.	September	100 gr.	none	—

Whilst the extract yielded by No. 1 was only slightly coloured and greenish, the succeeding numbers gave filtrates that were of a more and more bright and pure yellow colour with the increasing development of the flower-heads. The manufacture of santonin from July and August plants (old style) appears to be perfectly justified by these figures.

It appears also that the santonin only occurs in the parts above the soil, and not in the compact woody sapless roots. It is not limited, as shown by No. 1, to the flower-heads, but occurs also in the small leaflets with which the stalks of the plants are abundantly covered in the spring. It remains yet to be ascertained whether the small radical leafy shoots bearing no fruit, which the plant produces in addition to the flowering stems, contain any santonin.

On the approach of flowering time the stem leaves fall off. The santonin reaches its maximum in July and August and disappears immediately after the flowering of the plants, on which the bracts are persistent, but not the flowers.

It seems desirable also to ascertain the relative amount of essential oil in the plant at different stages of its growth, but for this a considerable quantity of material would be required. Probably the increase and diminution of the oil follow in some measure the appearance and disappearance of the santonin. With respect to the significance of the presence of santonin Professor Flückiger thinks it hardly likely that it has for its object the allurement of insects, but much more likely the keeping them at a distance during the time of flowering. But this would raise the question whether such a means of protection would be required in addition to the much more plentiful though less active essential oil.

GINGER IN "SOLUBLE ESSENCE."*

BY LUTHER F. STEVENS.

The published accounts of the work done by Dr. J. C. Thresh, in his studies upon ginger proved exceedingly attractive to the present writer, and one dull afternoon, some years ago, while running through that gentleman's experiments, the thought would obtrude itself upon the brain, that if in the second stage of his operation "lime or magnesia" was disadvantageous, perhaps it might be also in the first, although he there uses it to throw down the resins. This idea led on to the further query: Why should not water alone be a sufficient precipitant? Thence followed trials and detailed experiments which eventuated in the proof to the writer's mind that it was possible to easily produce, by a simple process, a truly soluble essence of ginger, readily miscible with any ordinary diluent, and yet representing all the grateful portions and the real therapeutic values of tinctura zingiberis, Ph. 1870, and greater than the tincture of 1880, in the same doses, and at a less prime cost.

To Dr. Thresh is due the great credit of the discovery of gingerol, which had been suspected by Professor Buchheim during his experiments in 1873, but had not up to that time, so far as I can find from any publication, been isolated.

The oils and resin had been well known since the study put upon the article by our own Proctor when he devised a fluid extract.

Thresh finds in ginger a hot pungent resin, a secondary less active resin, an active principle gingerol, a volatile oil, a heavy oil, wax, fat, gum, colouring matters, etc.

We wish to save nearly all of these except the first hot resin. Therefore into a half-gallon bottle put the following:—

℞ Fluid ext. ginger. . . . . Oi.
Powd. pumice stone . . . . 4 oz. avdp.
Water . . . . . Oij.

Pour the fluid extract into the bottle, and add to it the pumice; shake well occasionally during several hours, and then slowly add the water in portions of about four fluid ounces, with plentiful agitation, and alternate periods of rest and subsidence. Continue this at intervals during twenty-four hours, then filter, and upon the mass in the filter pour water until three pints are obtained, or until the three pints of partly alcoholic liquid originally mingled are pushed through, without allowing much water to pass. If the filtrate thus obtained is not quite clear it may be shaken with a little more pumice or a very little clean talc; the latter, however, must be used with care, as it is a magnesium compound, and may produce a noticeable effect upon the delicate flavour we seek.

The finished product is a delightful representative of the ginger minus the hot taste. It has the full aroma, and taken internally is a prompt and rapid diffusible stimulant without after-reaction.

It is of light straw colour (the colour varying with different samples of powdered root), darkens slightly upon standing, and by deposit of a little resin becomes in time a little cloudy.

The water here does the precipitating, throwing down from the strongly alcoholic solution the dark resin and some of the colouring matters.

The inert separating material prevents the agglutination of the precipitate into flakes and lumps. The alternate agitation, rest, and subsidence enable the new dilute spirit to dissolve nearly every essential portion except the alpha resin.

Dr. Thresh, in 1882, tried the water and pumice plan, but dumped the whole together at once, and, after rapid agitation, filtered, when he found so little aroma in the product that he abandoned the plan, missing one of the necessary points of the manipulation, viz., an allowance of time for the exchange of solvents from strong to weak spirit.

Aluminates, any alkali, even the alkaline earths or their carbonates, are detrimental to flavour and aroma. Thresh proved that this was because the two principles —volatile oil and gingerol—are very readily broken up; the latter particularly being supersensitive to rough treatment. Heat drives off volatile oil, ether only may be distilled from a solution containing it; ethereal extract of ginger may be freed from the ether, which distils at 98° to 100° F. (37° C.), but shortly after that has passed the oil comes over by itself. In distilling mixtures of various alcoholic strength, the volatile oil begins to come over with the very first portion of spirit at 180° to 185° F. (78° to 80° C.), and continues until the aqueous vapour rises at 211° to 213°, by which time all the volatile oil has escaped from the flask. If the heat is continued up to 220° to 225° F. (104° to 107° C.), the remaining gingerol begins to suffer decomposition; it will even commence to break up by long boiling with water.

Some preliminary points need noting here: the ginger used should be true "Jamaica," because the volatile oil from that variety is far pleasanter than when obtained from African or Chinese (Cochin ginger), and besides, both the other kinds have far more of the resins which we seek to eliminate.

* From the *American Druggist*, October.

The fluid extract should contain no glycerin, is preferable when freshly prepared, and should not have been heated in the process of manufacture, because there will have been loss of essential matters.

The powdered pumice, as obtained in the market, has sometimes a little starchy matter from the mill, and sometimes a portion of impalpable powder, either of which goes through the filter, but can be removed by the second shaking, as before spoken of. Powdered silica may be used in place of pumice. Kaolin, fuller's earth, and talc are not advisable.

Endeavours to increase the strength of the finished preparation, that is, to make it represent more than 33 per cent. of the soluble portions of the fluid extract, are not economical, as there is loss of gingerol upon the filter; and increase of alcoholic strength causes more resin to pass through, which afterwards is slowly deposited.

That the soluble essence as thus produced contains volatile oil is proved by distillation, or, easily, by throwing a teaspoonful upon the surface of hot water in a cup, when it becomes evident to the nose. That it contains essence of ginger or gingerol is proved by physiological test—by swallowing some, when shortly a genial glow is felt extending throughout the circulation.

The mass remaining upon the filter, if dried and washed with alcohol, yields a solution of hot resin of value for cooking, or for the delectation of "old drunks." If the alcohol is recovered by distillation, it is found to be sweet, clean, and pure, fit for any purpose, which shows that no volatile oil clings to the filter, and the resin will be left behind thick, black, and hot, and about 3 fluid drachms of it from 16 troy ounces of Jamaica ginger; the sample shown weighed 177 grains; a little over 2 per cent. (Thresh averages about 2 per cent.) Without doubt, there will be plenty of use found for it.

The pumice may be regained after washing, white and handsome, ready to be used again; so that this seems to be the Frenchman's ideal process where nothing is lost.

In the distillation of the alcoholic washings, if the heat be pushed at the last, after the spirit is all off, a pungent smell is noticed for a few moments in the air immediately surrounding the apparatus; but nothing condenses in a Liebig condenser supplied with cold water, showing that a trace of gingerol hangs on to the last. Thresh has found it difficult to entirely free the resin from gingerol.

Of this soluble essence, 50 c.c. was evaporated at a gentle heat in a weighed capsule until weight ceased to be lost; it gave a total residue of ·21, which, doubled, equals ·42, or a little less than ½ of 1 per cent.

To prove the presence of volatile oil, 50 c.c. was distilled until all spirit had passed over, and collected in an iced receiver. It has the smell of the oil, fragrant, but slight taste.

The residue is aromatic, aqueous, cloudy and *warm*. To find when the oil comes over most freely, 50 c.c. was distilled to dryness, the Liebig condenser iced, and the products received in succession small portions of about 5 c.c. in small iced receivers.

Distillation commenced with No. 1 at about 185° F., No. 2 at about 200° F., No. 3 at about 203° to 212° F. Each of these smelt strongly of the volatile oil, the No. 1 much the most so. With No. 3, all the spirit had come over, and with it all the aroma. Successive numbers caught only aqueous matters of little smell or taste until No. 7, at 213° F., which begins to have a peculiar smell, partly pungent of ginger and partly burnt—evidently some of the gingerol and its products in aqueous solution. This continued up to dryness in Nos. 8 and 9, at 225° F. The residue in the flask dissolves part of it in alcohol, and is pungent and hot to taste, empyreumatic to the smell. Part dissolves only in water, and is pungent to the taste, aromatic and tarry to the smell. The first contains some resins, some products of gingerol, and some gingerol. The second, considerable *crude gingerol*, some tarry matters soluble in water, but *no* resin.

From the original fluid extract there was taken 50 c.c., and distilled in the same manner as above, and at same heats, except that about 3 fluid drachms were received at once in iced homœopathic vials. The spirit oil came over smelling of volatile oil, the first the strongest; but no taste developed until No. 4, nearly the last of the spirit, and No. 5 (about 1 fluid drachm), which smells and tastes of the gingerol. No. 6 (½ fluid drachm) is aqueous, with a drop or too of apparently the terpene, or else a heavy oil. It has little taste, but a strong burnt smell. The residues were charred so much as to produce only decomposition products—creasote and coal. This cursory examination, pharmaceutical in its character, and not strictly analytical, seems to prove that this product contains all the volatile oil or aroma, all that is possible by any process of the gingerol or active principle and a small portion of the flavouring resins, and is minus the hot resin and most of the colouring.

VEGETABLE DIET AND FATTY FOODS.*

BY PROFESSOR DUJARDIN-BEAUMETZ.

If man claims a variety of aliments from the animal kingdom, equally important are those furnished by the vegetable kingdom. Considered as a whole, these vegetal foods contain as elements suitable for nutrition, 1, certain albuminoid substances,—gluten, vegetable albumen, casein, legumen, and fibrin; 2, starch; 3, dextrine and glucose; 4, fatty matters; 5, salts and water.

Foods thus constituted become complete aliments,—*i.e.*, aliments which contain all the primordial elements necessary for nutrition; only the vegetal proteids, the salts, and the fatty matters are in quantity insufficient to sustain life, at least in man, while, on the other hand, sufficing for the herbivora. The word *insufficient* is not even altogether applicable to man, for there are whole populations that are strictly vegetarian. In order, however, fully to meet the requirements of the economy, a great quantity of vegetable aliments must be ingested to supply the 20 grains of nitrogen which a man loses daily.

The advantages of an exclusively vegetable diet have been latterly much over-rated. We have heard it affirmed that by perseverance in such a diet man might successfully resist most diseases, and attain to a great age: this is the doctrine of vegetarians. While recognizing the great benefits which may be derived from a purely vegetable diet in certain affections of the stomach, I believe that man, by his anatomical and physiological constitution, is omnivorous, enjoying the fullest possession of his powers on a mixed diet; on this subject I shall hereafter have more to say.

The albuminoid principles of vegetables have been well studied by Ritthausen. They consist of vegetable albumen, casein, legumen, gelatin, gluten, and congluten. As for gluten, its composition is very complex, and Ritthausen affirms that it is made up of at least four albuminoid substances,—gluten-casein, insoluble in alcohol, and three substances soluble in alcohol,—gluten-fibrin, gliadine, and mucedine.

I give you here from Ritthausen the ultimate analysis of these vegetable albuminoid substances, as obtained from various cereals and legumes:

	Wheat.	Barley.	Indian Corn.	Lupines.	Peas.	Beans.
Carbon	53·12	52·86	52·31	52·63	52·94	53·33
Hydrogen	7·18	7·23	7·73	7·46	7·13	7·19
Nitrogen	17·60	15·75	15·49	17·24	17·14	17·14
Sulphur	1·55	1·18	—	0·76	1·04	1·04
Oxygen	20·55	22·98	—	21·91	21·75	21·75

If you glance over the following table, which gives the proximate composition of our principal amylaceous foods, you cannot fail to observe that in general the amount of starch is in inverse proportion to that of the azotized matters:—

* A lecture on Hygienic Therapeutics, delivered in Cochin Hospital. From a translation in the *Therapeutic Gazette*.

Ritthausen's Table of the Composition of Amylaceous Aliments.

Substances.	Azotized matters.	Starch.	Dextrin and glucose.	Fats.	Cellulose.	Salts.	Water.	Authorities.
Wheat	20·68	62·49	8·36	2·32	3·02	2·86	—	Payen.
Rye	9·06	57·50	10·00	2·00	3·00	1·90	14·60	Boussingault.
Oats	11·90	53·68	7·90	5·50	4·10	3·00	14·00	
Barley	12·96	66·43	10·00	2·76	4·73	2·10	—	Payen.
Bread crumbs	6·67	53·55	3·79	0·70	—	0·84	44·45	Violet.
Bread crust	13 00	62·58	3·88	1·18	—	1·21	17·15	
Army bread	8·85	44·50	4·12	0·70	6·07	1·39	34·17	Poggiale.
Indian corn	12·80	58·40	1·50	7·00	1·50	1·10	17·70	Boussingault.
Rice	6·43	77·75	0·60	0·43	0·50	0·68	14·40	
Potatoes	2·05	20·00	1·09	0·11	1·04	1·26	74·00	Payen.
Horse bean (Faba equina)	30·80	48·00		1·90	3·00	3·50	12·50	
Vetches	27·30	48·90		2·70	3·50	3·00	14·60	
French bean	25·50	55·10		2·80	2·90	3·20	9·90	
Lentils	25·20	56·00		2·60	2·40	2·30	11·50	
Peas	23·80	58·80		2·10	3·50	2·10	9·80	
English bean	24·40	61·50		1·50	3·00	3·60	16·00	

In the vegetable alimentation starch and the amylaceous principles play an important part. You know that they are absorbed in the state of glucose, and that the transformation of starch into glucose is the result of two ferments,—the one, the product of mixed saliva, is the salivary distaste ; the other, which belongs to pancreatic juice, is amylopsin.

This transformation of starch into sugar is not as simple as one might imagine at first sight. The supposed breaking up of the starch molecule into one molecule of dextrine and one of grape-sugar is not a representation of the reality, if we may trust the experiments of Musculus, of O'Sullivan, of Brown and Heron, and of William Roberts.

According to these experimenters, we must consider this reaction as much more complex, and as terminating by formation of maltose and achro-dextrine, as the following formula shows :—

$$10(C_{12}H_{20}O_{10}) + 8H_2O = 8(C_{12}H_{22}O_{11}) + 3(C_{12}H_{22}O_{11}).$$

Soluble starch. Water. Maltose. Achro-dextrine.

Ewald, of Berlin, has recently studied the influence which saliva exercises upon the saccharification of amylaceous matters in the stomach. He has shown that the transformation of starch into sugar is effected to a very trifling extent in the stomach, and that after the administration of a concentrated decoction of starch you may note the presence of fermentable dextrine and maltose, but that the metamorphosis of maltose into sugar takes place only in the intestine. If to the facts attested by Ewald we add that the pancreatic juice furnishes a ferment adapted to the digestion of amylaceous matters, we are warranted in the conclusion that starchy substances are exclusively digested in the intestine.

There is always an interest in knowing (and this especially with reference to the treatment of certain affections, and glycosuria in particular) the quantity of starch contained in cereals as vegetables. The following table from Nedats gives the percentage of starch in wheat, rye, potatoes, etc. :—

	Per cent. of starch.
Rice	74·10
Indian corn	65·90
Wheat flour	63·00
Whole wheat	59·60
Rye flour	59·84
Millet	59·90
Buckwheat	50·00
Wheat bread	42·70
Oatmeal	39·10
Peas	37·00
Rye bread	36·25
Beans	36·00
Jerusalem artichokes	16·60
Potatoes	15·50

We will now study successively cereals, legumes, and fruits.

The cereals serve as the basis of the principal food, the universal food, of man,—bread. Without entering here into the details and complex chemical reactions of bread-making, I must call your attention to the nutritive value of bread. In this respect it is important to distinguish the crust from the crumb ; the crust is much the more nutritious, as the following analysis by Barral shows :—

Water.	Crust.	Crumb.
Water	17·15	44·45
Insoluble azotized matters (gluten, etc.)	7·30	5·92
Soluble azotized matters (albumen and the like)	5·70	0·75
Soluble non-azotized matters dextrine, sugar)	4·88	3·79
Starch	62·58	43·55
Fatty matter	1·18	0·70
Mineral matters	1·21	0·84
	100·00	100·00

It is generally believed also that bread made from the coarser, inferior flours is more nutritious than bread made from superfine flour. This is a mistake, and Violet has shown us that the finer and whiter the flour the more nitrogen it contains. This is Violet's table : —

	Percentage of nitrogen.		
	Second quality.	First quality.	Superfine.
First sample	0·92	1·18	1·39
Second sample	1·05	1·36	2·06
Third sample	0·99	1·02	1·25
Average	0·99	1·15	1·57

Nevertheless, in placing ourselves on a somewhat different stand-point, and in judging the nutritive value of bread not by the quantity of nitrogen which it contains, but by that of its saline principles, bread made from flour that is incompletely bolted possesses certain advantages.

You know, in fact, that the husks of grains are especially rich in phosphates ; hence it has been recommended in certain cases, where it is desired to introduce phosphates into the economy, to give bran bread. When I come to speak of the dietetic treatment of diabetes, I shall show you by what artifices ordinary bread has been replaced by bran bread, or, better still, by gluten bread.

Rye, Indian corn, buckwheat, and even oats have been substituted for wheat in the fabrication of bread. Two of these deserve special mention. Corn bread is exceedingly nutritious. Cornmeal contains a larger proportion

of fatty matters than the flour of any other cereal; hence it is that corn bread occupies a large place in the dietary of certain peoples, especially in regions where wheat cannot be raised. It has, however, a peculiar taste, which renders it repugnant to most persons, at least till they become accustomed to it. Oatmeal has been highly vaunted by the Scotch physicians, who claim that the fine physical development of that nation is due to the fact that they are reared on oatmeal. In a work undertaken by me, in conjunction with Ernest Hardy, I have shown the large proportion of nitrogen contained in oatmeal. The following analysis, published by ourselves, will make this plain:—

	Per cent.
Water	8·7
Fatty matters	7·5
Starch	64·0
Azotized matters, gluten	11·7
Mineral matters	1·5
Cellulose, and other matters not determined	6·6
	100·0

Hence it is that in the feeding of horses, oats, by reason of their richness in nitrogen, have been considered the force-giving aliment *par excellence*. Add to this that oats contain a particular excitant principle, which Sanson has isolated, and the effects of which he has studied. This excitant principle is found especially in black oats, and its effect on the horse lasts, on an average, for an hour after giving a quart of oats. The large percentage of iron in oats is also worthy of note.

This double quality of being a strengthening and excitant aliment renders oatmeal suitable for the dietary of children, and you will find in the thesis of my pupil Marie* interesting facts relative to this subject. I believe even that we might to-day complete our researches by studying on man, as Sanson has done on horses, the effects of the excitant principle, which he has isolated, and seeing if it may be utilized in therapeutics.†

Vegetables are divided into starchy and herbaceous. Starchy vegetables (legumes,—*i.e.*, beans, peas, lentils) contain a great quantity of legumin, and for this reason are very nutritious. Hence it is that beans have been called the *poor man's meat*. The following analysis is from Boussingault:—

Composition of Seeds of the Leguminosæ.

	White beans.	Peas.	Lentils.	English beans.
Legumin	26·9	23·9	25·0	24·4
Starch and dextrin	48·8	59·6	55·7	51·5
Oily substance	3·0	2·0	2·5	1·5
Lignin and cellulose	2·8	3·6	2·1	3·0
Salts	3·5	2·0	2·2	3·6
Water	15·0	8·9	12·5	16·0
	100·0	100·0	100·0	100·0

The husk which covers these seeds is composed exclusively of cellulose, which renders them somewhat indigestible. So when you have to do with weak stomachs, or persons who masticate imperfectly, you should direct them to eat their beans or peas hulled, and boiled into a mash or soup.

Among these legumes I must call your attention to lentils, which deserve especial mention from the point of view of their nutritive value, being not only rich in azotized matters, but also containing much iron.

Boussingault, who has given us a very instructive analysis of different aliments with respect to the iron which they contain, has assigned the first place to lentils; in fact, the proportion of this metal in lentils is double that which is found in beef, although surpassed by oats:—

	Quantity of iron in 1000 parts.
Bullock's blood	0·03750
Blood of swine	0·06340
Muscle of beef	0·00480
Muscle of veal	0·00270
Muscle of fish (Merlan)	0·00150
Fresh codfish	0·00420
Hens' eggs (without the shell)	0·00570
Snails	0·00360
Beef bones	0·01200
Sheep's foot	0·02090
Wheat bread	0·00480
White beans	0·00740
Oats	0·01310
Lentils	0·00830
Potatoes	0·00160
Cow's milk	0·00180
Carrots	0·00090
Indian corn	0·00360
Rice	0·00150
Apples	0·00200
Spinach	0·00450
Cabbage	0·00390
Red wine of Beaujolais	0·01090
Beer	0·00400
Seine water	0·00104

But do not forget that in order that lentil flour may possess all its properties it must be cooked, and it is in this form that you should prescribe it for your patients. It is quite probable that the sweet revalescière (a patent farinaceous preparation common in France, and which has been so much advertised) is composed in part of malted lentil flour.

By the side of these starchy vegetables, and at their head, should be placed potatoes, an aliment to-day quite as indispensable as bread. You have seen by a foregoing table how small the proportion of starch contained in potatoes, and in this respect this vegetable occupies a low place; hence the applicability of potatoes to the dietary of diabetes.

The herbaceous vegetables may be divided into three great groups,—vegetables rich in vegetal albumen and in nitrogen, such as cabbages, watercresses, asparagus, mushrooms, truffles; then mucilaginous and saline vegetables, such as lettuce and chicory; lastly, vegetables rich in acids, such as sorrel and tomatoes. Let us glance over these three groups.

The first comprises those vegetables which are the most nutritious, but whose digestion is at the same time the most difficult. Leven maintains that cabbage is very hurtful to the stomach. I cannot agree with him, and regard cabbage as an excellent aliment, highly azotized, which is well digested when sufficiently cooked.

(*To be continued.*)

* Marie, "A Study on the Employment of Oatmeal (*Thèse de Paris*, 1873).

† Sanson, "Experimental Researches on the Excitant Action of Oats" (*Jour. de Anat. et de Phys. de Ch.*, Robin et Pouchet, t. xix., 1883, p. 113).

DOES CANNABIS INDICA CONTAIN NICOTINE?*

BY GEORGE W. KENNEDY.

In the year 1876, Preobraschensky claimed to have obtained nicotine from Bucharian hashish, and also from gunja. After this announcement was made, several chemists experimented with the drug, Indian hemp, with a view of isolating the nicotine, but I believe they were unsuccessful in their efforts, even after repeated examinations were made.

For the extraction of the alkaloid nicotine from the herb *Cannabis indica*, the acceptor of this query concluded to submit the drug to two different and separate treatments, the object for doing so being that, in case one manipulation should fail, the other might be tried.

* Read before the American Pharmaceutical Association.

Besides there would be stronger evidence of the presence or absence of the base in search of.

It is well known that the alkaloid nicotine is not a permanent base, but quickly assumes a brown colour on exposure to the air and light, and is partly converted into a resinous compound and, according to good authority, it appears even to undergo an alteration by repeated distillation in an atmosphere deprived of oxygen. Therefore, it is easy to realize the necessity of observing many little points apparently trifling, but yet of much importance in pursuing an investigation of this character, so as to obtain satisfactory and conclusive results.

A failure to observe any one of them, in all probability, would give quite contrary conclusions.

In order to make myself feel more satisfied with my work, I decided to work on tobacco for nicotine at the same time, the treatment being precisely the same in every particular and detail, so that if I succeeded in obtaining the alkaloid from tobacco, by either or both of the processes, then there should be no reason, if it was present, why I should not be successful in extracting it from the *Cannabis indica*.

In the one process I prepared an alcoholic extract of each by moistening the powdered drug with alcohol, packing in a conical glass percolator, and after allowing it to stand in this condition for twenty-four hours, pouring alcohol on the packed drug, until it was extracted, paying strict attention so that percolation would proceed slowly. The first third of the percolate was reserved, the remainder evaporated at a temperature not exceeding 50° C. (122° F.), to a proper consistence, the reserved portion added, and the whole evaporated to a pillular mass. In each case two pounds of the drug were used, with the following yield of extract.

Tobacco, $3\frac{1}{3}$ ounces.

Cannabis indica, $3\frac{1}{4}$ ounces; the former $9\frac{8}{10}$ per cent. and the latter 10 per cent.

Dragendorff states that nicotine may be readily obtained by means of ether, chloroform, benzol, or petroleum benzin. The extract of each drug was therefore treated with a small quantity of alcohol and acidulated with sulphuric acid, after which water was added and the alcohol evaporated.

The resinous matter set free was separated by filtration; the acid filtrate was then agitated with ether, and the watery acid liquid separated and rendered alkaline by potassa, and again agitated with ether. The ether would now take up the alkaloid nicotine if present, and it could be obtained by spontaneous evaporation. Since, however, the alkaloid is easily altered, only a portion of the ethereal solution was evaporated, the object of which was to procure a small quantity of the pure nicotine. In evaporating the last traces of ether present from the almost colourless base, I discovered that the alkaloid was undergoing a change, as it soon showed signs of decomposition, by slowly changing to a dark brown colour. The second portion was converted into a salt by agitating with slightly acidulated water (H_2SO_4), first driving the ether off, and afterwards evaporating the watery liquid. In the above examination, the Indian hemp gave negative results, but when a solution was tested with the general alkaloid reagents, such as the potassiomercuric iodide and phosphomolybdic acid, a very faint precipitate was perceptible.

The second process was conducted by exhausting the bruised drug with acidulated water, by evaporating this acidulated liquid to a small bulk, and then distilling with a solution of caustic potassa, the distillate neutralized by dilute sulphuric acid to combine with any alkaloid present, and the slightly acidulated solution tested with the alkaloidal reagents in order to ascertain whether an alkaloid is really present or not. As in the preceding experiment, a faint indication of the presence of an alkaloid was shown by a very light precipitate. The neutralized solution as obtained above was then evaporated to dryness on a water-bath, and treated with absolute alcohol, in order to separate any ammonium sulphate with which it might have been contaminated. The alcoholic liquid which would contain the nicotine sulphate was evaporated to the crystallizing point, when a small group of crystals was obtained. By dissolving the crystals in water, making the solution strongly alkaline with caustic potassa, and finally shaking with ether, the ether, upon evaporation, would leave the free base in quite a pure state.

In this second examination I failed to obtain nicotine from *Cannabis indica*, but was successful with the tobacco.

In concluding my work on this query, I would answer it by saying that nicotine is not present in *Cannabis indica* in accordance with my investigations, but there is strong evidence of an alkaloid of some kind, as the tests above referred to would indicate.

Late investigations by others point in the same direction.

QUININE PILLS.*

BY CLAY W. HOLMES.

In an attempt to answer the query "What is the best excipient (1) for uncoated quinine pills; (2) for such as are to be gelatin coated?" I can speak with the experience, both of the benighted pharmacist and the manufacturer, having made uncoated pills for stock; and also gelatin-coated pills for the market. Under the light of such experience, I regard the question of excipients as a very simple one. In the matter of quinine pills, the best excipient I have ever found for uncoated pills, after trying all which have been recommended by others, is simple syrup, U.S.P. When used alone it makes a soft plastic mass, which is easily rolled out, and hardens in a short time. The pills can be kept for any length of time without impairing the solubility. Uncoated pills of quinine after having been kept for a year in my dispensing department, have been found to show their effect on the system when taken, as quickly as quinine administered in powder. A number of test cases having been tried to prove it, I am satisfied in offering it as a conclusion. If the dispenser desires a small pill, the combination of about 5 per cent. of powdered tartaric acid with the quinine before adding the excipient will give an entirely satisfactory result without impairing the therapeutic effect of the pill. In either case the syrup should be carefully added in small quantites with a free use of the pestle. The mass works up easily, and when the operator thinks from the granular appearance of the same, that it needs just a few drops more to give it the proper consistence, if, instead of adding more, he will knead it a few minutes longer, and then take the mass in his hand, it will soften and become plastic and be ready to roll out in good shape. The pills when made will retain their form nicely. The presence of any excess of syrup gives a result which is unsatisfactory.

Section two of this query is answered by stating that the same excipient gives the best result in all cases. It has been my custom to add 60 grs. of powdered gum arabic to every ounce of quinine employed, to give a greater adhesiveness to the mass. When it is intended to coat the pills, larger masses are usually made at one operation, and the gum arabic seems to give a mass which will hold its plasticity for a longer time. Glycerin should never be used as an excipient for any pill which is to be gelatin-coated, and is not satisfactory for uncoated pills. On general principles, simple syrup can oftener be used as an excipient for pill masses than any other substance which has come under my notice, especially for pills which are to be gelatin-coated.

* A paper read at the meeting of the New York State Pharmaceutical Association. From the *Druggists' Circular*.

The Pharmaceutical Journal.

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Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

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THE BENEVOLENT FUND.

THE determination of the Council to apply the annual subscriptions as well as the other current income of the Benevolent Fund to the payment of annuities and of the grants that are made from time to time to afford temporary relief has now been acted upon sufficiently long to admit of a practical opinion being formed upon the suitability of this policy. Hitherto the result has been in every respect satisfactory, and while the number of annuitants has been gradually increased, until it is now very much larger than was thought to have been possible some years ago, there has been no difficulty experienced in meeting all the responsibilities undertaken by the administrators of the Fund. The policy of trusting to the generosity of those engaged in the trade has in fact proved so far to be no less sound than it is bold, and encouraged by the success that has attended the endeavours of the Committee to increase the number of annuitants all money available has been invested to make provision for that object. During the present year, for instance, no less than five hundred pounds has been invested, and some advance thus made towards the possibility of providing for the election of a further addition to the number of annuitants. But this year there has been some falling off in the amount of subscriptions received, which has given rise to some uneasiness and the apprehension that there might be an actual deficiency of available ready money to meet the payment of annuities falling due in January, and of grants for temporary relief upon the usual scale. That at least seems to be the idea suggested by the remarks of the Vice-President at the Council meeting, and this view of the matter was strengthened by Mr. BUTT's statement that the amount expended this year in the shape of annuities and grants has been slightly in excess of the income for the current year. Strictly speaking, this statement is correct, but it does not, as it stands, give the whole truth of the matter, for though, as a matter of fact, the amount of the payments of annuities and grants has been up to the present five pounds in excess of the receipts on account of income for the year, there are still a number of subscriptions remaining unpaid, which amount to upwards of seventy pounds. There is, moreover, still another month within which the payment of these subscriptions may be looked for, as they have continued to come in up to within the last few days. Consequently, the case is not so bad as might possibly be inferred from what was said at the Council meeting, and instead of there being any actual deficiency there might be a surplus at the end of the year if the subscriptions were all paid, and, in fact, a surplus equal to the amount required for the election of two additional annuitants.

Then, again, it appears that after the payment of the grants sanctioned at the last Council meeting, there will be a balance of about two hundred pounds in hand, and as the money invested this year will cover the amount of the donations and legacies received, that balance will be available for the payment of annuities falling due next year. In addition to that, there will be money coming in next January as income available for the same purpose, and as a considerable number of subscriptions are usually paid in January, there is every reason for believing that the receipts during that month will be equal to meeting the calls upon the Fund. Certainly the Fund is being administered in a manner that is productive of very great benefit, and although the Committee may, as Mr. ROBBINS remarked, have gone to the end of its tether in granting annuities for the payment of which it trusts to the income to the Fund in the shape of subscriptions, that fact ought to be regarded as an additional reason for more extended support from members of the trade. The inexpensive manner in which the Fund is administered is also another circumstance that should recommend it. In this respect it is probably unique, and subscribers have the satisfaction of knowing that their contributions are applied to the relief of distress, without being subjected to such serious taxation for the payment of administrative charges as is frequently the case with other charitable institutions.

An Evening Meeting of the Pharmaceutical Society will be held on Wednesday next, when Surgeon-Major Aitchison, M.D., F.R.S., late of the Afghanistan Delimitation Commission, will read a paper on "Some Plants and Plant Products from Afghanistan," and Mr. E. G. Baker will read some "Notes on a Sample of Afghanistan Galbanum collected from *Ferula Galbaniflua*." The chair will be taken at Eight o'clock precisely, but the Lecture Theatre will be opened at Seven o'clock, in order to give opportunity for the inspection of a number of articles presented to the Society's Museum, among which will be Herbaria of Singapore and Mauritius Medicinal Plants.

* * *

In the report from the Curator of the Society's Museum presented to the Council at the late meeting it will be noticed that some donations are mentioned as having been received from exhibitors at the Colonial and Indian Exhibition and officials connected with the commissions for the Cape of Good Hope and Victoria. Since the date at which

that report was drawn up a large number of other donations have been received from various sections of the Exhibition, and as the official notification of these donations will not in the ordinary course be made until the next meeting of Council, we think it is desirable to mention the fact, in order that it may not be supposed by the donors that there has been any neglect to acknowledge their contributions.

* * *

Those among our readers who have taken a lively interest in the question at issue between the Council and Scottish members of the Society, and they are no doubt many, will be glad to see in the proceedings of the Council at its last meeting the full report of what took place at the meeting held in Edinburgh on the 24th of last month and was briefly referred to in this Journal last week. It will be seen that the essential points of the conclusion then arrived at were such as we stated last week, and that the whole matter may now be regarded as satisfactorily disposed of.

* * *

By a proclamation published in the *Government Gazette* of the 8th of October, the Governor of Victoria has, on the recommendation of the Pharmacy Board of the colony, added to the list of substances that are to be deemed poisons within the meaning of the Sale and Use of Poisons Act (Victoria), 1876, carbolic acid, chloride of antimony, salts of barium, zinc chloride, creasote, elaterium, elaterin, nux vomica, nitro-glycerine (medicinal), digitalis and its preparations, and phosphorus (excepting red amorphous).

* * *

The *British Medical Journal* has entered a protest against the existing tendency to name new drugs, especially those of chemical origin, rather in accordance with their supposed therapeutical effect than with their chemical constitution, as a practice that cannot but lead to much confusion. It points out that the application to certain substances of names indicating their alleged properties as fever reducers might find a suitable corollary in the use of such designations as "pain-killers" or "diarrhœa producers." Moreover, it is suggested that the adoption of a name representative of only one property of a substance might tend to the overlooking of other valuable properties possessed by it. To these objections it may be added, that the use of trivial names is antagonistic to definiteness, and has already been known to cover the supply of more than one substance under the same designation. On the other hand, the lengthy systematic names do not always lend themselves to prescription writing, and their use would sometimes be productive of great inconvenience. It must also be admitted that in respect to chemical compounds, as a rule, sufficient information is supplied to enable the physician to prescribe them with a fair knowledge of their chemical composition.

* * *

About a year ago considerable interest was excited by an announcement that Messrs. Sutton of Reading had succeeded in producing a hybrid between three varieties of the ordinary cultivated potato, which is supposed to have been derived from *Solanum tuberosum*, and the *Solanum Maglia*, and as this latter species grows wild in moist soil along the coast of South America, it was hoped that the influence of the cross on the product would be favourable to its fitness for moist soils in this country. Under cultivation the tubers yielded by the new varieties have greatly increased in size; but it has now been discovered that the supposed *S. Maglia*, with which the cross was effected, was really only a geographical variety of *S. tuberosum*. But even this would appear to be a gain, since this is the first instance of the wild *S. tuberosum* being successfully crossed with the cultivated plant, and the tubers yielded by the hybrids have been very favourably spoken of.

* * *

According to the results of some inquiries, communicated recently in a paper to the Illinois Pharmaceutical Association, although the cultivation of the orange and other fruits of the Citrus family has grown to be a large industry in Florida and on the Pacific Coast of California, the business is at present confined to supplying fruits for the market and nothing is done in the way of preparing essential oil or preparing peel. Indeed, Professor Runyan states that the secretion of oil seems to be very deficient in the California orange.

* * *

Mr. William Saunders, pharmacist, of London, Ontario, whose acquaintance some of our readers had the pleasure of making recently whilst he was in this country in charge of the Ontario fruit exhibition at the Colonial and Indian Exhibition, has since his return to Canada been appointed Director of Experimental Farms in the Dominion.

* * *

Botanists in the country, and particularly mycologists, will regret to learn that Mr. C. E. Broome, the associate of the Rev. M. J. Berkeley on numerous publications relating to fungi, died on the 15th ult., in his seventy-fifth year. He was also associated with the late Dr. Thwaites, of Ceylon, in the investigation of the more minute algæ of the neighbourhood of Bristol.

* * *

The Chemists' Assistants' Association will not meet on Wednesday next; but a musical and social meeting will be held on Thursday, the 9th inst., at 9 o'clock in the evening. We take this opportunity of correcting a printer's error in last week's Journal by which the name of Miss Maud Martin was mutilated into Heather, and it is the more necessary to do this because the success of the musical part of the entertainment was in great measure due to the hearty assistance rendered by Miss Martin in the compilation of the programme and in securing the services of several of the professional singers who took part in the concert.

* * *

The next meeting of the Midland Counties Chemists' Association will be held on Wednesday, the 15th inst., at half-past eight in the evening, at the Grand Hotel, Birmingham, when a paper will be read by Mr. Martin Magor on "Sir John Lubbock's Regulation Act." After the discussion the meeting will be resolved into a musical and social evening, for which members are requested to make due provision.

* *

The next meeting of the School of Pharmacy Students' Association will be held on Thursday, December 9, when Mr. E. J. Millard will read a "Note on the Examination of the Fruits of Erythroxylon Coca," and a Report on Botany will be made by Mr. E. G. Baker.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, December 1, 1886.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT.

MR. THOMAS PRESTON GOSTLING, VICE-PRESIDENT.

Messrs. Allen, Atkins, Baildon, Borland, Bottle, Butt, Cross, Greenish, Hampson, Hills, Radley, Richardson, Robbins, Savage, Schacht, Southall, Symes, Williams and Woolley.

The minutes of the previous meeting were read and confirmed.

Appointment of Examiners.

The Council went into Committee to consider the names of gentlemen to occupy the post of Examiners.

On resuming, the following gentlemen were appointed:

England and Wales.

Barnes, James Benjamin, 1, Trevor Terrace, Knightsbridge, S.W.
Blunt, Thomas Porter, Wyle Cop, Shrewsbury.
Bowen, John William, 13, Curzon Street, Mayfair, W.
Corder, Octavius, 31, London Street, Norwich.
Fletcher, John, Montpellier Avenue, Cheltenham.
Gale, Samuel, 225, Oxford Street, W.
Gerrard, Alfred William, University College Hospital, W.C.
Greenish, Thomas Edward, 5, Bathurst Street, Sussex Square, W.
Linford, John Samuel, 16, Gladstone Street, Hull.
Ransom, Francis, Fairfield, Hitchin.
Symons, William Henry, 130, Fellowes Road, West Hampstead, N.W.
Tanner, Alfred Edward, High Cross, Tottenham, N.
Taylor, George Spratt, 13, Queen's Terrace, St. John's Wood, N.W.
Thresh, John Clough, The Willows, Buxton.

Scotland.

Clark, William Inglis, 104, South Canongate, Edinburgh.
Dott, David Brown, 93, Abbey Hill, Edinburgh.
Gibson, Adam, High Street, Leven, N.B.
Gilmour, William, 11, Elm Row, Edinburgh.
Kinninmont, Alexander, 69, South Portland Street, Glasgow.
Maben, Thomas, 5, Oliver Place, Hawick.
Nesbit, John, 162, High Street, Portobello, N.B.
Stephenson, John B., 48, Frederick Street, Edinburgh.

The Secretary reported that he had received a communication from the Privy Council approving the appointment of Mr. Ransom as an Examiner.

It was also resolved that the Board of Examiners in England and Wales should meet in February, April, June, July, October and December, 1887; and that the Board in Scotland should meet in January, April, July and October, 1887.

The President moved—

"That the cordial thanks of the Council are due and hereby given to each member of the Boards of Examiners in England and Wales and in Scotland for his services during the past year."

The Vice-President seconded the motion, which was carried unanimously.

Elections.

MEMBERS.

Pharmaceutical Chemist.

Lewis Walter Hawkins, of London, having passed the Major examination and tendered his subscription for the current year, was elected a "Member" of the Society.

ASSOCIATE.

Alexander William King, of Ayr, having passed the Minor examination and having previously paid as an "Apprentice or Student" his subscription for the current year, was elected an "Associate" of the Society.

Restorations to the Register.

The names of the following persons, who have severally made the required declarations and paid a fine of one guinea, were restored to the "Register of Chemists and Druggists":—

Henry Charles Darley, 7, Ditchling Terrace, Brighton.
Thomas Ramsden, 100, Cambridge Street, Pimlico, London, S.W.
Henry Thompson, 47, Harleyford Road, Kennington, London, S.E.

Reports of Committees.

FINANCE.

The report of this Committee recommending sundry accounts for payment was on the motion of the President unanimously approved.

BENEVOLENT FUND.

The report of this Committee included a recommendation of the following grants:—

£26 14*d.* 5*d.* to the widow (aged 63) of an associate and member from 1841 to 1879, to make up, with funds she has herself raised, sufficient to purchase her an annuity of £18 a year. (Devon.)

£5 to a registered chemist and druggist, female (aged 60). Applicant has had eleven previous grants, amounting to £95, is in ill-health and dependent on friends for support. (Lanark.)

£10 to a registered chemist and druggist (aged 70), who failed in business lately owing to agricultural depression. Applicant and wife are both nearly blind. (Northampton.)

£10 to the widow (aged 72) of a pharmaceutical chemist and life member and subscriber to the Fund. Applicant is in feeble health, with only one son, earning very little, and her late husband died insolvent. (Northumberland.)

£10 towards support of the Isherwood orphans.

Three cases had been deferred for further inquiries, and five cases the Committee had declined to entertain.

Robbins Fund.

The Committee recommended that £5 from this Fund be paid to Mrs. Caroline E. Davis before Christmas, her late husband having contributed the largest sum to the Fund of anyone amongst the annuitants.

Benevolent Fund Dinner.

The Committee also recommended that a public dinner in aid of the Fund be held in May next, it being ten years since this was last done.

The Vice-President, in moving the adoption of the report and recommendations, said that when these grants were paid there would be a balance of about £200 left, whilst the annuities falling due in January were about £440, so that if the casual grants in January were made on the usual scale there would be a deficiency of about £300, until next year's income begins to come in. The Committee had thought proper to invest money perhaps rather faster than it should have done; and it had been extremely generous with regard to the cases brought before it. Money, however, would be received in January, and he hoped also that further subscriptions would come in, and that a large addition would be made on the occasion of the dinner.

Mr. Butt seconded the motion.

Mr. Robbins said this report showed that the custodians of the Fund were getting almost to the end of their tether in granting annuities. In one respect the position of the Fund was satisfactory, as it appeared that the amount of subscriptions remained fairly constant,

though this year there was a decrease. Last year the subscriptions were £1529, and this year up to December they were £1445, but last year £7 or £8 was received in December, and if a similar amount came in this month it would make the total about £75 less than that of last year. The reason of being short of money was the increase in the number of the annuitants. The amount expended in casual grants had been about £600 a year for many years past; this year it had been slightly over that. Next year it was proposed to have a dinner, and possibly the donations would amount to about £1600, as they did on the last occasion, but the whole of that would have to be invested. He did not think there was any likelihood of the subscriptions being much increased unless fresh plans were devised.

Mr. ATKINS remarked that Mr. Butt had given the Committee on the previous evening some very useful figures, and he had hoped he would have repeated them to the Council. He felt sure that there were many people who would contribute if they thought money was really wanted, but who would not do so if they thought it was not necessary. He had often appealed to that class of persons, and would again support the appeal which the Vice-President had made. It would not do to wait until the dinner in May, when no doubt a good sum would be collected. He was not at all sorry that the Council had gone to the end of its tether in granting annuities, for seeing the pressing nature of the cases which came forward, it was well to use all the money which came in. If the Council were to go on giving as much casual aid as heretofore—and he believed this did an immense deal of good in enabling persons to trade over a temporary difficulty—all the aid which could be given would be required.

Mr. RICHARDSON remarked that these appeals had been made from time to time during the whole year, but the necessity for them was as great, if not greater, than ever. He was in hopes that Mr. Butt would have favoured the Council with a portion, at any rate, of the information he had given the Committee last evening. It was all very well for a Chancellor of the Exchequer to draw on the increment of next year, but that was not sound finance, and he was sorry to find it would be necessary to encroach on next year's receipts in order to pay this year's annuities. He sincerely hoped it would not put a stop to the granting of annuities to those who were brought to the verge of poverty in their closing years, for he believed that did more good than anything. He had often said that he believed the Council was too prodigal in granting casual relief; in some cases no doubt it did an immense deal of good, as for instance one now submitted, where an applicant had raised a considerable sum herself for the purchase of an annuity, and this was to be supplemented; but there were other cases in which the applicants came year after year for a grant, and he feared the only tendency was, not to tide over a temporary difficulty, but actually to pauperise, and ultimately to do more harm than good.

Mr. WILLIAMS thought there was a little mistake on the part of some of the subscribers as well as recipients of casual grants, who fancied they were really getting an annuity, and that they were entitled to apply again year after year. The letters of recommendation which were sent up constantly referred to the giving an annuity to the applicant; and therefore he thought it was as well to explain that a casual grant did not in any way imply that it would be repeated. He hoped the fear which had been mentioned, that it would not be advisable to elect further annuitants next year, would not be justified, and he trusted that when the necessity for more money was shown it would be forthcoming. One thing he might refer to which from time to time came under the notice of the Committee. Someone, either a member of the Society or a subscriber, took umbrage at something which was done by the Society, either serious or trivial, as the case might be, and thereupon wrote an angry letter, withdrawing his subscription from the Benevolent Fund. Now the slightest consideration ought to show anyone that that was not the proper way to avenge any injury, real or imaginary, which he had sustained. The Benevolent Fund was simply worked by the Society for the benefit of the charity, and at no expense. The Society only carried out executive duties, the officers and staff being all at the service of the Fund without charge. He trusted this would be borne in mind, and that anyone who had acted in the way he had described would reconsider the matter.

Mr. SAVAGE suggested that a statement of the accounts of the Fund should be printed and circulated throughout the trade through the local secretaries; he thought this would help in the collection of subscriptions.

Mr. SYMES hoped the idea would not get abroad that the Committee had given money too lavishly in casual grants. He quite appreciated the importance of annuities and hoped the number would be increased annually, but he had seen a good deal of the distress which had been relieved by casual grants, and he felt bound to support a continuance of the same system. He did not know of a case in which relief had been given to an unworthy person, and the Committee had endeavoured not to refuse help to any case which was worthy. Sometimes the grant was the means of tiding over a temporary difficulty; but even where it did not and the applicants came year after year for renewed help, if they were able to rub along with the aid of £5 or £10 from the Fund, why was not that as good work as the giving an annuity of £30? In the latter case when the annuity was once granted the Council had not much control over the annuitant, but in the case of casual grants the circumstances were carefully inquired into afresh on each application.

Mr. HAMPSON said he was not at present on the Benevolent Fund Committee, but from past experience he was quite sure that the Fund had been rightly administered. It was impossible to always avoid mistakes, and perhaps one or two solitary cases in a dozen years might have been helped unwisely; but he could assert boldly that the Fund was well administered and that it deserved help from those able to give it. There must surely be many persons connected with the trade who had been prosperous who had not given as freely as they might to this Fund and he appealed to them to increase their subscriptions at this juncture, for if the Treasurer's statement were correct the Fund certainly needed help.

Mr. BUTT said the points which he had brought before the Committee, which had been alluded to by one or two gentlemen, were hardly of a nature for the Council to go into; they were purely matters for the consideration of the Committee. He merely wished to remark now that this was the first year in which the amount expended in annuities and casual relief had exceeded the income for the current year. Up to the present time there had always been a small surplus, but this year the income had been slightly exceeded. He hoped it would be possible to continue the election of annuitants in future, even if the number could not be increased progressively. In the last seven years forty annuitants had been elected, including the six about to be elected. The annuitants received £948 in the year 1879, and this year the amount was £1575; the number having increased by twenty. There would always be a certain number of vacancies to fill up through deaths, and he hoped it would also be possible to increase the number of annuitants, through increased subscriptions, or at any rate that it might be possible to elect three or four annuitants if not six every year.

Mr. ROBBINS remarked that one statement had been made which he desired to correct. In the first place the annuitants were all paid for the present year, so that the payments for this year would not come on the income of next year. All legacies and donations must be funded, but during the last year the amount received from legacies had been very small. No doubt there would be a large addition made to the Fund at the

dinner, but that must be funded. The working balance was still just on the right side, but unless a large addition were made to the receipts the limit of granting annuities was about reached.

The PRESIDENT remarked it was very usual to carry forward a balance from one year to the next, and that was sometimes looked upon as part of the income of the current year, whilst another person looking at the matter more strictly would very properly not include that balance in the year's income. The broad fact remained that in consequence of the bold policy of the Council there was now a much larger number of annuitants than was thought of twenty-five years ago, and it was possible also to relieve a larger number of cases calling for casual relief. The Committee had dealt with all these cases in a liberal spirit, trusting to the generosity of all those engaged in the trade to assist. Substantially the annuitants were now being paid to a great extent out of annual income. In most institutions the principle laid down was that an annuity should not be granted unless there was a capital sum invested to yield the necessary amount in interest; but the Council had adopted a somewhat bolder policy, trusting to obtain the necessary means from the members of the Society and the trade. He believed this was a good policy, and so long as it was continued, and the Fund administered in a catholic spirit, he believed it would be adequately supported.

The motion was then put and carried unanimously.

A committee, consisting of the President, Vice-President, Treasurer, and Messrs. Allen, Butt, Hills and Williams, was appointed to make arrangements for the dinner in aid of the Benevolent Fund in May next.

LIBRARY, MUSEUM, LABORATORY AND HOUSE COMMITTEE.

Library.

The report of the Librarian had been received, including the following particulars :—

Attendance.		Total.	Highest	Lowest.	Average.
October	Day . .	384	23	3	15
	Evening .	157	18	3	7

Circulation of books.	Town.	Country.	Total.	Carriage paid.
October . .	140	150	290	£1 16 6

The undermentioned donations to the Library had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors :—

For the Library in London—

Attfield (J.), Water and Water Supplies, 3rd ed., 1884. From the AUTHOR.

United States, Surgeon-General's Office, Index Catalogue of Library, vol. 7, 1886. From the SURGEON-GENERAL.

Plugge (P. C.), Die wichtigsten Heilmittel in ihrer wechselnden chemischen Zusammensetzung und pharmakodynamischen Wirkung, 1886. From Professor E. SCHÄR (Translator).

West Kent Natural History, Microscopical and Photographic Society, President's Address, Papers and Reports, etc., 1886. From the SOCIETY.

For the Library in Edinburgh—

Technological Museum, New South Wales, Annual Report, 1885. From the COMMITTEE OF MANAGEMENT.

Salmon (W.), Botanologia, the English Herbal, 1710. From Miss WILSON, per Mr. J. F. BROWN, of Dover.

The Committee recommended the purchase of the undermentioned works :—

For the Library in London—

Flückiger and Hanbury, Pharmacographia, 2nd ed., 1879. *A third copy.*

Beale (L. S.), How to Work with the Microscope, 5th ed., 1881. *A second copy.*

Sutton (F.), Volumetric Analysis, 5th ed., 1886.

Gresswell (G., C. and A.), Veterinary Pharmacopœia, Materia Medica and Therapeutics, 1886.

Everett (J. D.), Units and Physical Constants, 2nd ed., 1886.

Urbanitzky (A. R. v.), Electricity in the Service of Man, 1886.

Fothergill (J. M.), Manual of Dietetics, 1887.

Lanessan (J. L. de), Les Plantes Utiles des Colonies Françaises, 1886.

For the Library in Edinburgh—

Brunton (T. L.), Pharmacology, 2nd ed., 1885.

Martindale and Westcott, Extra Pharmacopœia, 4th ed., 1885.

Museum.

The Curator's report had been received, and ncluded the following particulars :—

Attendance during October.	Total.	Highest.	Lowest.	Average.
Morning .	412	29	6	15
Evening .	138	16	2	6

The following donations had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors :—

A series of native medicinal drugs of the Cape of Good Hope. From Mr. SYDNEY COWPER, Commissioner for the Cape of Good Hope.

A series of Eucalyptus products, including the oils of *E. amygdalina*, *E. globulus*, *E. oleosa* and *E. dumosa*; pure eucalyptol, soluble and insoluble kino from *Eucalyptus rostrata*; Australian catechu from *Acacia mollissima*; Australian sandarac bark; essential oil of bark and atherospermine obtained from *Atherosperma moschatum*; essence of wattle blossoms prepared by enfleurage from the flowers of *Acacia pycnantha*; opium and poppy heads grown in Victoria, and boronia flowers. From Mr. J. BOSISTO, President of the Commission of the Victoria Court.

A series of specimens from Fiji, including nutmegs and mace, kava root, ndilo seeds and oil, castor oil seeds, ivory nuts, red cinchona bark, sandal-wood, cinnamon, ginger, gigia nuts, candle nuts and candle nut oil, croton oil seeds.

Specimens of the resin of *Doona zeylanica*, gutta-percha from *Alstonia scholaris* and the bark of *Nauclea coadunata* and of *Randia uliginosa*. From Dr. W. C. ONDAATJE, Ceylon.

The very complete and valuable collection of about five hundred Chinese drugs exhibited in the Hong Kong Court. From Dr. HO KAI.

Specimens of *Lichtensteinia interrupta*, and of the root of *Sansieviera thyrsiflora* from the Cape of Good Hope. From Messrs. ALLEN and HANBURY.

A series of specimens of the varieties of gum arabic of commerce. From Messrs. HALE and SON.

The Curator reported that the Ceylon drug collection, consisting of more than three hundred specimens, was for sale and the Committee authorized an offer of £10 to be made for it.

The following donations had been reported by Mr. J. Rutherford Hill, the Assistant Secretary :—

Capitula of *Pyrethrum roseum* and *P. cinerariæfolium*, and insect powder prepared from the former. From Mr. D. N. WYLIE, Edinburgh.

Wood oil derived from *Dipterocarpus alatus* and *D. turbinatus* in the Andaman and Nicobar Islands. From Mr. W. C. BAKER, Edinburgh.

Two perfect octahedra of potash alum. From Messrs. PETER SPENCE and SONS.

The Professors had attended and reported on their respective classes.

Register and Calendar, 1887.

The Committee recommended that Messrs. Butler and Tanner's estimate for printing the Register and Calendar for 1887 be accepted, and that 900 copies of the Calendar and 1600 of the Register be printed.

Local Secretaries and Superintendents of Written Examinations.

The Committee had again carefully considered the system of appointing Local Secretaries and Superintendents of Written Examinations and had arrived at the conclusion that it was not desirable to make any change, either in the mode of appointment of Local Secretaries or in the centres at which written examinations are conducted.

At a second meeting certain slight repairs to the house were recommended to be done immediately.

The application from Aberdeen for a grant for educational purposes had been considered and adjourned in order that further information might be obtained.

The PRESIDENT, in moving the adoption of the report, said the Committee had devoted a considerable time to the question of the Local Secretaries, but was of opinion that it was not possible to improve upon the present mode of election. The Committee was quite sensible of the great services rendered by many Local Secretaries, and the intention of the Council in referring this matter to the Committee was to see if it were possible to stimulate them all to be as active as some amongst them now were. The arrangements were now left in the hands of the members and associates in business resident in the different localities; and they practically elected the Local Secretaries, though it was technically a nomination for the guidance of the Council. He hoped that in time those who took less interest than some of their more active colleagues, would be stirred up to emulate their fellows. It was an old saying that those who had most work of their own to do often did most voluntary work; and it did happen that some of the most zealous officers were those in large towns who had a great deal of other work to do.

Mr. SAVAGE suggested that more interest would be taken in the election of Local Secretaries if the nomination were made on the same paper as the election of Council, instead of being on a separate slip.

Mr. WILLIAMS said the voting paper for the Council was settled by Act of Parliament, while that with regard to the Local Secretaries was not. Again, there were no Local Secretaries for London, so that one general rule would not apply. He believed Londoners would subscribe much more liberally to the Benevolent Fund if greater pains were taken to look them up.

The PRESIDENT said the voting paper for Local Secretaries might perhaps be attached to the Council voting papers, but they must be separated. However, the Committee could consider the suggestion and perhaps some better mode might be devised.

Mr. BUTT remarked that with four or five thousand voting papers it would be practically impossible for the scrutineers to pick out the few members in one town who voted for the Local Secretary.

The motion was then put and carried unanimously.

BUILDING.

This Committee recommended that the plans of the Pied Bull Yard premises now submitted be approved, but that the Committee be authorized to make such modifications therein as might be necessary to comply with the requirements of the Duke of Bedford or adjacent occupiers, and to settle any question which might arise with regard to party walls, access of light, etc., and to invite tenders.

The Council went into committee to consider the plans, which were explained by the President. After a long discussion, in the course of which various suggestions were thrown out by different members,

The Council resumed, and on the motion of the PRESIDENT the report and recommendations of the Committee were received and adopted.

GENERAL PURPOSES.

This report included the usual letter from the Solicitor, narrating the progress of cases placed in his hands.

Richard Knowles, Market Place, Ashton-under-Lyne, had paid £10 19*s.* into court for two penalties and costs.

Alfred Stokes, Drug Stores, Malvern,
had paid £10 5*s.* for two penalties and nominal costs.

The case against Mrs. Judd, Leamington, was tried on November 18, and resulted in judgment for defendant. A notice of appeal had been given, but the Committee recommended that it should not be proceeded with.

Several cases of alleged infringement of the Pharmacy Act had been considered by the Committee.

It was recommended, in response to a resolution forwarded by the Board of Examiners in Scotland, that in future the report of the College of Preceptors on the Preliminary examination should be sent to the Assistant Secretary in Scotland for the information of the Examiners in Scotland after having been submitted to the Board in London.

Meeting in Scotland.

The following report of a meeting of members and associates of the Society, held in the Society's house in Edinburgh on November 24, in reference to the Society's affairs in Scotland, had been received from Mr. Watt, the convener of the deputation that attended the Council in July last:—

"A meeting of Members and Associates in Business of the Society, resident in Scotland, was held in the Society's House, 36, York Place, Edinburgh, on Wednesday, November 24, at 2 p.m.

"The chair was taken by Mr. Watt, Haddington.

"Apologies for absence were received from Messrs. Adamson, Aberdeen; Allan, Dumfries; Fisher, Dunfermline; Frazer, Glasgow; Freeland, Bathgate; Kermath, St. Andrew's; Lawrence, Oban; Maben, Hawick; G. D. Mackay, Edinburgh; Paterson, Aberdeen; Robertson, Elgin; and Strachan Aberdeen. Mr. Baildon stated that he had received a letter from Mr. Borland, Kilmarnock, expressing regret at his unavoidable absence.

"The minutes of last meeting were read and approved.

"The Chairman then explained the circumstances connected with the calling of the meeting and called upon Mr. Storrar, Kirkcaldy, to read the report of the deputation appointed at the meeting held on June 22. The report narrated the steps taken by the deputation since the date of their appointment and the result of their conference with the Council, which have been already published. It concluded as follows: 'It will be seen from this that all that was asked by your deputation has been granted by the Council with the exception of two points, viz:—(1) They decline to allow of the titles President and Vice-President being held by the officers of the new Executive and decree that the titles used shall be Chairman and Vice-Chairman, and (2) they apparently decline to continue to us the nomination of the Secretary for Scotland.

"'It will be noticed, however, that the Council give us a little more than we ask in one particular; they propose to give the election instead of simply the nomination of the new North British Executive.

"'Your deputation cannot conclude this report without expressing their sense of the kindness and courtesy with which they were received by the Council of the Society.'

"Mr. Baildon then made a statement with regard to the consideration of the Scotch question by the Council and the decision agreed upon at the last meeting. Thereafter Mr. Nesbit, Portobello, moved and Mr. Gilmour seconded the following resolution, which was unanimously adopted, viz.:—

"'That the report of the deputation appointed at last meeting be approved.'

"A very full discussion then took place on the plan decided upon at the meeting of Council, held on November 3. Ultimately it was moved by Mr. Nesbit, seconded by Mr. Gilmour, and unanimously resolved—

"'That this meeting agree generally with the resolutions come to by the Council of the Society as to

the future management of the Society's affairs in Scotland, and thank the Council for the time and consideration they have devoted to the subject.'

"It was further moved by Mr. Mackenzie, seconded by Mr. Henry, and unanimously resolved—

"'That this meeting express their regret that the Council did not see their way to continue the use of the titles President and Vice-President, and would suggest that clauses 4, 5 and 6 of the Council's resolutions be altered as follows, viz.:—Clause 4, after 'Vice-Chairman,' add 'and Treasurer;' clause 5, for 'Chairman' substitute 'Treasurer;' clause 6, after 'Scotland' add 'and any paid officials connected with the Branch.'"

"Mr. Maclaren moved, and Mr. Baildon seconded, the following motion, which was unanimously adopted:—

"'That the deputation be discharged, and that they be cordially thanked for the diligence and success with which they had carried out the wishes of Scottish pharmacists.'

"The following gentlemen were then appointed a local committee to carry out the decision arrived at by the meeting:—Messrs. Dott, Gilmour, Henry and Mackenzie, Edinburgh; and Mr. Nesbit, Portobello; with Mr. Baildon *ex-officio*, Mr. Mackenzie to be convener.

"On the motion of Mr. Mackenzie, seconded by Mr. Henry, it was unanimously resolved—

"'That the following pharmaceutical chemists be nominated for appointment as Examiners for Scotland for the year 1887:—William Inglis Clark, Edinburgh; David Brown Dott, Edinburgh; Adam Gibson, Leven; William Gilmour, Edinburgh; Alexander Kinninmont, Glasgow; Thomas Maben, Hawick; John Nesbit, Portobello; John Bertram Stephenson, Edinburgh.'

"The meeting then closed with a vote of thanks to the Chairman, and requested him to forward a copy of the foregoing resolutions to the Council of the Society.

"(Signed) JAMES WATT,
"*Chairman.*"

The Committee had fully considered the report, but did not recommend any alteration in the scheme agreed upon at the last meeting of the Council.

The report of this Committee was, as usual, considered in committee.

After some discussion the Council resumed, and the report and recommendations of the Committee were adopted on the motion of the PRESIDENT, who expressed the hope that the friends in the north would agree with him that it was not desirable to enter into any further arguments on the question of the Scotch business.

A letter from the editor of the *Chemist and Druggist*, asking for certain information to be supplied him, was referred to the General Purposes Committee.

Proceedings of Societies in London.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting was held on Thursday, November 25, Mr. W. F. Southall, Vice-President, in the chair.

The Reporter on Organic Chemistry, Mr. W. H. Ince, read the following note:—

A NEW METHOD OF APPLYING THE FERRIC CHLORIDE TEST TO ORGANIC SUBSTANCES.

BY WALTER H. INCE.

In a course of laboratory work extending over a period of several years, I have frequently noticed the uncertain way in which ordinary ferric chloride acts as a reagent; nine out of ten samples of this reagent are always acid, due either to the age of the sample or to the imperfect method of originally making it.

The method of applying this test, which I wish to bring forward to your notice this evening, depends on the change of a ferrous salt to a ferric salt by the addition of bromine. The substance to be analysed is placed in a test tube, and a perfectly neutral solution of ferrous chloride added, then bromine vapour is carefully poured in, and the characteristic action of the substance analysed is obtained.

The ferrous salt should be slightly in excess at the end of the operation, as excess of bromine often leads to further decomposition.

For the neutral ferrous chloride I tried many methods: by dissolving iron wire in ammonium chloride, decomposing ammonium chloride by a copper-iron couple (made by precipitating copper from a 4 per cent. cupric sulphate solution on to bright iron wire), dissolving iron wire in diluted hydrochloric acid, by precipitating copper from cuprous and cupric chloride by iron wire, by passing ammonia gas through boiling ferrous chloride.

Of these the decomposition product of ammonium chloride with the iron-copper couple was very active, but soon formed a film of ferric oxide over its surface; the product of dissolving iron wire in hydrochloric acid always remained slightly acid, and when ammonia gas was passed through it at a boiling temperature the oxide film was formed.

Eventually a modification of the cupric chloride and iron wire was adopted. I now make the solution in the following way:—A strong solution of cupric chloride (obtained by dissolving cupric oxide in hydrochloric acid, and driving off the excess of acid) is brought to the boiling point in a flask, to drive off any oxygen in the water, and allowed to cool, the air being excluded by means of a tight-fitting cork. When the temperature has fallen to about 70° C. the flask is uncorked and bright iron wire or steel filings introduced, the copper in solution being immediately precipitated with the formation of perfectly neutral ferrous chloride — $Fe_2 + 2\,CuCl_2 = Fe_2Cl_4 + Cu_2$. As soon as the reaction is complete, that is to say, in about five minutes, the solution is filtered into a well-stoppered glass bottle and about 10 per cent. ammonium chloride added.

The solution must be filtered from the iron and precipitated copper as soon as the reaction is finished, since if left in contact with the couple decomposition takes place. It will be seen that provided cupric chloride be at hand, which is a stable salt, and will keep indefinitely, a solution of neutral ferric chloride may always be readily obtained.

The addition of the ammonium chloride tends to make the solution more stable, but it is best to make it as wanted.

The following is a short table showing a few reactions, the value of the reagent being that both the ferrous and ferric reactions can be shown on the same portion of the substance to be analysed.

Substance to be analysed.	No. 1 reaction with ferrous chloride.	No. 2. Addition of bromine.	Excess of bromine.
Trihydroxybenzoic acid (gallic acid) . .	Faint blue.	Indigo.	Bleached.
Gallo-tannic acid (tannic acid)	Colourless or faint blue-violet.	Blue-black.	Green to red.
Trihydroxybenzene (pyrogallol)	Faint blue.	Ruby.	Ruby.
Benzoic acid (ammonium salt)	Colourless.	Reddish ppt.	No change.
Hydroxybenzoic acid (am salt of salicylic)	Rose.	Violet.	Brown-red
Cinnamic acid . . .	Colourless.	Yel.-orange ppt.	No change.
Acetic acid (Na salt) .	Colourless.	Ruby.	No change.
Morphine	Colourless.	Dirty-blue.	Yel.-white ppt.
Phenol*	Colourless.	Wht. ppt.	No change.

* For testing phenol the bromine vapour should be added to the ferrous chloride before the addition of the phenol, as free bromine attacks the phenol (yielding bromo-derivatives) rather than the ferrous chloride.

A discussion followed, in which the Chairman, Secretary, Messrs. Eastes and Farr took part.

A general discussion of the Pharmacopœia was next opened by Mr. E. G. Baker, who read some notes on the subject, prepared by the Chairman and himself, which related chiefly to the general effect of the changes introduced into the new edition. The debate was continued, from both a general and an educational point of view, by Messrs. Huskisson, Short, Eastes, White, Farr, Petter, Thomas, Beach, Birkett and Smith.

At the conclusion of this discussion the Secretary announced that the Executive Committee had appointed the following gentlemen as a Committee of Reporters on Science :—Pharmacology, Mr. R. A. Cripps ; Practical Pharmacy, Mr. F. C. J. Bird ; Botany, Mr. E. G. Baker ; Materia Medica, Mr. E. H. Farr ; Physics, Mr. F. J. Yeatman ; Organic Chemistry, Mr. W. H. Ince ; Inorganic Chemistry, Mr. L. W. Hawkins ; Analytical Chemistry, Mr. J. G. Tingle.

The meeting then adjourned.

Provincial Transactions.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The third meeting of the ninth session was held in the House of the Pharmaceutical Society, 36, York Place, on the evening of Wednesday, November 24, at 8 o'clock, Mr. Wm. Duncan, President, in the chair. There was a full attendance of members.

The minutes of the last meeting having been read and approved, the Chairman called upon Mr. A. R. Robbie to read a paper on—

Apprentices.

Mr. Robbie began by referring to the great importance of youth or the formative period of life and compared it to the dawn of the opening day or the advent of spring in the revolving year. He pointed out that in Scotland an apprenticeship generally lasted for a period of four years. Indentures were almost unknown and the apprentice generally received a salary ranging from £5 for the first year to £25 for the last.

With regard to the relationship between master and apprentice it was much to be deplored that in too many cases the former assumed a position of unsympathetic superiority, while the latter was kept in slavish fear. There was no mutual confidence and esteem and thus the apprentice was left too much to himself ; the master apparently trying to get as much out of the apprentice as possible at the minimum cost. The result was that at the end of his period of apprenticeship the assistant was turned out in far from a fit condition, so far as a useful knowledge of his profession was concerned. It was this, he thought, that accounted for the large numbers of unqualified assistants to be met with at the present day, and for this reason he condemned the present system of apprenticeship. The masters appeared to consider that they had discharged their whole duty to their apprentices when they paid them the meagre remuneration which they received for their services and gave them an opportunity of picking up what information they could by their own unaided efforts.

He did not wish to blame the masters more than they deserved, and he was glad to say there were many who took a real interest in the progress of their apprentices and thereby won their lasting respect and esteem. And on the other hand apprentices were not all alike. He placed them in three classes ; the lazy, the indifferent, and the studious. He thought it was a waste of time for a master to try to make anything of the first class, and the best thing to be done with them was to send them about their business. The third class were deserving of all honour, and to them we must look to stir up the second class from their lethargy and bring about the progress of the whole body.

With a view to remedy the evils which they all regretted he would propose a radical change in the conditions of apprenticeship. He thought that the payment of apprentices should be discontinued, and that instead thereof, masters should allow time for attending classes and pay the expenses. During the first year the apprentice should attend a class on chemistry ; in the second year a a class on botany, in the third year a class on materia medica, and in the fourth year a final class specially directed to general preparation for the Minor examination. There should be in every pharmacy a completely fitted small laboratory, where the apprentice should be allowed to work at practical chemistry, and also a cabinet of materia medica specimens. In addition to these the master should regularly question the apprentice to ascertain his progress, and generally assist and direct him in his course of study. Of course it must be understood that the Preliminary examination should be passed before beginning the period of apprenticeship. By this means he believed masters would get over the erroneous idea that they had discharged their whole duty to the apprentice when they paid him a sum of money. The apprentice would also feel that his master took an interest in his progress and would endeavour to make a return by performing all his duties to the best of his ability. He strongly recommended apprentices to pay heed to the advice given by Mr. Gilmour, at the opening of the session, to cultivate diligently the habit of accurate observation. He also thought that, whenever possible, all chemists' apprentices should avail themselves of the opportunities for studying science afforded by the local classes connected with South Kensington. In this connection he urged them all to study the able address of Mr. Ogilvie at the recent opening of the Heriot-Watt College.

On the motion of the Chairman a cordial vote of thanks was awarded to Mr. Robbie, and on account of the large amount of business on the billet, it was decided to adjourn the discussion till next meeting.

The Chairman then called upon Mr. Thomas Stephenson to describe the Association Herbarium, which was again on view.

On the motion of the Chairman, seconded by Mr. Macdonald, a hearty vote of thanks was awarded to Mr. Stephenson for the time and trouble which he had devoted to the subject.

Mr. Hill intimated that since last meeting he had received from Mr. J. Sharp specimens of *Solanum Dulcamara* in fruit, *Vaccinium Vitis-Idœa*, *Lycopodium clavatum* bearing spores, and *Hierochloe borealis*, for the Herbarium. The latter was interesting from its rarity, and also from its having been actually collected by Robert Dick, the Thurso botanist.

The thanks of the Association were heartily awarded to Mr. Sharp, and also to Mr. G. D. Bowie for his donation of plants from the north of Scotland.

A discussion then took place on Sir John Lubbock's Shop Hours Regulation Bill. Mr. C. F. Henry, seconded by Mr C. A. Macpherson, moved that the Association petition in favour of the bill.

Mr. G. Coull, seconded by Mr. E. Bowman, moved as an amendment that the Association do not petition in favour of the bill. Those who opposed the petition stated that they were not opposed to the bill, but they considered it undesirable that the Association should discuss such matters, as they were apart from the objects of the Association.

After an animated debate, taken part in by Messrs. Baker, Duncan, Govan, Hendry, Hill, Jack, Macdonald, MacInroy, Stephenson, Taylor and Turnbull, Mr. Henry's motion was carried by a considerable majority.

The Chairman intimated that the next meeting would be held on Wednesday, Dec. 8, when Mr. T. Stephenson would communicate a note on "Tincture Ferri Acetatis, B.P." The meeting was then closed.

MANCHESTER PHARMACY STUDENTS' ASSOCIATION.

The second meeting of the session was held in the Pharmaceutical Laboratory, Owens College, on Thursday evening, November 25, Mr. William Elborne, President, in the chair.

The minutes of the previous meeting having been read and confirmed, the President called upon Mr. A. W. Duncan, F.C.S. (the Reporter on Chemistry), to read some "Remarks and Criticisms on the Tests of the British Pharmacopœia." The object of the paper was to point out the objections that exist to the use in the official work of indefinite indications, as "about," "nearly," and "not much more than," which were illustrated by such cases as the tests for phosphate of calcium, iodide of potassium, bromide of potassium, etc.

A discussion followed, in which Messrs. W. Elborne, W. Lane, W. Gibbons and H. Wilson took part.

Mr. Walter Gibbons next read a paper on "Milk," in which he referred to the difficulty that attended the application of arbitrary standards to its examination, and the practical failure that occasionally attended attempts to pronounce upon the quality of milk by their aid.

At the conclusion of the paper comments were made by Messrs. W. Elborne, A. W. Duncan, H. Wilson and W. Lane.

Reviews.

ANALYTICAL CHEMISTRY; A Series of Laboratory Exercises, Constituting an Elementary Course of Qualitative Chemical Analysis. By W. DITTMAR, F.R.S., F.R.S.E., Professor of Chemistry in Anderson's College, Glasgow. (New Edition.)*

This excellent little work is divided into the following sections:—

(1). Exercises in ultimate analysis by dry-way tests.
(2). Properties and reactions of the individual metals.
(3). Instruction for the analysis of alloys.
(4). The non-metallic elements.
(5). Instructions for the detection of the more commonly occurring non-metallic acids.
(6). General scheme for the analysis of solids.
(7). Organic acids.
(8). Alkaloids.
(9). Sugars and starch.
(10). Urine.

The dry-way tests are very fully and accurately explained, even the manipulation being in general so described that a beginner may perform the various operations without some one standing by to tell him what to do. The dry-way method is much neglected by pharmaceutical students, who would often save themselves trouble by a knowledge of these tests. Ignorance of Bunsen's flame-tests is not confined to students in pharmacy, but is frequently met with in other classes of chemists. All such will find the paragraphs on Bunsen's tests of real value. They are by Dr. Gibson, of Edinburgh University, who has made the subject a special study.

The properties of the acids and principal reagents are taught by means of a series of exercises, which are very informatory and instructive. For instance, under "Nitric Acid" there is not merely an account of the reactions of nitrates, but the properties of the acid as such and as an oxidizer are fully explained. Similarly, the reducing action of sulphuretted hydrogen is clearly explained, as well as its use in forming insoluble sulphides. Indeed, the chapter on "Sulphuretted Hydrogen" is particularly well done. Beginners who have mastered it will not be apt to expect a precipitate in a strong nitric acid solution, or to involve themselves in some of the other pleasing delusions occasionally indulged in.

The section "Properties and Reactions of the individual Metals" is very complete and accurate, being manifestly the work of one who is thoroughly conversant with the subject. The pages on the non-metallic elements are interesting, but (in part at least) are not of such obvious use to students beginning analysis. Under the heading of "Organic Acids," methods are given for detecting acetic, formic, tartaric, citric, succinic, and benzoic acids. These methods are satisfactory so far as they go, though possibly they partake too much of the character of exercises. The Appendix, treating of the alkaloids, etc., is necessarily a little meagre, yet it contains all that is essential.

The book is furnished with several excellent tables, but is not well adapted for "cram." It will not entirely recommend itself to those who wish to discover the most expeditious and easily remembered method of "putting a substance through the chart." To those students, however, who really desire some knowledge of chemical analysis, we can heartily recommend Professor Dittmarr's little book.

* London and Edinburgh: W. and R. Chambers. 1886. 16mo. Pp. 1–158.

CHEMISTRY OF THE CARBON COMPOUNDS; or Organic Chemistry. By Professor V. VON RICHTER, University of Breslau. Authorized Translation by EDGAR F. SMITH, Professor of Chemistry, Wittenberg College, Springfield, Ohio.*

Professor von Richter is the author of works on both inorganic and organic chemistry which are well known in Germany and Russia and bear a high reputation; the present volume is translated from the fourth German edition. Considering the size of the book (about 700 pages) the amount of information contained in it is extremely great, scarcely any known compound escaping notice, while the typical ones of each class, and all the more important, have concise details given as to their mode of preparation, properties, and decompositions. As in other recent works on organic chemistry, the plan is adopted of putting the general laws and principles, with the descriptions of the more important and better-known bodies, in a larger type, while details of preparation, descriptions of homologues of lesser importance, etc., are interspersed in smaller print.

There is the usual introductory portion treating of the ultimate analysis, determination of molecular formulæ, and physical properties of organic substances. It also contains an interesting historical sketch of the early theories leading up to our present views on the subject. Of the remainder or "special portion" rather more than half is devoted to the fatty compounds and the rest to the aromatic. These compounds are divided into homologous groups of hydrocarbons, alcohols, acids, etc., the more important members in each case being treated of in detail, while their homologues of less importance receive briefer notices. The hydrocarbons of the fatty series first receive attention, the paraffins, olefines, acetylenes, etc., all being fully described before any derivatives of either series are noticed. This portion contains a good deal of useful information respecting the natural petroleums from various sources and the differences in their composition. Petroleum is frequently spoken of as if all the natural oils consisted of paraffins, like the American kind; but attention is here directed to the fact that the Caucasian petroleum, now produced so extensively, consists mainly of hydrocarbons of a very different kind. Passing on to the haloid derivatives, we find first the general methods of preparation and then a brief description of each individual; the statement that chloroform is now chiefly prepared from chloral, strikes one as rather remarkable, although some German chloroform is made in that way. A little further on we find evidence of recent investigations in the notices of the nitrolic acids and pseudo-nitrols, ethyl and methyl hydrazines, etc. The knotty subject of the constitution of

* London: H. Kimpton. 1886. Crown 8vo. Pp. i.–xvi., 1–710.

fulminic acid is not discussed; the unsatisfactory formula of nitro-acetonitrile is assigned to it, and no reference is made to the more recent theories of Divers or Armstrong.

The section relating to the carbohydrates, sugars, starch, etc., is open to improvement, and some confusion is created here by using the same term, saccharic acid, for two distinct substances (pages 375 and 379). The latter relates to the body usually known as saccharic acid, and produced by the moderate oxidation of sugars; while in the former case the name is used to designate the combinations of sugar with lime, baryta, etc., usually termed sucrates.

The aromatic compounds receive careful notice, more especially those connected with the coal-tar dyes; about these latter more information will be found than is usually contained in any but technical works. The various other compounds which have been discovered in more recent years are also included; trimethylene and tetramethylene compounds, thiophene, etc., among others. Thiophene, furfuran, and pyrrol, with trimethylene and tetramethylene, forming a transition from the open chain to the closed benzene ring, are placed in an intermediate position between the fatty and aromatic groups. The alkaloids, glucosides, etc., whose composition is only partially known are briefly noticed at the end.

One feature of the book which immediately attracts attention is the use of the term ester to signify any ethereal salt, the name ether being restricted to the oxides of alcohol radicles only. It is a question, however, whether there is any advantage in this, the word ether being so firmly established in its more general sense.

We notice that whenever molecular transpositions or abnormal reactions occur, an explanation is given of the probable reasons which would account for it, as for example in the case of the conversion of normal into iso-propyl bromide; these explanations of apparent anomalies are of great use to the student.

The work seems unusually free from the clerical errors which are so numerous in many works on organic chemistry, and which are so apt to creep into the formulæ more especially. It is true there are a few here and there uncorrected, and the short list of errata is itself incorrect in two places, but as a whole the book bears evidence of very careful revision, taking into consideration the difficulties of the task. It is calculated to be very useful either as a text-book or as a work of reference, in which latter capacity it compresses a very large amount of information into a comparatively small space.

Obituary.

Notice has been received of the death of the following:

On the 11th of November, Mr. James Macfarlane, Chemist and Druggist, Glasgow. Aged 33 years.

On the 17th of November, Mr. John Davies White, Chemist and Druggist, Carmarthen. Mr. White had been a Member of the Pharmaceutical Society since 1869.

On the 20th of November, Mr. George Septimus Phillips, Chemist and Druggist, Coventry. Aged 56.

On the 20th of November, Mr. James Lang Galbreath, Chemist and Druggist, Paisley. Aged 40 years.

BOOKS RECEIVED.

SANITARY EXAMINATIONS OF WATER, AIR AND FOOD: a Vade-Mecum for the Medical Officer of Health. By CORNELIUS B. FOX, M.D., F.R.C.P., etc. Second Edition. London: J. and A. Churchill, 1886. From the Publishers.

A SYSTEMATIC HANDBOOK OF VOLUMETRIC ANALYSIS. By FRANCIS SUTTON, F.C.S., F.I.C. Fifth Edition. London: J. and A. Churchill, 1886. From the Publishers.

NOUVEAUX ELÉMENTS DE MATIÈRE MÉDICALE. Par D. CAUVET. Vol. I. Paris: J. H. Baillière et fils. 1886. From the Publishers.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

EDUCATION AND EXAMINATION.

Sir,—I shall be glad if you will allow me to correct an error made by your correspondent Mr. Ward, in his letter on the above subject, in which I am made to have said that a scientific and technical training under certain regulations was superfluous. I did not say so, neither is that my opinion; on the contrary, I think it absolutely necessary. But I contend that the man who passes the examinations necessary for him to become a chemist must have had some scientific training, and which in my opinion is sufficient for the protection of the public. Mr. Ward seems to think that I attach too much importance to the pecuniary aspect of the question. I should like to ask Mr. Ward what in his opinion is the reason that the majority of the men pass the examinations; for, in mine it is certainly not for the knowledge to be derived by so doing. If that were the case, the Pharmaceutical Council would not so frequently have to regret that so few after having passed the Minor stopped there, and did not go on for the Major. No, it is in order that by so doing they may be enabled to go into business, and by that business to earn their living.

From Mr. Ward's letter I should say that he is like the majority of the Pharmaceutical Council, independent of pharmacy (for which, by-the-bye, the chemists have themselves to blame, for out of 3603 voting papers sent out for the election of the Council in May last no less than 2050 took so little interest in the doings of the Society as not to think it worth the trouble to fill in and return the voting papers, which is much to be regretted), although probably engaged in it for his livelihood, or he would not think that part of the question of so little importance as his letter implies.

London, W. C. E. PALMER.

WHAT IS LAUDANUM?

Sir,—It is undoubtedly very interesting to know the origin of the term "laudanum," nevertheless, I consider the answer given by "Cantiana" (notwithstanding the fact that it contains nothing new or startling) a more suitable one to the query, "What is Laudanum?" than that given by Mr. Abbott. No doubt Mr. Abbott's letter is the more interesting and instructive of the two, and had the question been, "What is the derivation of the term Laudanum?" would have then been more to the point.

I presume that every chemist and druggist is aware that laudanum and tincture of opium have not always been synonymous terms, but so far as I have been able to discover, the word "Laudanum" has always been used in this country to signify a preparation of opium, and for a very long period it has been applied exclusively to the tincture, so that whatever laudanum may have been at one time, there is every reason to assume that it is now tincture of opium, and nothing else.

Glasgow. MINOR.

A Lancashire Chemist.—We have attempted to communicate with you at the address given, but our letter has been delivered to another person of the same name and address. We should be glad to publish your letter if signed with your proper name.

A. H. D.—The cause of the coloration is a little obscure. We should be glad to see the original prescription. Is it possible that the word "Ferri" is a misreading for something else?

J. F. Brown.—There appears to have been a decomposition, attended with the formation of carbonate of zinc. Had the pills been coated?

Charybdis.—Achillea Millefolium.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Thompson, Allatt, Verax, Inquirer, Student of the Pharmaceutical Society, Williams, P. F. B.

SOME PLANTS OF AFGHANISTAN, AND THEIR MEDICINAL PRODUCTS.*

BY J. E. T. AITCHISON, C.I.E., F.R.S.,

Brigade-Surgeon, Bengal Army.

During the month of August, 1884, I was appointed by His Excellency the Viceroy and Governor-General of India, the Marquis of Ripon, Naturalist with the Afghan Delimitation Commission. The British Commissioner, Sir Peter Lumsden, G.C.B., coming direct from England, joined the Indian portion of the mission in the vicinity of the proposed boundary. The party from India, commanded by Colonel—now Sir West—Ridgeway, left India in the end of August, Quetta on September 22, 1884, marched through northern Beluchistan to the Helmand, thence through Afghanistan to Khúsan. which was reached on November 18. During 1885 I travelled over a great extent of country in northern Afghanistan and Persia, finally left the mission on August 16, 1885, proceeding through Khorasán *viâ* Meshad and Astrabad to the Caspian, thence *viâ* Baku, Batoum and Constantinople to England.

In making my collections it was one of my principal aims to obtain those plants which yielded products of commercial value, and personally to collect from the living plant the product it yields, taking nothing for granted or on hearsay only, hoping thus to assist materially in elucidating the many diverse opinions held relative to the substances themselves, as well as to the plants that yield them. I also considered it of great importance to obtain good specimens for botanical identification, with seeds for cultivation, and when possible the local names of the plant and product were noted. I need hardly tell you that this was but a fragment of my work, having brought to England some eight hundred species of dried plants, amounting in all probability to ten thousand specimens, in addition to my numerous zoological collections. Although the work was intensely interesting it was of necessity laborious, and the difficulties to be overcome were numerous, but now that I have begun to discover the value of the material amassed, these troubles and labours are well nigh forgotten.

The class of plants with their products, upon which I propose speaking to you first this evening, and in which I feel sure you will be most interested, is the *Umbelliferæ* which form the characteristic vegetation of the region under consideration. The country in which these *Umbelliferæ* flourish consists of the great shingle and conglomerate plains lying between the hills and the beds of the rivers, which are broken up by numerous ravines and traversed by what are usually dry water courses, which once in every two or three years on the occurrence of heavy falls of snow on the hills above, or local showers of rain, suddenly become roaring torrents. The altitude of these plains above the sea level ranges from 2000 to 4000 feet. These plains during winter are perfectly treeless, arid, and bare, the only signs of a past vegetation being the gnarled remains, scarcely over a foot in height, of a few shrubs. As one gazes on this desert-like country extending on all sides, one wonders whether it could possibly produce even a blade of grass in summer. To make things worse, there is little or no water, which to the traveller is a matter of risk and difficulty, owing to the distances between the springs and the uncertainty of the supply. As summer advances a complete change comes over the scene; these bare plains become rapidly covered with a mass of splendid verdure produced chiefly by the presence of the following umbellifers: viz., *Ferula fœtida*, Regel, *Dorema Ammoniacum*, Don, and *Ferula Galbaniflua*, Boiss. and Buhse. The two former usually occur associated together, whereas the latter is generally found alone. The habit of growth of these three species is much the same; they all produce a great show of foliage thrown out from their perennial root stocks. This foliage spreads out on the ground to nearly 3 feet, forming a circle round the base of the flowering stems, little under 6 feet in diameter, and it is the close approximation of the foliage of adjacent plants that gives to the country in which they grow its wonderful appearance of a never-ending pasturage. Upon each species throwing up its own peculiar form of inflorescence the landscape becomes much altered, more especially with regard to the appearance presented by *Ferula Galbaniflua*. When this is in full flower, with its golden coloured panicled inflorescence from 3 to 4 feet in height, representing a miniature forest, the sight is one to be dreamed of rather than believed in or described. This wonderful verdure lasts from the end of April to the begining of July, by the end of that month it has as suddenly disappeared as it originated, even to the fruit-bearing stems. The hot sun dries the plants to a cinder, and the prevailing winds finish the work of destruction so thoroughly, that by August not a trace of the past season's vegetation is left.

Ferula fœtida, Regel, syn. *Ferula Scorodosma*, Bent. and Trim.; *Scorodosma fœtidum*, Bunge.—The plate in Bentley and Trimen's 'Medicinal Plants' is a most excellent one of the plant in fruit. The native name for the asafœtida plant near Herat is *Angúza-kéma*, *Kúrné-kéma*, *Khora-kéma*. *Kema* may be considered the generic term for all the Ferulas and Doremas. *Anguza* is the term for the product asafœtida, and is what in India is called "*hing*." This last name is also applied to it by traders in these parts.

In early spring great cabbage-like heads are to be seen distributed at intervals amongst the asafœtida plants. Their peculiar forms represent the primary stage of the flower heads, enclosed and completely covered up by the large sheathing stipules of its leaves. In a few days these heads become transformed into the semblance of a cauliflower; from this period the stem bearing the infloresence rapidly shoots upwards to a height of from four to five feet, its proportions being singularly massive and pillar-like. From a general calculation I found that only one out of a hundred plants bore a flowering stem. If you ask a native what plant this is, pointing to a flower-bearing one, he will tell you that it is "*kurné-kéma*," and that it has nothing to do with the plants that yield asafœtida. He will take out his knife, remove the head, cut the stem from its base, strip off the few sheathing stipules that are still adherent to the stem, and in his hand you see what looks like a very large cucumber: from this he will remove the dark-green cuticle and then slice away at the deliciously cool, soft, crisp, copiously milky stem, and eat slice after slice

* Read at an Evening Meeting of the Pharmaceutical Society, Wednesday, December 8, 1886.

with the greatest gusto and then say, "Did I not tell you it was the edible *kéma* and not asafœtida?" "Yes," says an onlooker, "You will stink like a camel for the next three months!" The method of collecting the drug, as far as I could learn, was as follows. A few men, employed for the purpose by some capitalist at Herat, are sent to these asafœtida-bearing plains during June. These take with them provisions consisting of flour, and several donkey-loads of water-melons, the latter in lieu of water, which is not only scarce there, but usually saline. The men begin their work by laying bare the root stock to a depth of a couple of inches of those plants only which have not as yet reached their flower-bearing stage. They then cut off a slice from the top of the root stock, from which at once a quantity of milky juice exudes, which my informant told me was not collected then. They next proceeded to cover over the root by means of a domed structure, of from six to eight inches in height, called a *khora*, formed of twigs and covered with clay, leaving an opening towards the north, thus protecting the exposed root from the rays of the sun. The drug collectors return in about five or six weeks' time, and it was at this stage that the process of collecting came under my personal observation. A thick gummy, not milky, reddish substance now appeared in more or less irregular lumps upon the exposed surface of the root, which looked to me exactly like the ordinary asafœtida of commerce, as employed in medicine. This was scraped off with a piece of iron hoop, or removed along with a slice of the root, and at once placed in a leather bag, the tanned skin of a kid or goat. My guide informed me that occasionally the plant was operated upon in this manner more than once in the season. The asafœtida was then conveyed to Herat, where it usually underwent the process of adulteration with a red clay *táwah*, and where it was sold to certain export traders, called *Kákri-log*, who convey it to India. On August 17, when I crossed the great asafœtida plains where this drug is chiefly collected, except for the small domes over each root there was not a leaf or a stem or anything left to point to the fact that any such plant had ever existed there, the heat and winds of July and August having removed every trace.

In northern Beluchistan, after much difficulty and searching, I came across one root of asafœtida, which I believe belonged to a different species; but I did not see a single stem, or even the remains of one, although we traversed immense plains upon which these fragments of leaves still existed, and where, I believe, during summer the plant must have grown in abundance.

Dorema Ammoniacum, Don.—This is the *Kandal-kéma* of Afghanistan, or, in other words, the *kéma* that yields the product *Kandal*, and which appears to me to be ammoniacum. As already stated, this grows along with asafœtida, *Ferula fœtida*, Regel. It is equally abundant with the latter, and occupies similar localities, having much the same habit. When these two plants have produced their base leaves only, it is almost impossible for any one to distinguish between them, and both, on injury, yield a milky juice. On the flowering stem beginning to shoot the Dorema is readily recognized, as the immature flower head shoots forth uncovered by any sheathing stipules, and in the form of a panicle, with the peduncles not spreading from the main stem. As the stem becomes fully matured one-sided nodes form on it at irregular distances, which give to it an undulating appearance characteristic of the plant. The plate of this plant in the 'Memoirs of the Imperial Academy of Science at St. Petersburg,' by Borszczoff, is excellent, though the peculiar enlargements on the stem are not sufficiently indicated. When it has reached its fruiting condition it is very liable to be attacked by a boring insect, especially in the fruiting heads, the result of which is the rapid escape of a large amount of a milky fluid, which, upon exposure, soon becomes tenacious and gummy, forming into solid concrete lumps of a greyish opalescent colour. This substance in these parts is the *Kandal* or *Ushak* of commerce. It is collected simply by removing the lumps from the surface of the plant, or, if later in the season, from the ground. No means are taken to increase the flow of fluid from the stem artificially. Between Bezd and Shér-i-nao a large quantity of *Kandal* grows, and it is there gathered for exportation.

I may mention here that *Dorema glabrum*, which attains a height of from 10 to 12 feet, grows in great abundance, along with tamarisk, in the Nehal-shéni portion of the Badghis territory, forming thickets in the stream beds. It yields a gum-resin. I also collected a very distinct new species of a *Dorema* with foliage resembling *Ferula fœtida*.

Ferula Galbaniflua, Boiss. and Buhse.—The plate of this in Bentley and Trimen is not sufficient, owing to the imperfect material they had to work with. Our plant differs from Boissier's description, in having a perfectly hollow stem and woolly petals; but this woolliness so entirely disappears in the herbarium, that unless seen originally one would doubt its having ever existed. Notwithstanding these discrepancies we have no doubt that it is *F. Galbaniflua*, Boiss. et Buhse. The native name for this plant is *Badra-kéma*. In habit it differs from the two already described species, in growing gregariously and in its being found in greatest luxuriance in moister localities, as in the Badghis near Gulran, where it grows in the sandy loam of that district. Its early root leaves spring from the ground like a fountain of soft green moss, and in this state it is greedily devoured by camels. The stem, which grows very rapidly, is of a semi-opalescent orange colour when young and perfectly glabrous. When in full blossom the flower is of a brilliant orange yellow; as the fruit forms and ripens the colour changes from the base of the plant upwards, showing various autumnal tints. The stem is thick at the base but tapers suddenly upwards, terminating in an elegant tall, loose, panicled inflorescence, reaching a height of about four feet. The stem, on injury, from its earliest stage of growth, yields an orange-yellow gummy fluid which very slowly consolidates, usually forming on the stem, like the grease on a guttering candle, and possessing in common with the whole plant when crushed a strong odour resembling that of celery. The gum is commonly found adhering to the lower portions of the stem, and is so tenacious that when subsequently examined pieces of the plant are frequently found attached to it. This substance is called by the natives *Shilm-i-badra-kéma*, *Shilm-i-barzat*, *Birzand-Jao-shír*. No artificial means are employed to my knowledge in the collection of this drug. It is stated to be an article of export through Persia *viâ* the Gulf to Arabia and India. In Persia

and Afghanistan it is said to be administered to parturient women, and the entire shrub is hung round the house to keep off evil spirits whilst parturition is actually taking place.

Ferula suaveolens, Aitch. and Hemsley, *sp. nov.* This is a new species of *Ferula* that comes under the division *Euryangium*. It is a plant from 3 to 4 feet in height, and grows, at an altitude above 5000 feet, in the hills to the south of Bézd. The root of the plant, called *Sambal*, is scented, and is collected and exported from Turbat-i-Haidri, through Persia, to the coast. The shrub itself is called *Kéma*, but so are all these large Umbelliferæ. It has a solid stem, with nodes on it much resembling those of *Dorema Ammoniacum*, and also yields some form of gum-resin, which, however, I was unable to collect.

Trachydium Lehmanii, Bth. and Hook., syn. *Eremodaucus Lehmanii*, Bunge, and *Albertia margaritifera*, Regel and Schmalh.—The roots of this species are not thicker than a goose quill, and from 3 to 4 inches long, tapering off to a point. They are collected as a drug under the name *Shákh-akhal* and exported from Herat. It is curious to note that generally on the central flower of the umbel there is a piece of gummy rose-red exudation, the result of injury by an insect.

Psammogeton setifolium, Boiss.—The fruit of this plant is largely collected and employed as an aromatic stomachic in Persia; it is a very common annual, generally met with over the whole country.

I would now proceed to draw your attention to the several kinds of manna, and their sources, which are produced in this country. There are three kinds which are usually met with, and which form articles of export. The first, and that most largely exported, is an exudation that occurs in certain seasons and years upon *Cotoneaster nummularia*, Fisch. et Mey. The plant is called *Siah-chob* (black stick) and the manna *Shir-kisht*, meaning hardened milk. This cotoneaster is a tall stout shrub, growing occasionally to 12 or 14 feet in height. It is met with throughout the Paropamisus range and in Khorasán, at an altitude of about 5000 feet. Although common everywhere in these hills it is found in greater abundance on the Siah-koh and Saféd-koh and the Ar-dewán pass, forming regular thickets; these are also the noted localities for obtaining the manna. During July, as the corn ripens, the smaller branches of the cotoneaster become covered with the exudation, and this is collected by merely shaking the branches over a cloth. It is eaten largely by the people as a sweetmeat, and exported in quantity to Persia and India.

The second kind of manna is that yielded by the camel-thorn, *Alhagi Camelorum*, Fisch. This is a thorny shrub of from 2 to 3 feet in height, growing generally over the country at an altitude of two thousand feet, very frequently gregarious, forming a dense scrub. In certain years during the months of July and August, this manna is developed on the branches of the camel-thorn (*Shutar-khár*), or goat's-thorn (*Khár-i-búzi*). The manna is called *Tar-anjabin*, which means the honey from the green (bush), this name probably originating from the shrub remaining vividly green over the country long after all other plants have dried up and disappeared. The country round Rui-khauf, in Persia, is celebrated for this product, whence it is exported in all directions.

The third kind of manna is that yielded by *Tamarix gallica*, Linn., var. *mannifera*. I collected specimens of this plant in the Badghis, where it was pointed out to me by a Persian as being the shrub that in Khairan Persia yielded *Gaz-shakar*. The plant in Afghanistan is called *Gaz*, and the manna it yields *Gaz-anjabin*; the latter I did not find.

At Sha-Ishmael on October 8, 1884, I collected a quantity of manna in the form of milk drops from the foliage of *Salsola fœtida*, Del. It was pleasant to the taste, with a slightly aromatic flavour. This I regret to say has been lost.

Glycyrrhiza glabra, Linn., and its variety *glandulifera*, Reg. et Herd.—This shrub in one form or other is very common all over the Badghis, and throughout the Hari-rúd and Khorasán districts, near water. Its annual stems grow to great coarse shoots of from 4 to 5 feet in height from enormous underground root stocks. The Turkomans prepare from its roots the extract liquorice, which as well as the shrub they call *Mahk*. The Persians call the plant *Sús*, the root *Behk-sús*, and the extract *Rob-i-sus*. Liquorice is not manufactured at Meshad, but I was told that it was imported from Yezd and Fars in Persia, as well as from Turkistan. I obtained a preparation of it made by boiling the extract down in whey, which gives it a saline flavour, making the liquorice more palatable. This preparation is called by the Turkomans *Ao-karút*, the same term as they apply to whey.

Astragalus heratensis, Bunge, and *Astragalus sp.* near *A. strobiliferus*, Royle.—These two species of Astragalus are very common in stony soil in the Hari-rúd valley and Khorasán, at an altitude of three thousand feet. The native names for either of these were *Khon*, *Kon* and *Gabina* and for a gum that exudes from them *Katíra*. This gum was found attached to the stem in the peculiar form of tragacanth wherever it had been able to make its way out through fissures in the bark, and on cutting the stem across the gum was seen to protude from the medullary space. It is collected in large quantities in the neighbourhood of a village called *Kalla-roving*, near Bezd, in Khorasán, for exportation to India *viâ* Herat, and to the sea coast of Persia.

Rheum sp. near *R. songaricum*, Schrenk.—I found a very handsome species of rhubarb on the great plains in the Hari-rúd valley, near Tomanagha, at an altitude of two thousand feet; this the natives call *Rewash-i-dêwana*, viz., fool's rhubarb, *Rewand-i-méghan*, *Ishkin*. It is very peculiar in its growth, producing three enormous basal leaves, which spread out flat on the ground, each being about four feet long by five feet across, and the flowering stem with a loose spreading panicle of flowers reaches a height of about three feet; the fruit is large and winged, ripening to a ruby red. The ripe fruit is collected and employed as a purgative, and when not procurable the root is substituted. I am glad to say that I have been able to obtain a large quantity of the seed, which has been distributed to several gardens; some plants have already sprung up and are doing well in the gardens at Kew.

Orchis laxiflora, Linn., and *Orchis latifolia*, Linn.—I obtained the two above species of orchis in a few localities in the Badghis, the Hari-rúd valley, and Khorasán, and near Meshad I came across people digging for the tubers of these orchids, which they called "sálab" and "sálap." In several places where I had purchased the dry tubers I was told by

the vendor that they were not procurable in Afghanistan, but only near Meshad. There can now be no doubt from my identifications on the spot that the tubers generally exported from Meshad into India through Afghanistan are those of the above species. In Meshad I was informed that these were *Sálap*, but not *Sálap-misri*; that the latter was an import article from Egypt, specimens of which, I regret to say, I was unable to procure.

Microrhynchus spinosus, Benth.—Native name *Chir-kah*.—This is a small shrub from 1 to 2 feet in height, with numerous intricately twisted branches, interlaced so as to give the shrub the form of a ball. It is apparently leafless, and very much resembles *Lactuca orientalis*, but has thicker and more fleshy branches without spines; both grow in the same stony gravel, especially on limestone débris. This plant yields a milky juice, which exudes from injury, and dries in small greyish-black pieces, irregular in form, the largest the size of a pea. This is collected and sold under the name of false *Anzérút*, or *Anzrúd*, and has the most nauseous and offensive odour of any substance that I have ever come across. The native who showed me this product said he knew the true *Anzérút*, or Sarcocolla drug, quite well; that it was collected from somewhat similar bushes by shaking them over a cloth, and that these bushes were common near Koin, Birjand and Yezd, in Persia, and were called *Chir-kah* and *Shai-a-kah*.

A true pine resin, also called *Anzérút*, is imported into Meshad from India.

Delphinium Zalil, Aitch. and Hemsley, *nov. sp.*—This plant is found in great luxuriance at an altitude of 3000 feet in the moister localities of the Badghis and Khorasán, and is called by the natives *Zalil*, also *Isparak*, *Isburg*, *Aswarg*. The flowers, which, when fresh, are of a brilliant yellow, are employed in native medicine as a tonic and alterative, but are usually exported from Persia and Afghanistan as a dye stuff.

Papaver somniferum, Linn.—The opium poppy is cultivated in Khorasán, where the inhabitants both eat and smoke it. The quantity produced is chiefly consumed in the country itself, a little being exported westwards through Persia, and some towards Turkistan. In Afghanistan it is but little cultivated, and scarcely used.

Merendera Persica, Boiss.—This spring flower is extremely common throughout Afghanistan and Persia. The corms of this species, with their external coverings removed, were sold at Meshad as *Shambalit*, one of the kinds of *Hermodactylus*, and which may be occasionally mixed with the corms of *Colchicum speciosum*, Stev., also a common plant in those parts. This is exported from Persia to India by the Persian Gulf to Bombay, rarely through Afghanistan.

The *Surinján* of the Punjab, which may also be another form of the *Hermodactylus* of the ancients, and which is imported into the Punjab from Kashmir, is without doubt the corms of *Colchicum luteum*, Baker. This is very common on the passes in Kashmir, extending as far west as the Murree Hills to Abbotabad, and has even been collected at as low an altitude as Lawrencepur. The corms of *Colchicum luteum* may be occasionally adulterated with those of *Merendera Aitchisonii*, Hook. fil., which I now believe is a variety of *M. Persica*, and which is very common throughout the salt range extending to Kashmir.

[*The discussion on this paper is printed at p.* 473.]

NOTES ON A SAMPLE OF GALBANUM FROM FERULA GALBANIFLUA.*

BY E. G. BAKER.

The following are a few notes on a sample of galbanum collected by Dr. Aitchison, Surgeon-Major, in Afghanistan, and brought back by him, together with the plant from which it was collected. The plant has been identified by Mr. Hemsley, of the Kew Herbarium, as *Ferula galbaniflua*, Boiss. et Buhse.

The gum-resin consisted of agglutinated tears of a white or reddish-brown colour, usually compact and hard, but softening if held in the hand.

When broken it presents a dull white waxy fracture resembling ordinary ammoniacum, in fact, judging from external appearances it might easily be mistaken for a sample of that drug.

Its odour is peculiar but not unpleasant. Mixed with the gum-resin portions of the stem from which it was obtained were found.

From the sample handed over to me for examination a portion was selected fairly representative of the whole; this was powdered and sifted through muslin, and then treated with the following solvents.

Petroleum Ether.—Of the sifted gum-resin I took 5 grams, and treated it with 50 c.c. of petroleum ether—allowing the mixture to remain in a suitable vessel for several days, during which time it was frequently agitated. I then decanted the fluid portion into a tared dish, rinsed the vessel out with more petroleum ether, and evaporated the whole of it as recommended by Dragendorff, in a current of dry air, the air being dried by passing through sulphuric acid and over chloride of calcium.

The petroleum ether extracted ·1254 gram; adding to this ·03 as the loss during evaporation would give ·1554 gram or 3·1080 per cent.

Ether.—The portion of the 5 grams remaining from the petroleum ether extraction was next treated with ether and allowed to remain as before. This was decanted and evaporated over a water-bath. It was only after several days that the weight was found to be constant, at the latter stages of the operation the evaporation taking place slowly. The matter extracted by ether was found to weigh 3·060 grams. This was then treated with alcohol, in which it was almost wholly soluble, ·226 gram of the 3·060 grams remaining undissolved.

The alcoholic extractive was evaporated, and consisted of a brittle resin, the melting point of which when taken over mercury was found to be 57° C. The resin was soluble in soda, from which it was reprecipitated by an acid.

Alcohol.—The portion of the gum-resin remaining from the ether extraction was next treated with alcohol. The resulting fluid was evaporated over a water-bath. The residue weighed ·3788 gram.

Water.—The portion of the gum-resin remaining from the alcohol extraction was next treated with distilled water. The filtrate evaporated over a water-bath yielded ·8514 gram of residue.

The latter was again treated with water, and various reagents applied. With ammonium oxalate and subacetate of lead the solution of gum gave copious precipitates, but none with acetate of lead or borax.

Insoluble Matter.—The portion of the gum-resin insoluble in petroleum ether, ether, alcohol, and water was found to weigh ·5280 gram.

Volatile Oil and Moisture.—·7876 gram of the

* Read at an Evening Meeting of the Pharmaceutical Society, Wednesday, December 8, 1886.

powdered gum-resin above referred to was next taken; this, after several days' evaporation, lost ·042 gram, which would represent 5·332 per cent., and would be the volatile oil and moisture.

Ash.—In order to determine the ash 1·5792 gram of the gum-resin was taken and burnt in a furnace. The ash, which was white, weighed ·039 gram; this would represent 2·463 per cent.

Upon examination the ash was found to consist of carbonates of calcium and sodium, sulphates and phosphates being absent.

When examined by the spectroscope the sodium and calcium bands were plainly visible. There was also a band in the red to the right of the calcium bands, which might possibly be strontium. The quantity present was not sufficient for a determination of its position.

Action of Gum-Resin with various Reagents.—Sulphuric acid turned the gum-resin dark brown. Hydrochloric acid gave no well-marked action in the cold, but when a portion of the gum-resin was boiled with this acid a dirty red colour was obtained, which underwent no change on the addition of alcohol.

A small portion of the gum-resin was boiled with water, and when cold ammonia added; a very slight blue fluorescence was visible, which indicates the presence of umbelliferon, $C_9H_6O_3$. To confirm the result a portion of the gum-resin was heated for some time with hydrochloric acid at 100° C.; this when cold was put into a glass separator with some chloroform, and after agitation the chloroformic layer drawn and evaporated. No crystals were visible, but when the evaporated chloroformic layer was extracted with water and ammonia added a decided blue fluorescence was seen.

I then fused a portion of the gum-resin with nitre, extracted the mass with water, and added barium chloride; this gave a precipitate wholly soluble in acid, indicating the absence of sulphur in the drug.

The analysis is then as follows:—

	Grams.	Per cent.
Volatile oil	·1554	= 3·108
Ether extractive } resin	3·0600	= 61·200
Alcohol extractive } resin	·3788	= 7·576
Water extractive, gum	·8514	= 17·028
Insoluble matter	·5280	= 10·560
	4·9736	

The foregoing experiments were made in the Pharmaceutical Society's Laboratory, by permission of Professor Attfield.

PASTE FOR LABELS.*

BY LEO ELIEL.

The formulas here presented, with samples, are not original with the writer, but have been in use by him for many years with entire satisfaction.

1. Gum tragacanth . . . . . 1 oz.
   „ arabic . . . . . 4 oz.
   Dissolve in
   Water . . . . . 1 pint.
   Strain and add
   Thymol . . . . . 14 grains.
   Suspended in
   Glycerin . . . . . 4 oz.
   Finally add
   Water . . . . . to make 2 pints.

This makes a thin paste suitable for labelling bottles, wooden or tin boxes, or for any other purpose paste is ordinarily called for. It makes a good excipient for pill-masses, and does nicely for emulsions. The very small percentage of thymol present is not of any consequence. This paste will keep sweet indefinitely, the thymol preventing fermentation. It will separate on standing, but a single shake will mix it sufficiently for use.

2. Rye flour . . . . . 4 oz.
   Powd. acacia . . . . . ½ oz.

Rub to a smooth paste with 8 oz. of cold water, strain through a cheese cloth, and pour into one pint of boiling water. Continue the heat until thickened to suit. When nearly cold add:—

   Glycerin . . . . . 1 oz.
   Oil cloves . . . . . 20 drops.

This is suitable for tin or wooden boxes or bottles, and keeps sweet for a long time.

3. Rye flour . . . . . 4 oz.
   Water . . . . . 1 pint.
   Nitric acid . . . . . 1 drachm.
   Carbolic acid . . . . . 10 minims.
   Oil cloves . . . . . 10 minims.
   Glycerin . . . . . 1 oz.

Mix the flour with the water, strain through a cheese cloth, and add nitric acid. Apply heat until thickened to suit, and add other ingredients when cooling. This is suitable for bottles, tin or wooden boxes, and will not spoil.

4. Dextrin . . . . . 8 parts.
   Acetic acid . . . . . 2 „
   Alcohol . . . . . 2 „
   Water . . . . . 10 „

Mix dextrin, water and acetic acid to a smooth paste, then add the alcohol. This makes a thin paste, and is well suited for labelling bottles and wooden boxes, but is not suitable for tin boxes.

* From a paper read before the American Pharmaceutical Association.

BUTTER.*

BY E. DUCLAUX.

The author has determined the proportions of volatile acids in butters by means of the method of fractional distillation described in 1865 (*Ann. Chim. Phys.*), the butters examined being a series of prize Normandy butters exhibited at the February exhibition in the Palais d'Industrie. The following results were obtained.

	1.	2.	3.	4.	5.	6.	7	8.
Water .	12·40	13·36	12·28	10·72	13·34	11·62	14·00	13·03
Fat . .	86·71	85·48	86·76	88·30	86 01	86·52	85·31	86·33
Milk-sugar.	0·16	0·20	0 17	0·13	0·20	0·30	0·20	0 11
Casein and salts .	0·73	0·96	0·79	0·85	0·45	1·56	0·49	0·53
	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00
Caproic acid (p. c.).	2·10	2·18	2·17	2·23	2·26	2·00	2·08	2·19
Butyric acid (p. c.).	3·55	3·52	3·53	3·60	3·65	3·38	3·52	3·46
Sum of the acids	5·65	5·70	5·70	5·83	5·91	5·38	5·60	5·65
Ratio. .	2·1	2·0	2·0	2·0	2·0	2·1	2·1	2·0

With the exception of No. 6, in which the proportion of casein is abnormally high, the composition of all these butters is remarkably uniform, and this is especially noticeable in the combined amounts of the volatile acids, and the ratio between the two acids. It may be said, therefore, that the constitution of the glycerides of the volatile acids is identical in all these butters. Further experiments are neces ary, however, to ascertain the influence of breed, locality and season. A sample of butter

* From *Compt. Rend.*, cii., 1022–1024, 1077–1079. Reprinted from the *Journal of the Chemical Society*.

from the district of the Meuse, derived from an entirely different breed, showed exactly the same ratio between the two volatile acids.

It is generally supposed that the rancidity of butter is due to a butyric fermentation resulting from the action of microbes derived from the air on the albuminoids present in the butter. Some very old and salt butters imported from Brazil were found, however, to contain casein in its original condition, and when the butter was washed the water was free from microbes. The free acid in the butter had, however, increased to ten or twenty times its original amount. It follows that the rancidity of butter is not due to microbes, but is the result of a spontaneous decomposition of the glycerides analogous to that which Berthelot has observed in the case of other ethereal salts. This decomposition is accelerated by the presence of water and free acid, but is more or less retarded by salt and borax. Of the different ethereal salts present in butter, butyrin is the least stable, caproin more stable, and the glycerides of the non-volatile acids still more stable.

This spontaneous decomposition is complicated by the action of air, microbes and light. The action of air and light results in an absorption of oxygen with formation of carbonic anhydride, the quantity of which is always less than that which corresponds with the amount of oxygen absorbed. The products of oxidation are various, but the most important is formic acid. Oxidation, however feeble, first attacks those substances to which the butter owes its flavour and odour. As oxidation progresses, an odour of tallow is developed, this action being especially rapid in direct sunlight.

In addition to the action of air and light, there is the action of microbes, and especially of cryptogamic vegetations which cover the mass of the butter with their loose, almost invisible mycelia. This action accelerates the decomposition of the glycerides, and at the same time brings about the alteration of the nitrogenous compounds present in the butter. If the albuminoids are present in small quantity, butyric acid is formed, and its presence accelerates the decomposition of the glycerides, more free acid being liberated up to a certain point, beyond which the acid is only set free in quantity equal to that which is oxidized or evaporates. The butter remains colourless except where it is in contact with mycelial tubes. When the quantity of albuminoids is large, the mass becomes alkaline, and the fatty matter darkens in colour owing to its gradual conversion into a black resin completely soluble in alcohol and in alkaline solutions. The resin is also formed in sunlight in presence of an alkali These facts explain the grey or black colour of old cheese.

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Eastes, E. J.	0	10	6
Elborne, Wm.	1	1	0
Elliott, Wm.	1	1	0
Emson, W. N.	0	5	0
Evison, A.	0	2	6
Foggon, G.	0	5	0
Forbes, J. W.	0	5	0
George, Henry	0	10	0
Gilmour, A.	0	5	0
Greenish, H. G.	1	1	0
Groves, R. H.	1	1	0
Hairsine, H. S.	1	1	0
Hardwick, S.	0	10	0
Harvey, W. R	1	1	0
Havill, Paul W.	1	1	0
Holmes, A. J.	0	10	6
Horner, Edward	5	5	0
Horsley, T. W.	0	10	6
Ive, Wm.	1	1	0
Jackson, Thos.	5	5	0
James, Morgan W.	0	5	0
King, W.	1	1	0
Lasham, J. W.	0	5	0
Lister, S.	0	5	0
Long, Henry	0	10	6
Loumeau, F. E.	0	8	0
MacDermott	0	10	0
Macintosh, A.	1	1	0
Mathews, H.	1	1	0
Mayger, W. D.	0	10	6
Mee, George	3	3	0
Meggeson and Co.	2	2	0
Morson, T.	3	3	0
Müller Dr. Hugo	3	3	0
Nesbet, J.	2	2	0
Nichol, A	0	10	6
Oldfield, H.	0	5	0
Palmer, F.	1	1	0
Parker, R. H.	1	1	0
Pharmacist	1	1	0
Pigott, Samuel	0	5	0
Potts, Robert	0	10	6
Pumphrey, A.	0	5	0
Purdue, T.	0	5	0
Quain, Dr.	5	5	0
Radermacher, C. J.	0	10	6
Rait, R. C.	0	10	6
Richardson, A.	0	5	0
Rees, W. H.	0	5	0
Rowntree, Thomas	1	1	0
Rowson, H.	1	1	0
Smith, W. F.	0	10	6
Spencer, Thomas	0	10	0
Stacy, F.	0	5	0
Stuart, C. E.	0	10	6
Summers, J. R.	1	1	0
Terry T.	0	10	0
Thomas, H.	0	10	6
Thomas, T. Recs	0	5	0
Thompson, C.	0	10	6
Thompson, G	0	2	6
Thompson, H. A.	2	2	0
Wakeham, C.	0	5	0
Watts, J. N.	1	1	0
Wiggins, H	0	5	0
Willmott. W.	1	1	0
Wine, J. A.	0	10	6

From Australasia.

Andrews, Albert (Beaufort)	0	10	6
Atkin, Charles Ager (Hotham)	0	10	6
Baker, Benjamin (Richmond)	0	10	6
Blackett, D. R. (Fitzroy)	0	10	6
Bowen, William (Melbourne)	0	10	6
Brind, Henry (Ballarat)	0	10	6
Brinsmead, James (St. Kilda)	0	10	6
Chequidden, F. P. (South Melbourne)	0	10	6
Colledge, William (Geelong)	0	5	0
Cooper, F. H. (Geelong)	0	5	0
Dalton, S. M. (Prahran)	0	10	6
Dorinaldi, H. A. (Prahran)	0	10	6
Duerdin, John R (Melbourne)	0	10	6
Evans, J. D (Collingwood)	0	10	6
Fowler, Alexander R. (Launceston (Tasmania)	1	1	0
Francis, Henry (Melbourne)	0	10	6
Francis, Rawson Parke (Melbourne)	0	10	6
Fullwood, R. J. (Melbourne)	0	10	6
Gabriel, R.	0	2	6
Gamble, Henry (Prahran)	0	10	6
Grimwade, F. S (Melbourne)	0	10	6
Gutheil, Herman (Melbourne)	0	10	6
Harrison, Christopher (Prahran)	0	10	6
Hirst, Charles E. (West Melbourne)	0	10	6
Hooper, E G. (Melbourne)	0	10	6
Huntsman, T. (Fitzroy)	0	10	6
Johnson, William (Windsor)	0	10	6
Kingsland, George (Melbourne)	0	10	6
Lacey, James (Melbourne)	0	10	6
Longstaff, Thomas (Ballarat)	0	10	6
Mackay, J. B. L.	0	10	6
Marston, C.	1	1	0
Massina, A. H. (Melbourne)	0	10	6
Morgan, J. V.	0	10	6
Morrow, George (Geelong)	0	5	0
Naylor, T. H.	0	10	6
Nelson, William Y. (Prahran)	0	10	6
Nieman, J. H.	1	1	0
Owen, Alfred J. (Geelong)	0	10	6
Owen, John (Geelong)	0	10	6
Palmer, T P. (Ballarat)	0	10	6
Potts, H. W. (Melbourne)	0	10	6
Pleasance, Charles (Melbourne)	0	10	6
Rogers, W. M.	0	5	0
Rowley, Walter M (Melbourne)	0	10	6
Scott, J. W. (Ballarat)	0	10	6
Shillinglaw, Harry (Melbourne)	0	10	6
Smith, John George (Carlton)	0	10	6
Strutt, S. S. (East Melbourne)	0	10	6
Swift, George (Melbourne)	0	10	6
Thomas, J. Turner (Melbourne)	0	10	6
Thompson, J. D (Melbourne)	0	10	6
Tomasitt, H. T. (Melbourne)	0	10	6
Treaver, Dr.	0	5	0
Treen, G. E. (South Melbourne)	0	10	6
Wallis, C.	0	10	6
Walton, T H. (Fitzroy)	0	10	6
Wallworth, A. (South Melbourne)	0	10	6

All subscriptions should be forwarded on or before December 31 to the Chairman, Mr. Michael Carteighe; the Treasurer, Mr. John Williams; or to the Honorary Secretary, Professor Dunstan, 17, Bloomsbury Square, London, W.C.

The Pharmaceutical Journal.

SATURDAY, DECEMBER 11, 1886.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE PHARMACEUTICAL EDUCATION QUESTION.

THOUGH the address delivered by Mr. BARCLAY at the opening of the session of the Midland Counties Chemists' Association has not yet been made the subject of comment it can scarcely be doubted that before long it will be. For that reason it appears undesirable to divert attention from the main issue that must be considered in regard to pharmaceutical education, by reference to matters of less importance than the question whether a compulsory system shall be established or not. Whether the school of pharmacy in some particular town is in all respects as perfect as might be desired, or whether the arrangements made by certain local associations for providing means of instruction for apprentices are sufficient for the purpose, are, we consider, questions of such secondary importance that they need not be dwelt upon. This must be our apology for not publishing several letters that we have received, protesting against Mr. BARCLAY'S remarks as to the general want of success that has sooner or later attended attempts to establish schools of pharmacy in the provinces. Those remarks we believe to have been thoroughly justified by the general experience gained during the last twenty years. It is not ground for reproach to any town that such failure should have been encountered, but rather, we think, matter for astonishment that, under existing conditions, any measure of success should have been attained at all. We therefore think it would be preferable for our correspondents to communicate with Mr. BARCLAY directly as to any particulars in which they may think he has not done full justice to the schools with which they are connected.

The more important point that requires consideration is whether some educational system shall be made compulsory, and until that question has been decisively determined it is idle to talk of the merits of any particular arrangements for scientific teaching existing here or there at any moment. Until that question has been decided in favour of a compulsory system, which everyone entering the business of pharmacy must go through, the only foundation upon which the maintenance of schools of pharmacy can be hoped for will not exist. Until that is the case there cannot be any such assured demand on the part of students for scientific instruction and technical training as would constitute a sufficient inducement for providing them. The time is long past for non-natural promotion of pharmaceutical education by grants and other adventitious stimulants, and if it be acknowledged as necessary in the same sense that capital is necessary for acquiring interest in a business, there should be the same possibility presented to the pharmaceutical aspirant of judging what may be within his capability as to the one as well as to the other. If at an early period it be evident that the cost of the systematic education requisite for obtaining qualification as a pharmacist cannot be met, it would be far better that some other line of business occupation were adopted. In regard to this point, and the need for compulsion in any system of education that may be established for the advancement of the general interests of pharmacy and of pharmacists as a body, Mr. BARCLAY'S address was throughout less explicit than we should have desired, and the system he advocates, of payment to teachers by results, does not, in our estimation, sufficiently ensure consideration of what will be required for obtaining qualification at the early period when a clear perception of those requirements would be of practical utility to youths intending to devote themselves to pharmacy. The inducements that lead them to do so are very often quite fallacious, and often it is not until much time has been lost that the insurmountable obstacle of an examination is recognized and considered a hardship, which a few years before would have appeared only as a friendly warning. We trust that those who take up the discussion of this important topic will not fail to give this view of the matter full consideration, since we believe that it is one of the most essential things for the future of pharmacy in this country that such a compulsory system of education should be established without delay.

A very pleasant interchange of compliments has lately taken place between the chemists of Chester and Dr. Waters of that town, on the occasion of the honour conferred upon him by the British Medical Association, in presenting him with a gold medal for distinguished merit, as a recognition of his long continued self-denying and able services in the cause of medical reform. This led to a congratulatory address being presented to Dr. Waters, by the Chester chemists, expressing also their deep sense of the uniform courtesy and kindness they had always received when they had occasion to confer with him. Dr. Waters's reply to this address manifests a high appreciation of the important services rendered by the pharmaceutical body for the welfare of the public, and he gracefully acknowledges that without the intelligent and skilled aid of the members of that body the best efforts of the medical man would be in vain. Dr. Waters also adds, in reference to his long practice in Chester, that his relations with the chemists of the town having been of the most

intimate character they have taught him to value and esteem their services, and that no locality could boast of a more reliable class of men. These expressions are evidence of the existence of a mutual relation between medical practitioners and pharmacists, which is precisely what ought to obtain, and we have pleasure in notifying these facts as showing that such is the case in Chester.

* * *

We desire to call attention to the second list of subscriptions to the Redwood Testimonial Fund, published in this week's Journal on page 470, and to remind our readers that the subscription list will be closed on the 31st inst. In the list now published, there is the interesting feature of a long series of subscriptions forwarded from Australia through Mr. Shillinglaw, the Secretary of the Pharmaceutical Society of Australasia and to the Pharmacy Board of Victoria.

* * *

It will be seen from a report on another page that the pharmaceutical assistants and apprentices of Torquay have formed themselves into an Association for the promotion of social intercourse and education. The sympathy of the employers was shown by the attendance of several of them at the opening meeting, and the young Association has had the singular good fortune to secure the services of Mr. Edward Smith as its first President. We regard this new society with great interest, and hope that by the success attending it other towns in the West of England may be stimulated to similar efforts.

* * *

Pharmacists in the island of Cuba have been recently much agitated by the announcement that the military authorities are about to establish a central laboratory and drug store, as well as various military pharmacies, in the island, where the officers and their families will have the right to purchase medicines and to get prescriptions made up at cost price. As Cuba is largely peopled by troops of one kind or another, and their families and dependants, this is a very serious matter for the pharmacists, who number about seventy, but whose taxes are said to amount to something like £3000 a year. It may be added that a similar system is in vogue in Spain, where, however, it is not quite so serious, as the military class does not bear so large a proportion to civilians. Nevertheless the injury done to civil pharmacists in Spain is increased by the practice of borrowing military badges or medals for the purpose of obtaining medicines at cost price. It is stated that of the half million prescriptions made up annually in Madrid nearly a quarter are dispensed at military pharmacies.

* * *

A correspondent of the *Ceylon Observer* calls attention to the increasing prevalence of canker among cinchona trees in that island, which has in some instances swept out whole plantations, and, as he suggests, may very seriously affect the producing capability of Ceylon. At the present time he states that cinchona seedlings die off there wholesale, before they have attained a foot in height, and as a remedy he proposes there should be a fresh supply of seed maintained annually from the native habitat. The editor of the *Ceylon Observer*, in commenting on this suggestion, agrees that the idea is a good one, though he scarcely thinks the apprehensions expressed are well founded. On the contrary, he contends that if cinchona trees canker off in Ceylon and India they do so as well in the forests of South and Central America, where they are indigenous. He also expresses a belief that in the East there is as good a climate for cinchona growth as in the Western world, though in both hemispheres the plant is susceptible to the influence of a damp stiff subsoil and is likely to die off in such situations. It would be a remarkable result if the spread of canker in the Ceylon plantations should increase to such an extent as to cause a failure like that which has been experienced in regard to the coffee crop, but in any case it seems to be imperative that Ceylon planters should direct especial attention to the requirements of cinchona for healthy growth.

* * *

A correspondent of the *Western Morning News*, writing from Helsbury Park, near Camelford, mentions the fact that the foxglove, locally known as the poppy, was seen by a shooting party on Wednesday last in the Woods of Hengar, the foliage and flowers of which were looking as fresh and beautiful as at midsummer.

* * *

The *Boston Medical and Surgical Journal* refers to an extraordinary mistake as having occurred in a druggist's establishment at Haverhill. It consisted in the misreading of "ss" for "88," resulting in a young woman for whom half a grain of podophyllin had been ordered taking 88 grains as a dose, with fatal effect.

* * *

It is sometimes of importance to know where to find the large herbaria of eminent botanists. It may be well, therefore, to place on record here, for the benefit of our readers who are botanists, that the herbarium of Lamarck, which belonged to the late Professor Roeper, of the University of Rostock, is now removed to the Jardin des Plantes, at Paris, where it will be more easily accessible than has hitherto been the case.

* * *

A case is now being heard before Mr. Justice Day in the Court of Queen's Bench, in which damages are claimed from a registered chemist for having, as is alleged, supplied extract of belladonna by mistake in place of confection of senna, and thus causing the illness of plaintiff's wife. The case had not been completed at the time of going to press, and therefore we defer any report until next week.

* * *

Information has been received of the death, on the 4th instant, of Mr. Thomas Stephenson, who was elected last year an Annuitant on the Benevolent Fund.

* * *

At the next meeting of the Chemical Society on Thursday the 16th inst., the papers to be read will be—"Researches on the Constitution of Azo-and Diazo-Derivatives," by R. Meldola and F. W. Streatfeild, and "The Influence of Silicon on the Properties of Iron and Steel," by T. Turner.

* * *

At a meeting of the Chemists' Assistants' Association, to be held at the Rooms, 103, Great Russell Street, on Wednesday evening next, the 15th inst., a paper will be read on "The Official Liquid Fixed Oils," by Mr. T. A. Ellwood.

GENERAL MEETING—BENEVOLENT FUND
ELECTION OF ANNUITANTS.

A General Meeting of the Members, Associates in Business, and Associates of the Pharmaceutical Society and of the Subscribers and Donors to the Benevolent Fund, was held at the house of the Society, 17, Bloomsbury Square, on Friday, December 3, at 12 o'clock, for the election of SIX ANNUITANTS.

Mr. MICHAEL CARTEIGHE, President, in the chair.

The notice convening the meeting was read.

Scrutineers were appointed, who examined the voting papers and brought up the following report:—

Scrutineers' Report.

We, the undersigned Scrutineers, appointed at the twenty-second election of Annuitants on the Benevolent Fund of the Pharmaceutical Society of Great Britain, do hereby certify that we have examined the voting papers committed to us and report the following result:—

Stone, Thomas William.	4168
Rossiter, Anne Hurry	3348
Chenery, Kate K. M.	3272
Morris, Mary	2944
Fife, George.	2283
Horncastle, Anne.	2108
Goadsby, Elizabeth	2042
Spendelow, Richard William . . .	1617
Sowter, Emily Sarah	1243
Pownall, Lydia Sarah	871

3744* voting papers were received, of which number 65 were informal (51 unsigned) and were disallowed.

W. K. HOPKIN, *Chairman.*

ROBT. SAML. BATHE.	WM. F. GULLIVER.
THOS. S. DYMOND.	R. S. DAMPNEY.
W. RALPH DODD.	E. M. BURDEN.
JNO. T. TUPHOLME.	W. TOOGOOD FROST.
A. E. TANNER.	H. BATE.
EDWARD N. BUTT.	A. W. GERRARD.
WM. MARTINDALE.	CHARLES E. TURNER.
T. HOWARD HALL.	SIDNEY CONSTANCE.
J. E. SAUL.	R. FISHER YOUNG.
E. H. FARR.	

December 3, 1886.

The PRESIDENT declared the following six duly elected Annuitants:—

Chenery, Kate K. M.
Fife, George.
Horncastle, Anne.
Morris, Mary.
Rossiter, Anne Hurry.
Stone, Thomas William.

The PRESIDENT proposed that a vote of thanks should be given to the Scrutineers for their long and arduous duties. He also alluded briefly to the present state of the Fund, saying that at a time when six fresh annuitants had just been elected it would not be out of place to point out that if it were desired to continue to elect four or six annually the onus would lie on the future to provide the necessary means.

Mr. BUTT suggested that an appropriate manner in which chemists and druggists might celebrate Her Majesty's jubilee next year would be to quadruple their subscriptions to the Benevolent Fund.

The vote of thanks was awarded unanimously.

* 5836 voting papers issued.

Transactions of the Pharmaceutical Society.

EVENING MEETING.

Wednesday, December 8, 1886.

MR. MICHAEL CARTEIGHE, PRESIDENT, IN THE CHAIR.

The third ordinary meeting of the session was held on Wednesday the 8th inst., at 8 o'clock.

The PRESIDENT, in introducing Surgeon Aitchison, the author of the first paper, stated that he was the man of science attached to the Delimitation Commission in Afghanistan, about which so much had been heard politically. It was very gratifying that the Society should have an opportunity of hearing an account of the plants and plant products of Persia and Afghanistan by so distinguished a naturalist.

SOME PLANTS OF AFGHANISTAN AND THEIR MEDICINAL PRODUCTS.

BY J. E. T. AITCHISON, C.I.E., F.R.S.

The paper is printed at p. 465.

At the conclusion of the paper, the President, before inviting discussion, called upon Mr. E. G. Baker to read some—

NOTES ON A SAMPLE OF GALBANUM FROM FERULA GALBANIFLUA.

The paper is printed at p. 468.

The PRESIDENT then invited Dr. Trimen to open the discussion.

Dr. TRIMEN said it had given him great pleasure to hear this paper. Very few had had the opportunity of collecting these curious plants in their native localities, and the great difficulty which botanists had always laboured under in endeavouring to determine accurately the botanical origin of the gum-resins of the Umbelliferæ, was that the materials at their command were so scanty. This was almost the first time that there had been fair specimens to work from in dealing with the question. Botanists were particularly indebted to Dr. Aitchison for being so conscientious in the mode in which he had collected the specimens, especially considering the great difficulties under which he must necessarily have laboured; for, from all he had heard, the position of a botanist attached to a military force was by no means an enviable one. He was not prepared to criticize any of Dr. Aitchison's results. Some years ago when working at the botanical part of 'Medicinal Plants' he had occasion to deal with the sources of ammoniacum and galbanum, and was then under very great difficulty for want of materials. He had not found, for instance, any species yielding galbanum in any herbarium in England, and he had to write to Professor Bossier of Geneva, who sent him a specimen of *Ferula Galbaniflua*, which was drawn in 'Medicinal Plants.' He was glad to find that the species Dr. Aitchison had brought over was clearly the same as was then figured. It was an extremely characteristic plant, the foliage being very different from that of all the other Umbelliferæ. There were no seeds available at that

time, and the petals were described as glabrous, following Dr. Bossier, but it now appeared that they were hairy. With respect to the source of ammoniacum, he was dependent on some specimens in the British Museum, collected by Dr. Loftus in the expedition he made from Persia in 1850. He then collected what he considered to be the *Dorema ammoniacum*, and some of those specimens were in the British Museum. But it was found that Loftus's plant had glabrous leaves, thereby differing from the true *D. ammoniacum*, and it was accordingly figured as one of two species yielding the drug. Dr. Loftus brought home not only a good series of plants, but a good specimen of the resin, which was also in the British Museum, and it was very much like the specimen shown that night; it was like ammoniacum, only darker in colour and similarly odorous. It had never been examined chemically. The plants of that series were clearly *Doremas*, though of another species than *D. ammoniacum*. Dr. Loftus's collections were made more in the south-western part of Persia, and the plant therefore seemed to have rather a wide range. He also collected another plant, which he called *D. robustum*, and though there were only fruits in the Museum it was evidently another species; the resin also was extremely different, having much more of the nature of a pure resin. Those specimens were the only material he had for working out the ammoniacum plants at the time, but with these additions now made it ought to be possible to get much closer to the real facts. The genus *Dorema* was extremely interesting on account of the polygamy of the inflorescence, both sexes being united on the same plant, which was an unusual character among the Umbelliferæ. It was interesting to hear that these Umbelliferæ were, as he understood, so decidedly annual, or rather less than annual, coming up in spring, and being entirely over by August.

Dr. AITCHISON said the asafœtida root-stock was perennial, but it only flowered once in four or five years.

Dr. TRIMEN asked if it were not the case that many of the plants alluded to came from Persia, not all from Afghanistan.

Dr. AITCHISON said most of the specimens were collected in the Hari-Rud Valley; everything not included in that he marked off as Khorasan.

Dr. TRIMEN said it was very interesting to find these three Umbelliferæ all agreeing so closely together. Dr. Aitchison had had the opportunity of settling not one question only, but two or three of great interest to pharmacists.

Mr. J. G. BAKER remarked that what Dr. Aitchison had put before the meeting that evening represented but a small portion of his work. Going back twenty years botanists as well as pharmacists had been much indebted to him for working up the flora of the Punjab, and writing a book on the subject. Again, three or four years ago he was appointed naturalist to the expedition to Afghanistan, previous to which time very little was known of the flora of that country, hardly anything except what has been ascertained by Griffiths, who accompanied the army in the first campaign thirty or forty years ago. Dr. Aitchison made large collections, which were worked up at Kew by himself and Mr. Hemsley. A special interest attached to the flora of that central portion of Asia, for this reason. There were three large Asiatic flora: the great Indian flora, numbering some 15,000 species; the Siberian flora, which was very characteristic; and the Oriental flora, which was extremely rich and peculiar, and the district in which Dr. Aitchison had worked was just the central point where these three met. His former collections had been pretty well worked out at Kew, and he had now brought home about 800 species more, so that in consequence of his collections botanists were in an entirely different position with regard to the flora of Central Asia to that in which they had been before; and he had really made a most valuable contribution to systematic and geographic botany. It was also a great satisfaction to botanists to have such perfect material to work with; very often they had to try and determine a species from very fragmentary materials, but Dr. Aitchison's characteristic was the great thoroughness with which he worked. Dr. Aitchison knew what was wanted, and spared no pains and avoided no risk to bring home complete material. Having himself worked through some portion of that material he wished to bear testimony to this point. Of those 800 species, about 150 were entirely new; 30 which had passed through his own hands were entirely new, and in most cases there was complete material for recording everything about them, which a botanist could require to know. He might say also that pharmacy and botany formed only a small portion of Dr. Aitchison's work. One of the alcoves at South Kensington was filled with the zoological specimens he had brought home, including beasts, birds, turtles, tortoises, butterflies and insects, and in the Zoological Gardens would be found a very fine tiger which he also brought. He might mention that he believed one identification had been made that afternoon as the result of Dr. Aitchison's work. In the 'Science Papers' of Daniel Hanbury there was a paper on a drug called "royal salap," also called "badjah," or "king salap," a specimen of which he had obtained from Dr. Stocks, which was at that time the only one; but shortly before writing that paper a package containing about 100 lbs. had come from Bombay, and Mr. Hanbury tried to make out its botanical origin. It consisted of a curiously conical substance, very rugose on the surface. All the other salaps were orchidaceous tubers, but this was extremely hard on the surface, and having been worked at by Mr. Oliver in the laboratory at Kew, and also by Mr. Johnson, Demonstrator of Botany at South Kensington, they found the structure to be exactly as shown in the illustrations to Mr. Hanbury's paper. There was an extremely thick horny substance on the outside, but on cutting there was found in the middle a small kernel. Of course a tuber was uniform in structure, but this showed the structure of a bulb, though no other bulb was known of precisely similar structure. That afternoon, however, he believed it had been identified. Mr. Hanbury tried to do so in vain; he showed it to Lindley, who said it was a bulb and suggested its affinity with the tulip, but a tulip was totally different in character. On that hint, however, he (Mr. Baker) went into the gardens and found a living bulb of extremely similar character. He had not cut it, as he wished it to grow, but he had no doubt himself that this was the plant. At the base there was a root cap with an enormous number of small rootlets, and they knew this bulb to belong to the Amaryllidaceæ, the *Ungernia trisphœra*. The *Ungernia* was a very little known genus, but Dr. Aitchison had brought home several bulbs which he hoped it would be possible to raise. This would remove the question entirely out of the range botanically of the other salaps; it was more like the bulbs which grew in similar arid regions in the centre of Africa, such as the *Hæmanthus toxicarius*, which was used by the kaffirs for poisoning their arrows. He hoped someone would also investigate the question from a chemical point of view. Mr. Johnson was going to work out in detail if he could the meaning of the peculiar thickening in the penultimate tissue; besides that there was an enormous number of thin membranous tissues which proceeded from the net at the base, but from a structural point of view it certainly presented very great peculiarities, and he should think it was worth working out pharmaceutically. Dr. Aitchison therefore seemed to have solved a problem which had been before the pharmaceutical world ever since 1856. What he had done with regard to the gum resins was only an additional proof of the value of his work.

Mr. HEMSLEY being called on, said Mr. Baker had gone so thoroughly into the subject that there was nothing left for him to say; except that having had the honour of being associated with Dr. Aitchison in deter-

mining the species of his former Afghan collection, he could say that in all his experience he had never met with such full and excellent material.

Mr. JACKSON had great pleasure in bearing testimony to the excellence of Dr. Aitchison's economical collection. It was a great thing when a botanical collector paid attention to economic products as well as to the collection of specimens of the plants themselves, and wherever Dr. Aitchison went he always brought the products, as well as the plants, whether they were drugs or dye plants, as in the case of delphinium. Whatever uses they had he never missed them.

Professor BENTLEY, after confirming what previous speakers had said as to the complete character of Dr. Aitchison's work, said he had not yet had an opportunity of examining these specimens carefully and therefore could not say much about them; but with regard to the ammoniacum he noticed that Dr. Aitchison's account of the mode of collection seemed to agree with what had been previously stated by Sir John MacNeil, many years ago, that it was an exudation caused from the puncture of a kind of beetle. He was glad to find that the galbanum had been worked at so well chemically by an old pupil that there was no question that the specimen of galbanum shown chemically resembled that ordinarily found in commerce, and if the *Ferula Galbaniflua* was proved to produce this gum by its being tested chemically and giving indications of umbelliferon it was very satisfactory as showing that the plant did yield galbanum. He understood it was a natural exudation and he should have liked to know whether there was any proof that the quality varied at all according to the time at which it was collected and prepared for the market, though of course it would not exude to any great extent, except when the gum-resin was in perfection. Still, galbanum did vary a great deal, and there was one kind which Mr. Hanbury described as smelling something like savin. He should also like to know if Dr. Aitchison came across *Ferula rubricaulis*, or any other species; if so it might throw some light on the different kinds of galbanum found in commerce. He did not gather whether the *Dorema flavum* yielded ammoniacum, as *Dorema Aucheri* did, and that appeared to be very good. It would be very useful to have these further examined if sufficient quantity could be obtained. He did not quite gather what was said about *Ferula suaveolens*, but sumbul was spoken of just afterwards, and he was not sure whether he referred to that as a source of any root resembling the true sumbul. The question of manna, again, was very interesting, and he had never before heard of its coming from the Contoneaster. He knew of manna from various plants, namely, the ordinary manna, alhaji manna, tamarisk and larch manna, and, although he had never seen it, from the cedar of Lebanon; a species of *Cistus* also was said to yield manna, and species of *Eucalyptus*, and Hanbury mentioned a species of the evergreen oak as yielding it. Within the last year he had had a specimen sent him, which he believed was quite unique, from the interior of British Columbia, of, so far as he could ascertain, *Pinus Douglasii*. He had written for further information about it, and should be glad to communicate it to the Society when received. Kuteera gum was another matter Dr. Aitchison seemed to have set at rest. Up to now, this gum had been more generally referred to two different plants, one a *Cochlospermum*, and the other a species of *Sterculia*. With regard to salap, what Mr. Baker had said reminded him that some had come under his notice after Hanbury's paper, and his remembrance was that it had not the appearance of a tuber of an orchid, but was more like the bulb of some amaryllidaceous plant. He did not gather whether Dr. Aitchison intended to refer the sarcocolla to an *Astragalus*.

Dr. AITCHISON said he did not refer it to anything; he only said it was a gum obtained in those localities; he left it to others to determine the plant.

Professor BENTLEY said there was a difference of opinion between Professor Flückiger and others as to the source of this gum.

Mr. HOLMES said that as Curator of the Museum he felt deeply indebted to Dr. Aitchison, not only for the excellent specimens of Afghanistan drugs presented to the Society, but for having set at rest the botanical sources of so many interesting drugs, to which he (the Curator) had not been able hitherto to assign a name and place in the Museum. The herbarium specimens exhibited by Dr. Aitchison were so carefully collected, and so excellently preserved, that he learned with surprise that evening for the first time that Dr. Aitchison had been successful as a zoologist. It was very rare to find a naturalist who collected equally well both animals and plants. By his investigations into the botany of Afghanistan Dr. Aitchison had added very largely to our knowledge of materia medica, and cleared up many important points that had long been held in doubt. With respect to asafœtida Dr. Aitchison clearly showed that the bulk of the ordinary asafœtida in commerce was derived from *Ferula Scorodosma* and not from *Ferula Narthex*, and with regard to galbanum, the specimens brought by Dr. Aitchison so closely corresponded with one of the specimens of galbanum in the Museum of the Society (No. 278A) that there could be little doubt that this specimen might be referred to *Ferula galbaniflua*, and that the other two varieties in the Museum probably had a different source since they were not identical in odour or character with the above. All three of the Museum specimens had been submitted to chemical tests by Mr. E. G. Baker, and evidently could not be regarded as identical products. Previous speakers had alluded to the colour of the various gum-resins. It should be pointed out that ammoniacum in particular was very liable to become darker in colour; although white when first imported, on exposure to the light it gradually assumed a yellowish-brown colour; the character of colour alone could not therefore be regarded as a distinguishing feature. It was of course possible that age might also affect the results obtained by chemical colour tests, but of this there was not as yet sufficient evidence. The *Psammogeton setifolius* was of interest on account of resembling cumin in flavour, the only other fruit which he recollected as possessing the same flavour being *Carum nigrum*, which is sold in some of the Indian bazaars. Anzeroot, or sarcocolla, as it was more generally called in this country, was, as Professor Bentley suggested, evidently the product either of an *Astragalus*, or a closely allied genus. The flowers and fruit had been described in Dr. Dymock's 'Materia Medica of Western India,' and Dr. Dymock had sent specimens of the small hairy pods to the Museum of the Society. It was important to have been able to refer the varieties of salep to their respective botanical sources, although the plants *O. latifolia* and *O. laxiflora* were both natives of Great Britain. If the late Daniel Hanbury could only have been present he would have been deeply interested to have listened to this valuable paper, and especially to have learned that the "royal salep," in which he took so great an interest, had at last been referred to its botanical source. Dr. Aitchison had spoken of future travellers finishing his botanical investigations in Afghanistan. He (the Curator) hoped that if any other botanist did visit that country, he would work as carefully, thoroughly and conscientiously as Dr. Aitchison had done. Although much had been accomplished already, there was still more to be done; for instance, although opopanax and sagapenum had been known for several hundred years, there was still complete ignorance as to their botanical source. Seeing that a knowledge of the country and of the flora already collected would be of the greatest value in future researches, he could not conceive that anyone could better conduct further botanical investigations in Afghanistan and the neighbouring countries than Dr. Aitchison himself.

Professor BENTLEY said asafœtida had been especially referred to the *Ferula Narthex*, and also to the *Ferula Scorodosma*, but it had always been said that the chief mart for it was Afghanistan. Dr. Aitchison seemed now to have set the question at rest, and proved that the latter plant was the principal source of asafœtida.

Mr. HOLMES remarked with regard to the plant which was supposed to be an allied species to that which yielded the sumbul root, the *Ferula suaveolens*, although it was said to be perfumed in the fresh state, the specimen exhibited had very little odour. About a year ago a variety of sumbul was imported into this country which had hardly any odour, and which was much smaller than the ordinary kind; possibly it might have been derived from the plant Dr. Aitchison mentioned.

The PRESIDENT, in proposing a vote of thanks to Dr. Aitchison, desired to express how much all present appreciated the consideration he had shown in allowing them to examine both the botanical specimens and the plant products. Probably he would not be sent to the same region again, but wherever he went he would have opportunities of which he would be sure to make abundant use; and when he returned by-and-bye from some other distant part of the world they would undertake to investigate from a chemical and pharmaceutical point of view anything he might bring. What had been done by Mr. Baker showed that there were some amongst them who were quite willing to work, and he hoped that before many years had passed the Society would possess a research laboratory in which all such work could be carried on systematically, with the assistance not only of chemists and pharmacists but, if need be, of botanists and pharmacologists. He had also to include in the vote of thanks Mr. Baker for his useful notes on galbanum.

The vote of thanks having been passed unanimously the meeting adjourned.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

On Wednesday, the 1st instant, the monthly meeting of the Council was held at the Society's rooms, No. 11, Harcourt Street, Dublin.

The President, Mr. William N. Allen, in the chair.

The other members of the Council present were the Vice-President, Mr. Draper; Messrs. Hayes, Doran, Wells, Beggs, Grindley, Brunker, Dr. Collins, Professor Tichborne, Mr. Simpson and Dr. Montgomery.

The President: Gentlemen, the Vice-President before commencing the business wishes to make a personal explanation.

The Vice-President: It will be remembered that at the meeting of the Council held on the 1st of last September the report of Dr. Duffey on the July examination was read; that report included the following statement: "That one examiner was allowed, apparently from pecuniary considerations solely, to discharge the duties that three examiners were elected to perform." In the course of the discussion which ensued I said: "It is not a pecuniary question" Some weeks afterwards I received a letter from Dr. Duffey calling my attention to the fact, hitherto quite unknown to me, that my statement was not in accordance with some remarks made by the President at the meeting on the 7th of April or with the terms of a letter addressed on the part of the Council at the same meeting to Sir William Kaye. Dr. Duffey further requested that I would withdraw or justify my statement at the next meeting of the Council. I cannot better explain my position in the matter and at the same time fulfil my promise to Dr. Duffey than by quoting from my reply to his letter. I wrote on the 11th of October:—"Anything I said concerning your report I then supposed and still believe to have been not only fair but adulatory comment upon it. But I did not know until now that the question of expense had before arisen. I was absent from Ireland during the whole of April and have never read the report of the meeting of the 7th until to-day. Ignorant of what had passed I simply, in the sentence to which you object, expressed my own views. At the next Council meeting I will most cheerfully make the explanation you desire. I have only to add that having been again away from home during the interval between the date of this correspondence and the last meeting of the Council the subject unfortunately escaped my memory, or I should, as I intended, have mentioned it at that meeting." I make this explanation now simply in accordance with Dr. Duffey's request and in reply to a very long letter from him in which he seems to have found himself aggrieved. I made a mistake—that is all—and I apologise for it.

Letters were received from Dr. Tweedy, Dr. Whitla, and Mr. Harry C. Draper, thanking the Council for re-electing them as Examiners.

A letter was received from Mr. Alfred H. Bolton, stating that he attended the first day of the October examination, but was prevented by illness from appearing on the two following days; and he now, under the circumstances, asked leave to present himself at the January examination.

The President: I think he should be allowed to come up in January if he pays 10*s.* 6*d.*, the fee of the examiner in chemistry.

Mr. Hayes: How did he get on in chemistry?

The President: He got on very poorly according to Dr. Duffey's report.

Mr. Brunker said he did not think it was necessary to go into particulars of the case. The young man was not thoroughly examined and was not rejected. If within three months he felt prepared to face the ordeal of an examination again they should let him in on his paying the fee.

Mr. Hayes moved that Mr. Bolton be accepted as a candidate at the January examinations on his paying a fee of 10*s.* 6*d.*

Mr. Brunker seconded the motion.

Professor Tichborne: Would it not be desirable to say "examiner's fee" in the resolution? We are not asking for the 10*s.* 6*d.*

Mr. Brunker: It is better not to enter into any explanations. He asks a favour and we state the terms on which we will grant it.

Professor Tichborne: The resolution is satisfactory to me as it stands, but it may not look so satisfactory towards the public.

The resolution was agreed to.

A letter from Mr. Samuel Kammond, of Weybridge, Surrey, stated that he was at present attending lectures at Woodland's School of Pharmacy, and going through the whole course of practical chemistry, and asked would the Council accept these in lieu of lectures at the South Kensington School of Science, which he could not attend.

The President: I do not think we can do anything. There are no other schools that we can add to the number already admissible.

Mr. Brunker: This matter will receive some attention from the Council before long. I think our present arrangements as to schools of chemistry require modification, and under the circumstances I do not think it is advisable to extend our list until the matter has been fully considered.

The President: We cannot do so without the consent of the Privy Council.

Mr. Brunker moved that the Registrar be directed to inform Mr. Kammond that the Council are not disposed to extend the list of chemical schools recognized by the Society at present.

Mr. Doran seconded the motion, which was agreed to.

A letter was received from Mr. J. B. Neville, Acting Clerk to the Privy Council, forwarding the following report of Dr. Duffey on the October examinations:—

"May it please your Excellency—I have the honour to report that I attended the examinations of the Pharmaceutical Society of Ireland held upon the 4th, 6th, 7th, and 8th insts. For the Preliminary examination eight candidates presented themselves, four of these were rejected, one of the rejected candidates having previously failed to pass the same examination. He scored the same total of marks at each examination. The cause of rejection in each instance was as much due to defective general knowledge as to ignorance of the special subjects, viz., elementary chemistry and elementary botany. This examination was conducted as heretofore by one examiner only (*vide* former reports). In the Regulations of the Society for the Preliminary examination, the only book that is laid down as comprising the scope of the "rudiments of chemistry" the candidate is to be examined in, is a most excellent work, by a well-known authority and teacher, on 'Experimental Chemistry.' The system pursued in this work is a novel and admirable one. The student is proposed to be trained by the 'experimental method,' viz., by making and studying himself a series of connected experiments. But it is assumed that he should have the necessary assistance of a teacher in making many of these experiments, as well as practical instruction in a laboratory or elsewhere in the construction and use of chemical and other apparatus. The great want of such a system of training in those who present themselves for both the Preliminary and Final examinations is most apparent. But the Preliminary examination is not conducted on these lines. Students require to be taught how to learn chemistry practically; they can rarely master the subject unassisted. Until the Society, with this in view, makes their Preliminary examination to a limited extent practical as their Final examination to a wider extent should then be and now is, it would be, I think, desirable to indicate the range of subjects in the examination, as is done now in the case of other examining bodies. I should also recommend for the consideration of the Council of the Society the advisability of including a limited course of chemical physics in the Preliminary examination. At present it would seem intended that the examination should be more purely a theoretical one than the chemical text-book recommended would imply, and that the practical examination, as is now the case, should be reserved for the Final examination. This is a course which, under existing circumstances, seems the best. *Mutatis mutandis*, the remarks I have made above with respect to chemistry apply also to botany. It would be better, I respectfully submit, to define the range of botany that would be examined in than to indicate one particular book on that science, which, notwithstanding its merits, a student might cram himself up in a few days before the examination, with the demoralizing result of knowing really nothing about the subject. For the examination for the Licence there were eight candidates. One of these, who had failed previously last April, withdrew from the entire examination after doing badly in theoretical chemistry; and six others were rejected. Only one candidate, therefore, out of the eight passed. In addition to the candidate who had failed previously and withdrew from this examination, which should be considered as a rejection, three of the other rejected candidates had also failed previously. Four of the unsuccessful candidates failed to obtain the total number of marks in the examination in order to pass. Two of the unsuccessful candidates, the cause of whose rejection was the want of 4 marks, in each case, in practical chemistry, out of a passing mark of 20, scored more than was required for a pass on the total marks for chemistry (theoretical and practical combined). They also scored respectively 21 and 5 marks more on the grand total than the single successful candidate did; and 35 and 19 more respectively than the total required to pass. One of these two candidates, who, as I have stated, failed by so few marks in one part of one subject, scored 90 per cent. in botany and materia medica. The successful candidate got a mere pass mark in botany. These facts call again most strongly in my opinion to the desirability of the examiners consulting together as to the passing or rejecting of a candidate after a consideration of the merits of each case. According to my reading of the regulations of the Society it is compulsory on the examiners to do so, and to vote, in person, on each candidate (*vide* Order in Council, January 26, 1876, and my report to his Excellency the Lord-Lieutenant, in January, 1886). Although the regulations of the Society as to the number of marks to be obtained in each subject, and part thereof, in order to pass the examination tell in most cases in the interest of the candidates, it is easy to see that a man whom the other two examiners considered would make a good pharmaceutical chemist might be rejected by one examiner in consequence of a comparatively unimportant mistake in his answering. In such a case—and some such, I think, have arisen—there should be a consideration of a man's answering on the whole examination. It should be remembered that the examination is not a competitive one. The same number of questions are not given orally to each candidate. Judgment should, therefore, be passed, not by an official adding up a number of marks, arbitrarily used to represent each examiner's opinion of the candidate, but on a review of the whole style and character of his answering, of his general intelligence, and of the extent of what he really does know. Should the present mode of marking in the examination be continued, it is obviously unnecessary that when an examiner has rejected a candidate, that candidate should be further examined. Thus, on the last occasion two of the three examiners had to examine, on two days, six candidates who were, as a matter of fact, rejected on the first day. This is hardly fair to either examiner or candidate; on the latter it must in many cases impose a wholly unnecessary pecuniary and mental tax. All the unsuccessful candidates failed in practical chemistry; two, as previously stated, in it alone. The instruction of the average candidate in chemistry is deficient, and there is evidence of too much "cramming" for examination in it. The present examination of the Society is very properly a searching and strict one. Whether this standard should be kept up, even at the risk of reducing the number of candidates for the title of pharmaceutical chemist rests with the Society. If the Society desires that its licentiates should be more than mere mechanical compounders and salesmen and should have a real knowledge of practical and theoretical chemistry, higher even than the examination standard which at present so many candidates fail to attain and which if attained would probably never be utilized by the average man for the advancement of pharmaceutical knowledge or the credit of the Society, its regulations as to the attendance required on a practical course of chemistry in recognized laboratories would seem to need revision. What, however, would be most beneficial to the advancement of pharmacy in Ireland would be the establishment, in connection with the Society, of a school of pharmacy, in which courses of systematic and practical instruction in the subjects specially required by pharmaceutical students would be given by competent instructors. Such a School exists in connection with the Pharmaceutical Society of Great Britain, and is most successful. Unfortunately, the Pharmaceutical Society of Ireland has not, I believe, funds available for such a purpose, although the subject has been often under its consideration, and its desirability acknowledged.

"I have, etc.,

(Signed) "GEO. F. DUFFEY, M.D."

The President said he thought the question of the reply had better be taken into consideration at the next meeting of the Council, gentlemen would then have had an opportunity of seeing Dr. Duffey's report in print.

At the same time he should be glad to hear any observations on the report now.

Professor Tichborne said that to him at any rate Dr. Duffey's report was particularly interesting. At the last meeting of the Council, when such an extraordinary and violent personal attack was made on him, the reports of the Visitor were thrown at his head as if that gentleman were particularly in love with the examinations. Now at that time he was not particularly well posted up in the reports of Dr. Duffey, but he had since looked them up and had found to his surprise that hardly one of them was in favour of the mode in which the examinations were conducted. But his last report capped them all and he was more than ever decidedly in favour of a change in the mode of conducting them. And yet, because he (Professor Tichborne) in a reasonable manner proposed that a committee should be appointed to inquire into them, it seemed that he had fluttered some particular dovecote in an extraordinary manner, for it ended in a most scurrilous attack being made upon him. Now, however, he was going to put all that behind; let bygones be bygones. But he would state that so long as he possessed the suffrages of the members of the Pharmaceutical Society—and he was glad to say that he still possessed their confidence second to none—he would always exercise his rights as a member of the Council whenever he saw anything that he thought needed reform. His criticism of the markings at the examinations, which he thought looked peculiar, was perfect child's play to Dr. Duffey's report, and yet he had been supposed to be in perfect harmony with the existing system. At the same time he quite agreed with the Chairman as to the advisability of postponing the discussion on the report.

Mr. Brunker said Dr. Duffey concluded his report by saying there was a bye-law of the Society in existence which made it necessary that the examiners should meet. That was not so. The bye-law simply stated that "when the examiners did meet, the President, or the Vice-President, of the Society, or any other member of the Council who was present, should preside thereat." It was, therefore, rather a straining of the sense of the bye-law, as originally framed, to say that it required the examiners to meet.

Dr. Montgomery said he thought Dr. Duffey's report upset their present system of examining altogether. If they were to be guided by what he said they would have to frame a new system. He was sure that Dr. Duffey, in the analysis which he made of their examinations, spoke sincerely, and had the best interests of the Society at heart. Certainly, his observations would require a great deal of consideration. He objected to that body being so scientific in its plan of examination, if he (Dr. Montgomery) understood his report rightly.

Mr. Brunker: You are quite mistaken.

The Vice-President: Not at all; he wishes that the examinations should be even stricter than they are at present.

Mr. Wells: He says that if you want scientific pharmacists you must have stricter examinations.

Dr. Montgomery said what struck him in the report was the remark as to the attainment of a standard "which if attained would probably never be utilized." The Council would have to consider whether it was really essential that they should establish a higher standard of chemical knowledge than they had at present, and should give up the plain standard they had hitherto had, and which he thought had answered so well. If they adopted a higher standard, they would certainly restrict the number of candidates, and pharmaceutical chemists would say *cui bono*?

Mr. Brunker said the meaning intended to be conveyed was not a condemnation of the standard at which the Council at present aimed, but that the practical education which they were able to obtain at the present moment was not sufficient to enable them to come up to that standard. They should remember that they had to keep up that standard not only as Irish pharmaceutical chemists, but in order that it should be as near as possible to the standard occupied by the British pharmaceutical chemist. What the Visitor was speaking of was the opportunities young men had of obtaining practical instruction at the present moment; and he acknowledged the advisability of having a school of pharmacy.

Professor Tichborne said he believed it was contemplated by the Examinations Committee to ask the Council to further appoint them; and he would propose that they should consider Dr. Duffey's report and report upon it to the next meeting of the Council.

The President: That Committee was appointed for another purpose.

Mr. Hayes said that Dr. Duffey's remarks bore upon that purpose, and it would be just as well that the Examinations Committee should take his report into consideration.

The President: It has been stated that Dr. Duffey is down on our examinations.

Dr. Montgomery: I would not say "down" on them.

Professor Tichborne: Do you refer to my remarks, Mr. President? I did not say that.

The President said Dr. Duffey's statement about the examinations of the Society was that they were at present very thorough and searching and strict. His report did not find fault with them or with the examiners, but with the amount of knowledge that the candidates displayed. That was what the whole thing was about from beginning to end. He said that they were not prepared and that the Society ought to have a school of its own.

Mr. Brunker suggested that the subject should be allowed to lie over. The Examinations Committee asked to be reappointed, as they had not finished their work. Dr. Duffey's report should be referred to them.

Professor Tichborne moved that Dr. Duffey's report on the October examinations be submitted to the Examinations Improvement Committee in order that they might frame a reply thereto and report to the Council.

Mr. Simpson seconded the motion, which was unanimously agreed to.

The President said the Preliminary Examination Marks Committee had had one meeting, and had referred some matters to Dr. Tweedy. They had not yet received his reply, and therefore their report could not be made until the next meeting of the Council.

Mr. Brunker then stated what had been done up to the present by the Examinations Improvement Committee. They had had full meetings on November 1 and 10. It was decided to postpone any matters on which they were not unanimous. Accordingly a proposal of Dr. Collins that candidates who answered well in particular subjects at an examination should not be re-examined in those subjects was postponed for further examination. On the motion of Dr. Collins the Committee agreed that candidates who were rejected should, upon their own application, be informed by the Registrar in what subject they had failed, but not given their marks.

Mr. Simpson: I think we are all unanimous about that.

The recommendation was passed.

Mr. Brunker said the next recommendation was made on the motion of Professor Tichborne, and was that in order to enable all candidates for examination in practical chemistry to be examined at the same time two benches should be provided.

The Vice-President: I think it a great pity that the whole of the examinations are not taken up on the same day.

The President: So do I.

The matter was referred to the House Committee.

Mr. Brunker: If you could get a sufficient number of members of the Council to attend to help the examiners it could be done.

Mr. Hayes: If the examinations were all held on the one day you could easily get men to attend.

Mr. Brunker said the next proposition the Committee had had to consider was one by Professor Tichborne. that the examiners should be asked to meet at the close of the examinations for the purpose of considering doubtful cases. This was favourably entertained but had been postponed for further consideration, and it was ordered that in the meantime the views of the examiners should be ascertained. A proposal that candidates should be allowed to carry away their examination papers at the close of the examinations had been agreed to.

The last recommendation was approved of by the Council.

Mr. Brunker, in continuation, stated, that on November 29, at another meeting of the Committee, the proposition of Dr. Collins, that rejected candidates should not have to be re-examined in branches in which they had passed well, was again taken into consideration, but the feeling of the Committee was against it. Letters were read from the examiners consenting to meet after the examinations. The report of Dr. Duffey was then read to the Committee, and on the motion of Dr. Montgomery, seconded by Mr. Brunker, it was resolved that further discussion on the subject should be postponed, and that the Council should be requested to reappoint the Committee.

At the request of Mr. Grindley the letters from the examiners were read.

Mr. Brunker said that if the practice of a conference between the examiners should be adopted, some modification would have to be made of the hard and fast way of marking; but he did not think the difficulty was insuperable. The system of marking might be left as it was, but a discretion might be given to the examiners to make concessions where they thought that the intelligence and information of the candidates justified it.

The Vice-President said a difficulty in the matter was that the marks were registered. Were they afterwards to be stultified by an alteration in the opinion of the examiners? The only possible way of dealing with the matter was by sweeping away the present system of marking, and allowing the examiners to mark in any way they pleased for their own guidance, and each of them to say "yes" or "no" as to whether a man was to pass or not. If there was a doubt as to the competency of any candidate, let there be a conference of the examiners about him. But he did not think it would be possible to maintain the present system of marking and have the conference of examiners as well. They would differ, and there would be no end of trouble arising out of it.

Professor Tichborne said the Committee would be quite competent to thresh out the whole question.

Mr. Simpson said he did not think they could have a better system of marking than the present.

A motion for the reappointment of the Committee was then passed.

The Vice-President moved that the name of Mr. Simpson be added to the Committee. He knew that Mr. Simpson's views were against his own, and therefore wished to have him on the Committee. Their only object was to get at the best result.

Mr. Begg seconded the motion, which was agreed to.

On the motion of the President, seconded by Mr. Brunker, Mr. William Carbett Hendry of Dungarvan was elected a member.

Mr. Brunker: It would be well to ascertain if Sir Michael Hicks Beach will receive a deputation from the Council while he is here.

The President: I will direct Mr. Ferrall to write to him asking when it will be his convenience to receive a deputation relative to the Pharmacy and Poisons Act, before the opening of Parliament.

Some financial business was then disposed of, after which the Council adjourned.

Proceedings of Societies in London.

CHEMICAL SOCIETY.

At the meeting of the Chemical Society on Thursday, December 2, W. Perkin, Esq., Ph.D., F.R.S., Vice-President, in the chair, several certificates were read for the first time, and the following were elected Fellows:—Messrs. J. A. Audley, C. A. Bell, J. W. Bevan, C. R. Blackett, W. B. Bottomley, E. J. Cox, J. Fuller, A. Galt, T. F. Garwin, S. J. Harris, G. C. Holt, H. E. Kirby, H. A. B. Leissner, J. B. L. Mackay, H. O'D. Macan, J. B. Mackintosh, E. L. Marks, N. A. F. Moos, H. Pickington, L. S. M. Pyke, E. Quayle, J. Schleselman, H. Silvester, A. Turner, A. H. Twining, W. Walker Jun., R. Williams.

The following papers were read:—

Bismuthates. By M. M. Pattison Muir and Douglas J. Carnegie.—The authors have attempted to isolate definite compounds of Bi_2O_5 or Bi_2O_4, with K_2O, but without success. They find that very long-continued washing with hot water is required to remove all the potash from the solid products of the reaction between BiO_3H_3 or BiOCl, very concentrated potash solution and chlorine. They show that $Bi_2O_5.xH_2O$ dissolves in about one hundred times its weight of a boiling solution of KOH in a little water, and that yellowish-white solids are obtained by nearly neutralizing this solution; that these solids may be washed free from potash by boiling water, and that the residual bodies then contain more oxygen than Bi_2O_3, and nearly approach the composition Bi_2O_4. They conclude that $Bi_2O_5.xH_2O$ exhibits feebly acidic functions in its reaction with a large mass of very concentrated potash solution; that under these conditions compounds of the form $xBi_2O_5.yK_2O$ (or perhaps $xBi_2O_4.yK_2O$) are probably formed, but that such compounds can only exist, if at all, in presence of large quantities of potash. The authors give reasons for regarding the formulæ given by C. Hoffmann (*Annalen*, ccxxiii., 110) to so-called potassium bismuthates as of little if any value.

The Action of Inorganic Compounds on Living Matter. By James Blake, M.D.—The reactions taking place between living matter and inorganic compounds have been investigated by introducing solutions of the substances directly into the veins and arteries of living animals. The action of compounds of more than forty of the elements has been investigated, and the following conclusions have been arrived at:—1st. That the action of these substances on living matter is determined by the electropositive element. 2nd. That their general biological action is connected with their isomorphous relations, substances in the same isomorphous group causing the same biological reactions. 3rd. That in the same isomorphous group the intensity of biological action is determined by the atomic weight, the greater the atomic weight the smaller the quantity required to cause the same amount of biological action. The nature of these reactions is at present undetermined. They most probably are due to contact reactions.

Mr. Lloyd asked whether Dr. Blake had experimented on vegetable matter, and if so, had he obtained similar results? Potash salts appeared to have an action altogether different from that of other members of the group; and it was known also that they affected plants in a special manner.

Dr. Stevenson said that the subject of the communication was one of great interest, but beset with difficulties. Isomorphous substances often acted very differently upon the animal body, as, for instance, in the cases of sodium chloride and potassium iodide. Nor would the differences in the atomic weights of potassium and sodium account for the numerous differences in the toxic properties of their salts. Zinc sulphate and ferrous sulphate are isomorphous, but their physiological actions differ greatly. The magnesium group of metals was asserted by the

author to act upon the vomiting nervous centre, but whilst this might be conceded as true of zinc and cadmium salts, magnesium salts were not usually regarded as emetics. So little was known of the molecular constitution of bodies in solution, that it was hazardous to reason from the isomorphism of solids to their analogies when in solution.

Dr. Lauder Brunton regarded Dr. Blake as a pioneer in the field of pharmacology, and thought his paper interesting and instructive. The conclusions were, however, rather too general, and the exceptions deserving of more attention than Dr. Blake had given them. Thus the action of the chloride, bromide and iodide of sodium is determined rather by the electronegative than by the electropositive element, and this is still more the case with the nitrites, all of which, both organic and inorganic, cause dilatation of the blood-vessels. The first-named salts also differ in action, although isomorphous. Again the toxic power of elements does not rise regularly with their atomic weight, for sodium is less toxic than lithium; but potassium, though more toxic than sodium, is less so than rubidium. The body as a whole is a too complicated reagent, and instead of trying to arrange substances according to their lethal action on the body, a better result would be obtained, he thought, by investigating the effect of different substances on the constituent parts of the body, such as muscle, nerve, and nerve-centre.

Dr. Blake, in reply to a question by Mr. Newlands, stated that he had not experimented on the therapeutic action of boracic acid. He had never before heard of the fact mentioned by Mr. Lloyd, that potash salts exercised an abnormal action on living vegetable matter. The observation was interesting, as of all substances experimented with the potash salts were the only ones whose biological action was not in agreement with their isomorphous relations. This fact, however, cannot be regarded as an argument against his deduction that analogous actions were produced by isomorphous compounds, which was based upon the results of the examination of the biological action of forty-two other elements, potash salts forming in fact the only exception. The statement made by Dr. Stevenson, that the bromides, iodides and chlorides of the same base differed in their physiological action, was a mistake, founded on imperfect methods of experimenting. His own experiments, as well as those of other observers, had shown that such was not the case, The remark by Dr. Brunton as to nitrous acid modifying the biological action of the base was undoubtedly true. Pyrophosphoric end pyrovanadic acids also exerted a modifying influence; but he had shown that the sulphates, nitrates, phosphates, arseniates, carbonates, acetates, chlorides, iodides and bromides of the same base caused the same biological reactions when introduced directly into the blood. To the remark of Dr. Stevenson that it was extremely improbable that compounds of such different elements as are contained in the same isomorphous group should cause the same reactions on the various organs, the speaker would only say that, however improbable such a fact might appear, yet experiment had clearly proved that such was the case. As an example that such was the case the action of the salts of the magnesium group was referred to, all of which act on the heart, on the vomiting centre, on the spinal cord and on the blood, in exactly the same manner.

Morindin and Morindon. By T. E. THORPE, F.R.S., and T. H. GREENALL.—Morindin was discovered by Anderson in the *Surangi*, the roots of *Morinda citrifolia*, which are extensively used in India as a dye-stuff, more especially for dyeing reds, purples and chocolates. The substance occurs mainly in the root bark, and can be extracted by treatment with dilute alcohol, from which it crystallizes in lustrous sulphur-yellow prisms. According to Anderson it has the formula $C_{28}H_{30}O_{15}$. On heating in closed tubes it is decomposed, and yields a sublimate of *Morindon*, crystallizing in long red needle-shaped crystals, to which Anderson assigned the formula $C_{28}H_{20}O_{10}$. According to Rochleder and Stenhouse morindin is identical with ruberythric acid, $C_{26}H_{28}O_{14}$, and hence morindon is alizarin. Stein (*J. Pr. Chem.*, xcvii., 234) has, however, pointed out several facts which are inconsistent with this supposition. Morindin, like ruberythric acid, is a glucoside, but the product which it yields on hydrolysis, in addition to glucose, is not alizarin. The authors have examined this question, and in the main their results agree with those of Stein. They extracted morindin from the roots of *Morinda citrifolia*, for a sample of which they were indebted to the Director of the Royal Gardens, Kew, and have compared its properties with those of ruberythric acid, obtained through the kindness of Dr. Schunk. The two substances are not identical, and they behave very differently on hydrolysis. Morindin gives with sulphuric acid ferric chloride, and on treatment with nitric acid perfectly different reactions from those afforded by alizarin. The analytical numbers obtained for morindin agree closely with those of Anderson; those obtained for morindon indicate that it is probably trihydroxymethylanthraquinone. The quantity of the two products at the disposal of the authors was insufficient to definitely settle the constitution of the substances. Through the kindness of Mr. Wardle, of Leek, they have obtained a large supply of *M. citrifolia*, and also of *M. tinctoria*, and a further communication on the subject is promised.

Mr. Groves said that he had assisted Dr. Stenhouse in the investigation referred to; it was not certain whether the species of *Morinda* examined was *citrifolia* or *tinctoria*. Also it was important to remember that a particular constituent might occur in a plant on one occasion and be absent in another sample, grown, perhaps, under somewhat different conditions. Thus, Dr. Stenhouse had discovered munjistin in the sample of munjeet he originally examined, but had altogether failed to find it subsequently in another sample, which, instead, contained another substance.

The Hydration of Salts: Cadmium Chloride. By S. U. PICKERING.

The Decomposition of Sodium Carbonate on Fusion. By S. U. PICKERING.—The author has investigated sodium carbonate in the manner in which he investigated sodium sulphate (*Chem. Soc. Trans.*, 1884, 686), with a view to ascertain whether the discrepancies in the numbers given for its heat of dissolution could be accounted for by its existence in two modifications, as in the case of the sulphate. All specimens dehydrated at temperatures below the fusing point of the salt gave identical numbers, but the fused salt gave a result 200 cal. higher; this was traced to the decomposition of the carbonate: for on exposure to carbon dioxide that gas was absorbed, and the salt then gave a heat of dissolution 600 cal. less than the normal, owing to the formation of some of the acid carbonate, the necessary hydrogen having been derived from atmospheric moisture absorbed by the decomposed carbonate during its preparation. The amount of carbonate decomposed on simple fusion was about 3 per cent.

Derivatives of Tolylbenzene. By THOMAS CARNELLY, D.Sc. (Lond.), and ANDREW THOMSON, D.Sc. (Edin.).

The Amount of Chlorine in Rain-water collected at Cirencester. By EDWARD KINCH, Royal Agricultural College, Cirencester.—Determinations of chlorine in the rain-water collected in a small 5-inch rain gauge, at the Royal Agricultural College, 443 feet above the mean sea-level, have been made continuously since 1870. The rain collected during the six months April to September is kept apart from that of the six winter months October to March; the chlorine is determined in the mixed waters of each six months. The amount of chlorides in the rain is nearly always greater in the winter months than in the summer months. An abnormal amount of chlorides can generally be traced to storms from the south west, bringing salt spray from the Bristol Channel, about thirty five miles distant. Crystals of common salt have been found after such storms on the windows of the College facing

west. On one occasion, in September, 1869, Professor Church found chlorine equivalent to 6·71 grains of common salt per gallon in storm-water. The rain collected during the winter six months, 1872-3, contained an abnormally large amount of chlorine; excluding this period the yearly averages for sixteen years, 1870–1885, for the twelve years 1874–1885-86, also the means of the last twelve summer periods and twelve winter periods are—

	Rainfall in inches.	Chlorine per million.	Equivalent to NaCl per acre.
Mean of 12 summer periods to 1885 . .	17·04	3·14	19·91
Mean of 12 winter periods to 1885–86 .	17·65	3·58	23·56
Average for 16 years (excluding winter 1872–73)	33·31	3·25	40·33
Average for 12 years to March, 1886 . .	34·69	3·36	43·47

Lawes, Gilbert and Warington have found in the rain collected at Rothamsted, as a mean of six years' monthly determinations, 1·99 of chlorine per million, with a mean rainfall of 33·15 inches, equivalent to 24·59 lbs. of common salt per acre. They found the amount of chlorides in the summer months to be less than one-half that of the winter months.

Some Analogous Phosphates, Arsenates and Vanadates. By JOHN A. HALL, Student in the Laboratory of Owens College.—The author describes a number of phosphates and arsenates corresponding to the vanadates previously described by H. Baker (*Trans.*, 1885, 353); the salts of which an account is given are the following:—

$Na_3AsO_4.19H_2O$, Regular.
$Na_3VO_4.7H_2O$
$Na_3PO_4\ 7H_2O$
$Na_3AsO_4.4\frac{1}{2}H_2O$.

Agricultural Experiments with Iron Sulphate as a Manure during 1886. By A. B. GRIFFITHS, Ph.D.—The author and others have grown various crops with iron sulphate. Mr. Barlow (Oak Lane Farm, Whitefield, Manchester), after treating a plot of land of one-eighth of an acre with 14 lbs. $FeSO_4$, obtained 5287 lbs. of potatoes, while a similar plot, without sulphate, only yielded 4891 lbs. Mr. J. J. Hunter (Newcastle-upon-Tyne) states that he obtained a crop of turnips grown with $FeSO_4$, as good as a similar crop grown with guano and dissolved bones; he states, "it will be far cheaper to use copperas." The author has tested the value of $FeSO_4$ as a manure for hay. Taking two plots of land of the same size, one manured with $FeSO_4$ gave 6962 lbs. of hay (dry) while the other not so manured gave only 3496 lbs. Mr. Barlow has found that iron sulphate is a good manure for onions. The author has grown mangel-wurzel crops with the ordinary artificial manures and top-dressing of nitrate of soda. Two plots were taken of the same size and treated alike as far as artificial manures, quantity of seed used, etc. One plot was dressed with $\frac{1}{2}$ cwt. $FeSO_4$ to the acre. This plot yielded 32 tons of roots; and the other plot (which was treated in precisely the same way, *minus* the $FeSO_4$) gave 26 tons of roots. The author has grown for the third time bean crops. The land manured with $FeSO_4$ yielded 50 bushels of grain, while the other crop (not manured with $FeSO_4$) gave 30 bushels of grain. He also finds that iron sulphate is a good manure for palms and india-rubber trees. He recommends $\frac{1}{2}$ cwt. of $FeSO_4$ per acre at a top dressing. The iron sulphate has proved to be an antiseptic agent of great value for parasitic micro-organisms. The paper shows that $FeSO_4$ is apparently a better manure (for certain crops at least) than kainite. With a top-dressing of $\frac{1}{2}$ cwt. of $FeSO_4$, the author obtained 9 tons potato tubers; and with 2 cwts. of kainite as a top-dressing only 6 tons of tubers. In all crops grown with $FeSO_4$, the albuminoids and soluble carbohydrates are increased. Concerning the ashes of the plants it is found that when the iron manure has been used, the ferric and phosphoric oxides are increased, and the potash decreased in the ashes of all crops.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The third general meeting of the thirty-eighth session was held at the Royal Institution on Thursday evening, Nov. 25.

The President, Mr. A. C. Abraham, F.C.S., in the chair.

The minutes of the previous meeting were read and confirmed and the following donations announced:—*Pharmaceutical Journal*, from the Society; *Canadian Pharmaceutical Journal*, from the Society; *Pharmaceutical Record of New York*, from the publisher; *British and Colonial Druggist*, from the publisher; and the 'Proceedings of the Liverpool Philomathic Society, 1885-86'; from the Society.

A vote of thanks was accorded to the respective donors, and the President then showed a sample of white wax, and one of sulphydrate of magnesium.

CERA ALBA AND FLAVA.

The President (Mr. A. C. Abraham) said, that owing to a remark by a member at a previous meeting to the effect that it was not possible to obtain pure white wax, he had tested some which his firm had in stock, a sample of which he showed, and found the melting point when taken as directed by the Pharmacopœia to be 149°, and as out of seven samples of yellow wax prepared by himself from the comb he found two melting at 148° and the rest at 149°, 150° and 151°, and as this test was confirmed by others, he was satisfied that it was quite genuine. He said that the thermometer he used in this case might be in error, although he thought not, and he considered that the temperature mentioned by the Pharmacopœia was wrong, and that it contradicted itself, because although it mentioned the melting point, it really directed the point at which it became transparent to be noted, and this temperature was higher than the former, as shown by the fact that the wax would actually melt, and rise in the tube before it became transparent.

Mr. Conroy said that he also considered that the melting point in the Pharmacopœia was too low.

The President also showed a sample of solution of sulphydrate of magnesia, which, he said, was now made on a large scale, and was capable, by simply boiling, of liberating thirty-five times its own volume of sulphuretted hydrogen of great purity.

A discussion now took place upon the advisability or otherwise of holding the general meetings in the afternoon, as suggested by some members, instead of in the evening as heretofore.

Most of the members present took part in the discussion, and it was unanimously resolved to continue the meetings in the evening as hitherto.

This concluded the business and the meeting then terminated.

NOTTINGHAM AND NOTTS CHEMISTS' ASSOCIATION.

The annual dinner took place on Wednesday evening, December 1, at the George Hotel. Councillor Fitzhugh, J.P., President, occupied the chair, and Mr. C. A. Bolton the vice-chair. Nearly sixty members and friends sat down to dinner.

After the usual loyal toasts had been disposed of, the Chairman proposed "The Pharmaceutical Society," and Mr. W. H. Parker suitably replied.

Professor Blake, of the University College, then pro-

posed, in an able manner, the toast of the evening, "Success to the Nottingham and Notts Chemists' Association," remarking that while it was very evident that it provided its members with bodily sustenance, it took great pains to provide the associates, consisting of assistants and apprentices, with mental sustenance of the very best kind, and from his conversation with the Secretary, it was certain that a most important work was being carried on. This he sincerely hoped would long continue.

Mr. Fitzhugh, in responding, referred to the interesting fact that it was eighteen years ago that day since the society first started; and as he had been connected with it the whole of that time, he was very proud to see round that table members who had formerly been associates, and who would acknowledge with thankfulness the great service that the different classes of the Association had rendered to them. He did not remember a more successful gathering. They numbered forty-eight members and forty-five associates, and so long as the society flourished as it was now doing he should only be too proud to continue its President.

Mr. C. A. Bolton proposed "The Professors of the College," remarking that the University classes had relieved the Society of great responsibility, and he was quite sure the young men were proud to attend.

Professor Blake (who is conducting the botany classes this session) said he was equally proud of his students, who were regular and very attentive to their work.

Mr. J. H. Haywood, in giving "The Town and Trade of Nottingham," said he was quite sure they would all agree with him in hoping that the cloud of depression would soon pass away.

Councillor Lees suitably replied.

Mr. Beilby gave "The Visitors," which was responded to by Messrs. Cobb and Walbran.

Mr. des Forges next proposed "The Officers of the Association," coupling the names of the Treasurer (Mr. W. H. Parker) and the Hon. Sec. (Mr. A. Middleton), both of whom replied.

After the usual vote of thanks to the Chairman, whose health was drunk with musical honours, the company separated.

TORQUAY CHEMISTS' ASSISTANTS' ASSOCIATION.

The assistants and apprentices of the pharmacists of Torquay have recently formed themselves into an association for the promotion of social intercourse and pharmaceutical education. Mr. E. Smith, F.C.S., has accepted the office of President, Mr. Bathe is Vice-President, and Messrs. W. Smith and F. March, Secretaries.

The opening meeting was held at the Temperance Hotel on Wednesday, the 1st inst., when the President delivered his inaugural address. After referring to the advantages to be derived for principals and assistants alike from mutual intercourse and exchange of ideas, he proceeded to speak of the past, present, and probable future of pharmacy.

Mr. Guyer, F.C.S., followed, and spoke of the necessity of such associations and of earnest, individual self-denying work, if the pharmacists of the present day were to keep abreast of rapidly advancing science.

During the evening prizes were offered by the President and by Messrs. Guyer, Riches and Shapley for the best papers on "Pill-making and Pill-coating," "The Botany of the B.P.," and "The Proposed Curriculum."

Votes of thanks to these gentlemen and to the President for his address closed the business part of the proceedings and the remainder of the evening was given over to musical entertainment and refreshments.

At the next meeting, on Tuesday, December 14, papers will be read by Mr. W. Smith on "Cinchona Barks," and by Mr. Morrison on "Vinum Ipecacuanhæ."

OLDHAM CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

On Thursday evening last, Mr. Albert Smith read an admirable paper before the members of this Association, at a meeting held in the Church Institute, the subject being "A Synopsis of Organic Chemistry." The essayist gave a very instructive review of the subject, and fully performed the work he had set himself to do. The interest the members took in his subject was evident by the marked attention which was shown during the delivery of the paper.

Mr. James Lee, in a few appropriate words, proposed a vote of thanks to Mr. Smith for his useful paper, which Mr. Charles Garside seconded, and being carried closed a very profitable evening. Mr. C. Granville Wood occupied the chair. There was a good attendance.

Parliamentary and Law Proceedings.

Prosecutions under the Drugging of Animals Act, 1876, and the Pharmacy Act, 1868.

Before G. E. Jarvis, Esq., and N. Clayton, Esq., at the Kesteven Petty Sessions, at Lincoln, on Friday, December 3, Edward Goy, waggoner in the service of Mr. William Pepper, of Dunston, was charged with administering, or causing to be administered, poisonous drugs to his master's horses; and Alfred Parrinder, of Waterside North, Lincoln, was charged with selling the drugs to Goy without distinctly labelling them, as required by the Pharmacy Act.

Mr. Charles Scorer appeared to prosecute on behalf of the police, and also for the Society for the Prevention of the Administration of Poisonous Drugs, etc., to Horses.

From the evidence given it appears that on November 5, Mr. Pepper lost a valuable mare, and on a *post-mortem* examination being made on the body traces of arsenic were found in the stomach. This aroused Mr. Pepper's suspicions, and on November 11, in consequence of other suspicious circumstances, he ordered Goy to open his bin, and he found therein a packet of powders. These he handed over to Sergeant Peacock, to whom he also gave his servant in charge. Sergeant Peacock placed the powders in the hands of Dr. G. M. Lowe, of Lincoln, and that gentlemen informed the magistrates he had made an analysis, and found them to consist of sulphur in lumps, and nitre, with about 3 grains of antimony in proportion to 100 grains; about $\frac{1}{4}$ of a grain of arsenic, and about $\frac{1}{4}$ of a grain of mercury. Dr. Lowe added that it was only right to explain that antimonial compounds used for veterinary purposes were very impure, and frequently contained arsenic as an impurity, and the quantity he found in the powders would justify that amount. He was unable to say what the effect of poisons of that character would be upon horses; it would be sufficient to act as an irritant in man, and would prove highly poisonous.

The lad Goy, on being examined, stated that he received the powder from Parrinder, whom he saw at Metheringham station on October 27. Parrinder, he said, showed him a book of recipes, and he told him to make up a powder from one of them, though he did not know what it contained. Parrinder brought him the powders on the following Tuesday, and told him he could give them to the horses as he liked, they would not hurt them. He stated there was two pounds weight, and Goy paid him 2*s.* 10*d.*, but he noticed there was no label on the packet.

In defence, Parrinder contended there was no necessity for the packet being labelled, as the contents did not come within the meaning of the Pharmacy Act, and he further stated that he got the recipe made up at Boots' establishment at Lincoln, and no label was then on the packet.

This was corroborated by Mr. Harrison, who stated

he was a duly qualified chemist and was manager for Boots and Co. Mr. Harrison assured the Bench that he frequently made up such powders for Parrinder and others, and was, in fact, in the habit of selling them every day without any label on. Parrinder too, admitted that he frequently sold these powders to farm servants and others.

The magistrates told Parrinder that, from his own statement, he went about getting hold of servant lads to sell them his injurious powders, and they did not think they would be doing their duty if they did not fine him in a substantial sum. He was liable to a fine of £5, but as the costs came to £1 13*s* 6*d*., and he would have to pay them, they should inflict a penalty of £3. As Goy had given information against the man who had sold him the powders, he would only be fined 30*s*., and 9*s*. 6*d*. costs.

Review.

THE LIFE AND LABOURS OF JOHN MERCER, F.R.S., F.C.S., etc.; the Self-taught Chemical Philosopher. By EDWARD PARNELL, F.C.S.*

The man whose busy and useful life forms the subject of this memoir has now been dead twenty years, and during that period the art of calico printing with which he was particularly associated has been revolutionized in respect to the pigments used. But John Mercer was a remarkable man, entitled to rank high even among Lancashire worthies, and Mr. Parnell deserves thanks for putting on record the principal facts of a life full of noble lessons. We may say at once that Mr. Parnell has used the materials at his command in an unpretentious, but very effective manner, the result being a handsome little book that many will read through with pleasure, notwithstanding the indispensable technical passages that may occasionally prove beyond their comprehension. But for others these technicalities will no doubt have a special value, and notably so the appendix of recipes used in the Oakenshaw works, some of which have never before been published.

John Mercer was essentially a self-made man. Born in 1791, at Great Harwood, a few miles from Blackburn, he was only nine years old when he lost his father, who seems to have combined cotton spinning with farming in a small way. As a consequence the *res angusta domi* seems to have driven him into a factory instead of a school and he became a bobbin winder before he could read. A pattern-designer, however, took a fancy to him and the child received his first lessons in spelling and figures whilst working in the factory of which in after years he became one of the principal proprietors. Music appears to have been his first love and his wooing must have been fairly successful, for whilst doing compulsory service in a militia corps his proficiency was the means of rescuing him from the "awkward squad" and placing him in the band for the rest of his term. But the real turning point of his life came when he was about sixteen years old, the sight of a fine orange colour in a dress setting him "on fire to learn dyeing." There were no dyers near from whom he could seek instruction and books and receipts being equally out of reach he obtained his first information by a stratagem. Having ascertained that the Blackburn dyers bought their dyeing materials from a certain druggist, Mercer went to the shop, got the shopman to enumerate the different dyeing materials he sold,—peachwood, brazil-wood, logwood, quercitron, alum, copperas, and so on,—and then purchased threepennyworth of each kind. Persevering experiments with these materials yielded him sufficient "rule of thumb" knowledge to encourage him to set up as a dyer, the principal fabrics operated upon being the remnants which were the perquisities of the hand-loom weavers. Probably however, the returns were not large, since he was tempted to abandon them by an invitation from Messrs. Fort, of the Oakenshaw works, to enter their colour shop as an apprentice. But not obtaining in the shop the experience he desired, he accepted an offer for the cancelling of his indentures, brought about by depression of trade caused by the Berlin decree, and went back to the loom. Even there his natural bent for colour found some expression in devices for weaving stripes, checks and designs; but the study of pigments and their application remained in abeyance for about two years, during which time his spare hours were devoted to mathematics, in which he had the assistance of a friendly excise surveyor. In 1813, Mercer resumed operations in dyeing, making a profitable application of the imperfectly spent materials of the print works, which were obtainable at a low price. A few months afterwards, whilst on a visit to Blackburn to obtain a marriage licence, he purchased at a bookstall a second-hand copy of 'The Chemical Pocket-Book, or Memoranda Chemica arranged in a compendium of Chemistry, by James Parkinson, of Hoxton, 1803.'

The 'Pocket-Book' was the first systematic book on chemistry that Mercer ever possessed, and the study of it, to use his own metaphor, introduced him into a new world. He soon saw the importance of a knowledge of chemistry to the dyer and calico printer, and following up his reading with experiment soon obtained his first important practical result. Before that time no good orange pigment was known suitable for the purpose of the calico printer, the best one being made from a mixture of quercitron yellow and madder red. The account in the Pocket-Book of sulphide of antimony led him to experiment with a view to applying the golden sulphide in calico-printing, and at length he obtained a solution of antimony in sodium sulphide, suitable for printing, which gave the bright orange sulphide when the cloth was passed through weak sulphuric acid. This discovery of antimony orange did not, however, bring him any direct remuneration, for a firm to which he made his secret known, being somewhat over-cautious in the business of engaging him, just missed the opportunity, and in 1817 Mercer once more entered the Oakenshaw works, his third engagement being for five years as experimental chemist in the colour shop, with a salary commencing at thirty shillings a week. Mercer had now full scope for his inventive genius, which brought chemical principles into practical application in calico printing in a manner hitherto unknown. Indeed, it appears probable that at that time not more than two other similar firms indulged in the luxury of a "chemist" in their colour shops. Mercer was the first person in this country to apply chromate of lead to calico printing, the price paid for the yellow chromate of potash used in the earliest operations being eight shillings per pound. Closer acquaintance with the chromates led to the utilization of the oxidizing properties of chromic acid. Then manganese was pressed into the service of the calico printer, metallic tin was introduced as a reducing agent for converting blue indigo to white, and cochineal was made to yield the whole of its colouring matter. But Mercer's discoveries and improvements were, in fact, far too numerous, and to some extent too technical, to be recounted here. As a reasonable reward for his indefatigable exertions in the service of the firm Mercer was made a partner in 1827.

Notwithstanding the number of Mercer's discoveries his first patent was not taken out until 1839. It related to the substituting of arsenates and phosphates for cow-dung in what is known as the "dunging process," an idea that he worked out in conjunction with a Mr. Prince A process for making stannate of soda by the dry way, which proved a great boon to the calico printer, was patented in 1847, and about the same time the application of various alkaline phosphates and arsenates in the production of what became known as "Mercer's

* London: Longmans, Green and Co. 1886. Crown 8vo. Pp. i.-xiv., 1-342. 7*s*. 6*d*.

Scouring Salts," was also made the subject of a patent. About three years later another patent in which he was concerned covered the process of "mercerizing" calico, based on his observation of the remarkable and beneficial effect on cotton fibre of the properly limited action of caustic alkalies or sulphuric acid. The extension of this idea to paper yielded the now well-known "parchment paper." Mercer appears also to have been the first to notice the remarkable action of an ammoniacal solution of cupric oxide on cotton fibre.

The little book under notice contains a carefully written account of Mercer's technical labours, which were continued almost up to the time of his death in 1866; for although he retired from the partnership in 1848, he utilized much of the leisure time so gained in working out problems that had been set on one side for a more convenient opportunity. Indeed Mercer's interest was by no means limited at any part of his career to the chemistry and physics of the calico printer, though whilst in a position of responsibility in the Oakenshaw works these claimed and received his first attention. His views in chemical science, as still manifest in various publications, were far ahead of those of most of his contemporaries, and his position as a scientific man was recognized by his election as a Fellow of the Royal Society in 1852. Some "thoughts on mould," for instance, communicated to his friend Dr. Playfair in 1843, which had their origin in the spoiling of some calicoes, anticipated Pasteur and Koch so far as to theorize that the deleterious matter in infected air "must be a nitrogenous body, and at least as highly organized as ferment and that class of substance." A paper giving his views on the class of phenomena which Berzelius and Liebig had attributed to the action of a "catalytic force," and designated under the name "catalysis," but which Mercer argued are simply the outcome of the usual laws of chemical affinity, furnishes another illustration of the clearness and independence of his judgment. In bringing this notice to a conclusion, we cannot do better perhaps than quote a short passage from this paper, merely premising that it was read forty-four years ago. Having mentioned as an illustration of "catalysis," the fact that nitric acid and oxalic acid in aqueous solution in certain proportions will remain in contact without any reaction taking place, yet upon the addition of a protosalt of manganese the one is reduced to nitrous acid, and the other oxidized to carbonic acid, whilst the manganese salt remains unaltered, Mercer says, "The explanation I would offer of the action of the protosalt of manganese is this. The atoms of nitric acid being already in a state of tension by the attraction of the oxalic acid for its oxygen, a very feeble additional force suffices to complete the decomposition of the nitric acid. This is supplied by the salt of protoxide of manganese, which has a slight tendency to unite with oxygen; but at the instant of its liberation the oxygen is called upon to select with which of the two bodies it will unite, as both exercise a certain amount of affinity for it. The affinity of oxalic acid for oxygen being far greater under existing circumstances, it therefore becomes oxidized with production of carbonic acid, while the protoxide of manganese is free to exert a similar influence on other molecules of oxalic and nitric acids."

BOOKS RECEIVED.

OUTLINES OF QUANTITATIVE ANALYSIS. By A. HUMBOLDT SEXTON. London: C. Griffin and Co. 1886. From the Publishers.

MANUAL OF PRACTICAL PHARMACEUTICAL ASSAYING. By A. B. LYONS, A.M., M.D. Detroit: D. O. Haynes and Co. 1886. From the Publishers.

THE HEALING ART: or Chapters upon Medicine, Diseases, Remedies and Physicians, Historical, Biographical and Descriptive. In two volumes. London: Ward and Downey. 1887. From the Publishers.

Obituary.

Notice has been received of the death of the following:—

On the 25th of November, Mr. Edward Grimwade, Chemist and Druggist, Christchurch. Aged 74 years.

On the 28th of November, Mr. William Henry Troake, Chemist and Druggist, Kingsbridge. Aged 66 years.

On the 30th of November, Mr. Albert Paine, Chemist and Druggist, New Romney. Aged 45 years.

On the 3rd of December, Mr. Albert Pam, Chemist and Druggist, Lewes. Aged 88 years.

On the 4th of December, Mr. Thomas Stephenson, Chemist and Druggist, Rothwell. Aged 74 years.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

UNG. HYDRARG. OX. RUBRI, P.L.

Sir,—Will you allow me to refer Mr. Parkinson to a paper on the "Rancidity of Fats," published in the first volume of the 'Transactions of the Pharmaceutical Conference,' held at Bath? He will there find recorded a long series of experiments on the preservative action of certain aromata on ordinary lard, etc., in the presence of red oxide of mercury. The oils of clove and pimento (I prefer the latter) were found to have wonderful powers in this direction; others were not so powerful, though, if I remember rightly, each of the essential oils experimented on exerted a protective influence in some degree.

I have invariably ever since, whilst adhering to the P.L. formula in other respects, added to each pound of Ung. Hydr. NO a scruple of ol. pimentæ, and the result is invariably the same—it will keep without apparent change for an indefinite time. As a crucial test, I kept some in a willow box for several years in a warm place without its changing colour. Why, you will ask, has this simple plan not been followed? Some were of opinion that the addition was unjustifiable, and that the oil of pimento would exert an irritant action on tender surfaces. This last reason is not borne out by practice.

I have dispersed, since then, thousands of boxes of the ointment, most of which was used for inflamed and granular eyelids, on which it acts as a charm (N.B.—Do not grind the oxide too fine, or it will be escharotic instead of stimulant), and no such effect has ever been hinted at.

The fact is, that my first contribution to the proceedings of the Conference was in a manner strangled in its birth by being announced, *in the official journal, mind you*, as a paper on the "Rancidity of Facts!" My old colleagues will remember the circumstance, and I have not forgotten the bantering suffered by the unfortunate author.

Weymouth. THOS. B. GROVES.

"*Quaerens.*"—Mayer's Solution is a solution of mercuric iodide in potassic iodide, prepared by adding potassic iodide to mercuric chloride solution until the scarlet precipitate is just redissolved.

A. E. Lomax.—Compositæ: 557, *Peucephyllum*, A. Gray; 506, *Psathyrotes*, A. Gray; 556, *Crocidium*, Hook.; 588, *Tetradymia*, DC.;—Convolvulaceæ: *Brewcria*, R. Br.;—Lythariеæ, not Onagraceæ: 24, *Lagerstrœmia*, Linn. The other names do not occur in the work.

J. Williams.—The name has been applied to a colouring matter obtained from rhubarb by treatment with nitric acid (see *Pharm. Journ.* [1], vol. ix., p. 528); also to a red substance produced by the action of nitric acid on tyrosine.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Urquhart, Draper, Jackson, Fletcher, Barclay, West, Haydon, Hesse, Medicus, W. F. G.

THE AMOUNT OF CINCHONIDINE IN COMMERCIAL QUININE SULPHATE.

BY O. HESSE.

Since the time when I gave an unfavourable decision in regard to the optical method of analysing quinine sulphate, Dr. de Vrij has continued to apply that method of examination to this salt, and has made an exception only with the salt prepared by me, which he will in future, as he says, for the sake of appeasing me, test by his bisulphate method. This method of testing, according to him, would give the actual quantity of cinchonidine to within that part of it which remains dissolved in the ether, and according to de Vrij that amounts to nearly 2 per cent.

I will in the first place consider the mode of carrying out this test as it has been minutely described by de Vrij. In the experiment there referred to 80 grams of neutral quinine sulphate was the quantity taken. The bisulphate obtained from it proved to be free from cinchonidine, and, therefore, the whole of the cinchonidine present in the original quinine sulphate had been concentrated in the mother liquor from which the bisulphate had separated. That mother liquor was shaken with ether and caustic soda in excess, and by that means, as de Vrij says, the remaining quinine was dissolved by the ether together with some cinchonidine, while the greater part of the cinchonidine was separated.

The ether solution thus obtained was drawn off from the separated cinchonidine and upon examination of the latter it was found that in 4·7 grams of it there was 1·79 gram of quinine. Consequently the actual quantity of cinchonidine was 2·91, or 3·64 per cent., corresponding to 4·91 cinchonidine sulphate.

The quantity of cinchonidine here referred to is termed by Dr. de Vrij the "relative" amount that is present in commercial quinine sulphate and that can be determined by any skilled pharmacist without much difficulty. As a matter of fact this cinchonidine still retains a considerable amount of quinine, but it is assumed that this admixture is always the same when different samples of quinine sulphate are tested in the same way.

Turning now to the ether solution obtained as above. On evaporating off the ether a residue of 9·69 grams was obtained, having a gum-like appearance and presenting not the least sign of crystals. Nevertheless, on applying the optical test to the tartrate obtained from it a result was observed from which it might be calculated that this residue contained 1·49 gram of cinchonidine. In order to obviate any kind of misunderstanding in this matter and in reference to the determination of this quantity of cinchonidine I will for the moment define it as "optical cinchonidine." Calculated as sulphate it would amount to 2·5 per cent.

Since the direct application of the optical test to the quinine sulphate in question gave a result indicating the presence of 9·46 per cent. cinchonidine sulphate there must have been a deficiency in the above described test amounting to 2·05 per cent. that could only have affected the amount of "optical cinchonidine." The quantity of "optical cinchonidine sulphate" would therefore amount to 4·55 relatively to 4·91 per cent. of actual cinchonidine sulphate.

In the account of the experiment lately given in the *Nieuw Tydschrift voor de Pharmacie in Nederland*, the determination of the "optical cinchonidine sulphate" was omitted, and de Vrij confined himself to determining the quantity of the crystals separating from the ether solution obtained in applying his bisulphate test, calculating from that basis the quantity of cinchonidine sulphate exactly to the third place of decimals and then asserting that the quinine sulphate in question contained at least 7·912 per cent. crystallized cinchonidine sulphate. At the same time de Vrij is silent as to the fact previously pointed out by himself that the cinchonidine obtained from ether is by no means pure, but contains a considerable amount of quinine. So that he now considers it appropriate in regard to the quinine sulphate prepared by me, as the censor of which he sets himself up, to simulate a considerable quantity of cinchonidine sulphate. And this is what has been done to appease me!

In the face of this simulation there is less reason for my being appeased, since de Vrij in another place states that the method now in question is entirely inadequate for the quantitative determination of cinchonidine in quinine sulphate. Under these circumstances I naturally consider it due to myself to inquire into the real worth of this bisulphate test.

In carrying out my experiments for that purpose, the results of which are comprised in the following table, I mixed known quantities of cinchonidine sulphate $(C_{19}H_{22}N_2O)_2SO_4H_2 + 6H_2O$ with quinine sulphate, then dissolved 5 grams of the mixture by warming with 12 c.c. normal sulphuric acid, and left the solution for several hours to crystallize, a certain quantity of the bisulphate being thus separated meanwhile. The mother liquor was then drawn off by means of an exhaust pump from the crystals, which were then gradually washed with 3 c.c. of cold water added drop by drop while the suction was kept up. With the exception of the experiments 1 and 3 the crystals were crushed and pressed together before being washed by means of a glass rod so as to separate from them as completely as possible any adherent mother liquor. The entire solution was then mixed with caustic soda in excess or ammonia and shaken with 12 grams of ether of 0·721 to 0·728 specific gravity. After the lapse of a day the separated crystals were collected, it having been first ascertained by a control experiment that that time was quite sufficient to allow before collecting the crystals. The temperature at which this operation was carried out ranged between 10° and 20° C., but in most instances it approximated nearer to the latter limit. The cinchonidine sulphate employed in these experiments was absolutely pure, and this was likewise the case with the quinine sulphate, which had been prepared from bisulphate and

Experiment number.	Cinchonidine sulphate taken per cent	Cinchonidine calculated.	Crystals obtained.	Cinchonidine sulphate calculated from crystals	Ratio of the cinchonidine taken to that apparently found.
1	10	0·3702	0·543	14·8	100 : 148
2	9	0·3333	0·541	14·6	100 : 162
3	8	0·2961	0·440	11·9	100 : 149
4	7	0·2592	0·404	10·9	100 : 156
5	5	0·1851	0·293	7·5	100 : 150
6	3	0·1111	0·195	5·26	100 : 175
7	1·5	0·0555	0·0987	2·66	100 : 177
8	0·5	0·0185	0·031	0·84	100 : 168
					100 : 161 mean

again recrystallized from solution in boiling water. When this salt was submitted to the bisulphate test it gave an ether solution which did not show the slightest trace of crystals after the lapse of many days.

These data show conclusively that in the bisulphate test the amount of cinchonidine sulphate calculated from the observed results is never too low, as de Vrij states that it is, but that it is always too high, *and exactly as much too high as the amount of de Vrij's simulated cinchonidine sulphate, exceeds the quantity that is really present, or on the average* 61 *per cent.* Consequently, the 7·912 per cent. of cinchonidine sulphate which de Vrij maintains that he has found in the quinine sulphate made by me must be reduced to 4·91 per cent., and it is certainly not uninteresting to note the fact that on a previous occasion de Vrij found by direct determination just this amount of 4·91 per cent. cinchonidine sulphate in the same quinine sulphate obtained from another source. Probably both samples came from one and the same bulk of material. Of the former sample, as already mentioned, some was tested by the optical method, the result obtained being 9·46 per cent. cinchonidine sulphate, or 4·55 per cent. too much. This *plus* quantity, which I have termed "optical cinchonidine sulphate," is chiefly referable to the defective nature of the optical test, and also to the presence of hydroquinine sulphate; for so far as I have been able to examine commercial quinine sulphate, it is never without some hydroquinine salt.*

There is no reason for supposing that de Vrij examined by the optical method the quinine sulphate made by me less carefully than that obtained from other sources, and therefore one is involuntarily forced to the conclusion that all data given by him as to the amount of cinchonidine sulphate in quinine sulphate are too high by about one half of what he represents them to be.

Since de Vrij's latest method of examining quinine sulphate by means of neutral potassium chromate has been stated to give results almost as accurate as the optical method, I am justified by this statement in declaring that the amount of cinchonidine is not correctly determined by this method. It is true that quinine chromate is precipitated, but not entirely, so that the residuum of quinine appears as an addition to the true amount of cinchonidine. For this reason the 5·32 per cent. and 5·51 per cent. of cinchonidine sulphate which de Vrij has lately stated that he has found in the quinine sulphate made by me must be respectively reduced to 3·3 and 3·4 per cent. if it be desired to arrive at a correct representation as to the amount of cinchonidine sulphate present.

In whatever manner the precipitation of cinchonidine from solutions containing quinine may be carried out the precipitate will always contain quinine. This circumstance is due to the formation of a compound of quinine and cinchonidine. This compound crystallizes from ether in brilliant rhombic plates and rhombohedrons, and it contains 64·5 per cent. of cinchonidine with 35·5 per cent. quinine, corresponding to the formula—

$$C_{20}H_{24}N_2O_2,2C_{19}H_{22}N_2O.$$

It has been shown that the bisulphate test, when carefully carried out, will furnish very satisfactory results in regard to the amount of cinchonidine, and that it excludes every kind of fallacy such as may obtain with the very hazardous optical method. In order to carry out that method of testing most appropriately, it is desirable to operate with 5 grams of the sulphate in question, to dissolve this quantity with 12 c.c. of normal sulphuric acid in a small porcelain basin with the aid of heat, then to pour the solution into a funnel closed at the bottom, rinsing the basin out with a few drops of water. The crystallization of the bisulphate soon commences, and is complete after two hours. By then removing the stopper of the funnel the mother liquor may be drained away, and any residue removed by a suction pump. The upper portion of the crystals should then be pressed down with a glass rod and washed with 3 c.c. of cold water added drop by drop while the suction is kept up. The whole solution is then to be mixed with 16 c.c. of ether from 0·721 to 0·728 specific gravity and shaken up, then 3 c.c. of ammonia solution of 0·960 specific gravity added and the whole well shaken again. After standing for one day the ether is removed with a pipette, the crystals that have separated are collected upon a filter and washed with water saturated with ether. After this the filter should be placed on an absorbent surface and the crystals again washed with some ether before being dried at 100° C. These crystals have the composition represented by the formula $C_{20}H_{24}N_2O_2,2C_{19}H_{22}N_2O$, but almost always there is some quinine adhering to them, especially when the amount of cinchonidine in the quinine sulphate tested is very small. In order to ascertain from the weight of the crystalline mass the amount of cinchonidine with the greatest accuracy, it is necessary, for the reason above stated, not to multiply by 0·645 in accordance with the formula of the compound, but with 0·62, this number being the mean result of all determinations I have made in reference to this mode of testing.

By this method trustworthy results may be obtained with all samples of quinine sulphate containing not more than 10 per cent. of cinchonidine sulphate.* By means of its application it may be ascertained that contrary to de Vrij's assertion the quinine sulphate of commerce frequently contains less than 5 per cent., and very often only from 2 to 3 per cent. of cinchonidine sulphate. If it be considered that, according to de Vrij, the original quinine sulphate of Pelletier contained a considerable amount of cinchonidine, and that it was with this preparation chiefly that the most important therapeutic effects of this alkaloid have been established, it will be absolutely inconceivable that at the present time the quinine sulphate containing at the most only a small percentage of cinchonidine sulphate should be less efficacious than it was formerly. In any case no great weight can be attached to de Vrij's statement to the contrary, since in another place he says that Pelletier obtained only traces of cinchonidine; in fact, as we have already sufficiently seen above, de Vrij is in the habit of representing things just as it suits him.

Supposing a sample of quinine sulphate to contain

* In the case of quinine sulphate obtained from Indian bark the presence of hydrocinchonidine would also have to be taken into account. Under these circumstances the laudation bestowed upon the optical test by Hooper is entirely unintelligible to me.

* If the amount be more than 10 per cent. a larger proportion of ether must be used. I have not considered such a case, because in the course of the last two years I have never met with commercial quinine sulphate for which such a proceeding would have been necessary.

4 per cent. of cinchonidine sulphate. According to what is known as to the therapeutic value of cinchonidine sulphate it may be taken that this 4 per cent. of the salt would be at least equivalent to 1 per cent. of quinine sulphate. The money value of such sample for the patient compared with that of absolutely pure quinine sulphate would therefore be as 100 : 103, or in other words the patient should pay for the purer salt 3 per cent. more money than for the other in order to obtain the same therapeutic effect. But then the separation of this 4 per cent. of cinchonidine sulphate would involve an increase of price amounting to from 15 to 20 per cent. by the manufacturer, which would have to be borne by the consumer. Therefore it appears, from an economic point of view, quite absurd to insist upon a substitution of absolutely pure quinine sulphate for the ordinary sulphate that has been in established use, quite independently of the fact that this demand appears very curious on the part of de Vrij, who has maintained that the separation of cinchonidine from quinine is altogether superfluous for therapeutic purposes. Certainly it must, however, be borne in mind that at the time this view was propounded it was only de Vrij's object to smooth the way for the introduction of his hobbyhorse, quinetum.

AMMONIO-NITRATE OF SILVER.

BY HARRY NAPIER DRAPER, F.C.S., M.R.I.A.

It is not a little remarkable that the phenomena attendant upon so familiar a process as the preparation of a solution of silver ammonio-nitrate should remain absolutely unnoticed by the text-books. One of the most recent and best of these indeed warns the student against the evaporation of the liquid "as there is a risk of producing an explosive body," and only one chemist, as far as I can find, has ventured upon an opinion as to the nature of the precipitate formed on the addition of ammonia to silver nitrate. Prescott* looks upon it as $(NH_3Ag)_2O$; admitting, however, that this formula is merely hypothetical.

I cannot think that it will be uninteresting if I shortly state the circumstances under which some years ago my attention was directed to this subject. There is a very excellent and frequently used method of glass silvering particularly applicable to the production of telescopic specula, which, shortly described, consists in the reduction by milk sugar of an ammoniacal solution of silver nitrate to which potassium hydrate has been added.

I have abundant reason to know that with ordinary precaution this process can be carried out with perfect safety; but that no departure should be made from the prescribed conditions, and that especially the silver solution should not be left about unheeded was sufficiently demonstrated by the circumstance which I now detail.

To a solution of 3·3 grammes silver nitrate enough ammonia was added to re-dissolve the precipitate at first formed, and then 5 grammes of pure caustic potash. The precipitate produced by the potash was (nearly) dissolved by a further addition of ammonia. The entire volume of the liquid was 50 c.c. It was inadvertently left in an uncovered beaker during nine days, and on being then examined its surface was found to be covered with a broken-up, lustrous, graphitic film. The internal walls of the beaker were coated with a closely adherent continuous deposit, which might have been taken for metallic silver, were it not that its colour more nearly resembled that of the lead-sulphide which is reduced by sulpho-carbamide. I poured from the beaker into the laboratory sink a perfectly clear liquid, but observing at the bottom a nearly black pulverulent deposit, I, in a weak moment, turned upon this a stream of water from the tap. Here my observations, as regards any practical usefulness, came for the time to an end, for there was a violent explosion, which so completely shattered the beaker as not to leave a fragment of it in my hands, which were somewhat severely cut, and I was made deaf for several hours.

It was pretty clear from the outset that under conditions not quite expected, I had inadvertently produced the compound of silver with ammonia known as Berthollet's fulminating silver, and which has also been viewed as a nitride of the metal. These conditions seemed to be sufficiently interesting for examination, and with the double object of doing this and of arriving at the principle upon which the silvering process was based, I began a series of experiments.

That up to the present these have not been carried so far as was first intended, is due, firstly, to the fact that at a very early stage of the work the theory of the process became sufficiently intelligible to render its further prosecution unnecessary, and, secondly, to a not unnatural sympathy with the many chemists who, though they have told us something about the physical characters of this remarkably treacherous explosive compound, seem to have unanimously agreed that its ultimate analysis might be just as well left unattempted. But some of the results obtained (notes by the way, so to speak), affecting as they do the relations between two so familiar bodies as silver and ammonia, are I think quite interesting enough to be noted. It is true that I have sometimes found after a tiresome search into the literature of the subject that they had been observed before; but they were so unfamiliar to myself, and are so persistently ignored by the ordinary text-books, that I venture to think there may be others for whom also they may have interest. I propose to state these results in the form of memoranda and as concisely as possible.

When ammonia is added to solution of neutral silver nitrate, the first drop produces a precipitate which is *brownish-white*. As more ammonia is added, the precipitate becomes darker, and just before the point of final solution is reached, it is *dark brown*.

This precipitate is slightly soluble in water.

The smallest addition of nitric acid to a neutral solution of silver nitrate completely prevents its precipitation by ammonia.

The first addition of ammonia to a solution of silver nitrate renders it alkaline to turmeric paper and phenolphthalein, but the solution does not smell of ammonia.

Silver oxide, freshly precipitated by KHO and thoroughly washed, strongly browns turmeric paper.

Freshly precipitated silver oxide is readily soluble in a neutral solution of ammonium nitrate and the solution is strongly alkaline to turmeric paper.

In the following experiments a solution of ammonia was used of which 10 c.c. required for neutralization 16·37 c.c. of standard solution of oxalic acid. 100 c.c. therefore contained 27 grammes NH_3.

* *Journal of American Chemical Society*, and *Chemical News*, vol. xlii., p. 31

To the solution of 8·5 grammes silver nitrate in 70 c.c. water the standard ammonia solution was added from a burette until the precipitate at first formed was redissolved.

The quantity of ammonia solution required was 6 6 c.c. (theory requires 6·3 c.c.).

Ten test tubes, each containing the solution of 1·7 grammes silver nitrate in 17 c.c. of water (the solution having been made neutral by digestion with precipitated silver), were arranged in series. To tube 10 was added just so much of the standard ammonia as was necessary to redissolve the precipitate at first formed. This quantity was 1·3 c.c. To the other nine tubes the ammonia solution was added in decreasing proportion, thus :—

Number of tube.	Cubic centimetres NH_4OH added	Weight of precipitate in grammes.
10	1·30	
9	1·17	0·008
8	1·04	
7	0·91	0·054
6	0·78	
5	0·65	0·076
4	0·52	
3	0·39	0·069
2	0·26	
1	0 13	0·044

In none of the filtrates did either ammonia or silver nitrate give a precipitate. As nearly as could be noted by observation the amount of precipitate increases from No. 1 to No. 3 and in No. 5 seems to attain its maximum.

It then diminished, until in tube No. 9 there was but little apparent precipitate.

To obtain more precise results weighings were made of the precipitates in alternate tubes and the result of these is given in the third column of the table.

As it was obviously important that this precipitate should be examined, and as the maximum quantity obtainable was only equal to 4·47 per cent of the silver nitrate employed, its preparation on a larger scale became necessary. One hundred and seventy grammes silver nitrate were dissolved in 170 c.c. distilled water and 64·5 c.c. of the ammonia solution added ; just half the quantity required for re-solution of the precipitate. The liquid became very hot, but the filtrate afforded no further precipitate either on cooling or on dilution with water. A determination in it of the silver as chloride showed that only 11 per cent of the nitrate had been precipitated, and therefore that the remaining 89 per cent. had been dissolved in the ammonium nitrate formed.

The precipitate was collected and examined after being simply air-dried under a bell glass.

Heated at 100° C. it did not lose weight.

Heated to redness, it afforded a residue of metallic silver which was weighed, and the loss of weight compared with that which would have occurred with silver oxide.

(*a*) 1·249 grammes gave Ag 1·141, a loss of 20·60 where $Ag_2O=16$.

(*b*) 0·915 grammes gave Ag 0·836, a loss of 20·01 where $Ag_2O=16$.

The precipitate heated alone, or with potassium hydrate, does not evolve ammonia.

Dissolved in dilute nitric acid, bubbles of gas are evolved.

The precipitate is therefore silver oxide, apparently mixed with silver carbonate, formed by the absorption of carbonic acid during drying.

The conclusions which may, I think, be drawn from the foregoing experiments are as follows :—

When ammonia is added to a solution of *neutral* silver nitrate the first addition produces a precipitate of silver oxide (if the solution be acid no precipitate is formed, the oxide dissolving in the simultaneously produced ammonium nitrate). When the quantity of ammonia added is just enough to form ammonium nitrate the reaction

$$2AgNO_3+2NH_4OH=2NH_4NO_3+Ag_2O+H_2O$$

takes place, but by far the greater part of the silver oxide dissolves in the ammonium nitrate formed, and it is only on the further addition of ammonia that silver-ammonium nitrate ($AgNO_3,2NH_3$) is produced—

$$AgNO_3+2NH_4OH=AgNO_3,2NH_3+2H_2O,$$

a result which may also be obtained by the solution of silver oxide in a mixture of ammonium nitrate with ammonia,

$$Ag_2O+2NH_4,NO_3+2NH_4OH=2AgNO_3,2NH_3+3H_2O$$

This body, described by Mitscherlich,* may be obtained by the slow evaporation of its solution. It forms rhombic crystals permanent in the air, and easily soluble in water. Their solution reacts strongly alkaline towards both phenolphthalein and turmeric. When heated—as may be done with perfect safety—they fuse, and leave a residue of metallic silver.

It is this compound which is contained in the ammonio-nitrate of silver solution of the Pharmacopœia, and of our laboratories, and I cannot fitly conclude this paper without pointing out that it is a very different substance from that obtained by dissolving silver oxide in ammonia, or by adding potassium or sodium hydrate to any solution of silver containing ammonia. The former may, as I have already noted, be heated even to redness with impunity, while the solution Ag_2O+4NH_4OH, on losing by exposure to the air two molecules of ammonia, splits up with treacherous facility, and probably in the following way :—

$$Ag_2O+2NH_4OH=2AgNH_2+3H_2O;$$

into water and Berthollet's fulminating silver, the body with the mention of which I have introduced this subject, and with which the cultivation of a closer acquaintance is little desirable.

ALOES.

The following extract from a report by Captain Snell, Assistant Resident in charge, Trade Registration Department, Aden, has been kindly placed at our disposal by Mr. W. T. Thiselton Dyer, the Director of the Royal Gardens at Kew :—

"*November* 3, 1886.

"This valuable drug, which is one of the products of the island of Socotra, was formerly exported solely to Bombay, but of late years small quantities have been sent, *viâ* this Settlement, to the United Kingdom. There would be a considerable saving in the freight on this drug were the wholesale importers in England to direct that it be shipped *viâ* this Settlement, as there are many facilities for so doing, there being several lines of steamers plying between this and the African coast, in addition to a large fleet of native craft. In the year 1885–86 there

* 'Gmelin,' vol. vi., p. 177.

were only 1213 cwts. exported from Aden, the value of which was Rs. 29,958. There being no British merchants in this Settlement, this trade is also in the hands of foreigners."

VEGETABLE DIET AND FATTY FOODS.*

BY PROFESSOR DUJARDIN-BEAUMETZ.

(*Concluded from p.* 453.)

I will say a few words about mushrooms. Despite the large quantity of water which enters into their composition—85 to 90 per cent.,—they contain considerable nitrogen, and for this reason are nutritious. Carl Wœrner, of Upsal, who has recently studied the alimentary value of mushrooms, has shown that a kilogramme of beef has for equivalent :—

	Kilogrammes.
In edible mushrooms (*Agricus esculentus*)	9·30
In oyster mushroom (*Agricus ostreatus*)	10·60
In morilla (*Morchella esculenta*)	15·20
In chanterelle mushrooms (*Chanterellus cebarius*)	41·60

The second class contains the mucilaginous and saline vegetables, and includes chicory, lettuce, spinach, artichokes, celery, string-beans, asparagus, green peas, carrots, beets, and pumpkins. These are the aqueous vegetables, and the quantity of water which most of them contain is represented in the following formula :—

	Per cent.
Cucumbers	96·2
Asparagus	92·2
Spinach	91·7
Cabbage	87·7
Turnips	87·0
Carrots	87·5
Turnip-cabbages	82·0
Artichokes	76·0
Jerusalem artichokes	76·0

Certain of these vegetables contain also inosite or sugar, as the beet and carrot ; the greater number are rich in salts, such as malates and oxalates of lime or potassium. This richness of vegetables in potassium is one of the most interesting points connected with their composition, and shows their utility in nutrition. Boussingault has given a good analysis of vegetables with respect to the quantity of potassium which enters into their composition. One kilogramme of the following vegetables contains the amount of potassium here given :—

	Grams.
Cabbage	3·6
Chicory	1·7
Turnips	3·7
Carrots	2·5
Beets	6·8
Potatoes	3·2
Spinach	4·5

Hence Beunge has insisted on the necessity of introducing into the dietary of individuals who subsist largely on vegetables common salt, in order to maintain a constant equilibrium between the salts of potassium and sodium, an equilibrium which is essential to a healthy nutrition.

The last group is constituted by vegetables rich in acid, and particularly in oxalic acid. We have here sorrel and the tomato, which, when eaten too freely, may give rise to oxaluria. There has been much discussion respecting this physiological oxaluria, some pretending that it may be brought about independently of alimentation, others that it is always of alimentary origin. While believing that the latter view is the correct one, I shall reserve what I have to say on this subject till I come to speak of the diet of urinary gravel, and in particular of oxalic acid gravel. It remains to finish what pertains to vegetable foods by speaking of fruits.

* A lecture on Hygienic Therapeutics, delivered in Cochin Hospital. From a translation in the *Therapeutic Gazette*.

Fruits complete the alimentation of man by the acids, the salts, and the sugar which they contain. Their general composition is very complex ; besides sugar, salts, and acids, gum, cellulose, and a small proportion of azotized matter enter into their compostion. The following is Berard's analysis :—

Analysis of Ripe Fruits (*Berard* 1821).

	Apricots.	Peaches.	Pears.	Cherries.	Prunes.
Azotized matters	0·17	0·93	0·21	0·57	0·28
Colouring matters	0·10 (Yellow.)	—	0·01 (Green.)	—	0·08 (Green.)
Cellulose	1·86	1·21	2·19	1·12	1·11
Gum	5·12	4·85	2·07	3·23	2·06
Sugar	16·48	11·61	11·52	18·12	24·81
Malic acid	1·80	1·10	0·08	2·01	0·56
Lime	Traces.	0·06	0·04	0·10	Traces.
Water	74·47	80·24	83·88	74·85	71·10
	100·00	100·00	100·00	100·00	100·00

The acids contained in fruits are very variable. Thus, peaches, apricots, apples, pears and currants contain malic acid ; grapes, tartaric acid ; oranges and lemons, citric acid ; quinces, pectic acid ; the latter, by undergoing transformation into pectine, enables us to make jelly of this fruit.

Like vegetables, fruits introduce into the economy alkaline principles, such as lime and potassium ; they are then useful foods. By the sugar which they contain they serve also for nutrition, but when eaten too freely they become purgative.

I ought especially to call your attention to grapes, from which therapeutics has derived such great advantage in the treatment of certain affections,—a kind of treatment known under the name of *grape-cure*. Very much in vogue in certain parts of Switzerland and Germany, and now employed in France, this mode of treatment is particularly applicable to gastro-intestinal affections. It has proved of service in abdominal plethora, and paretic conditions of the alimentary canal from high living or overeating. If we may trust Carrière and Curchod, the grape-cure is also an efficacious means for combating diarrhœic fluxes and certain diathetic states, as gout.*

These are the principal rules to follow. You will direct the patient to eat before his meals a certain quantity of grapes, which he must himself gather from the vines, and which should be eaten while being gathered. I say a certain quantity, for it is impossible to say exactly how much each patient should eat. He ought, however, to eat to complete satiety, for the benefit is largely due to an excess being ingested. As for the kind of grapes to choose, the best is the white grape, with fine skin and delicate pulp. The skins must, of course, be rejected, and the seeds, if possible. As is the case with the whey-cure system, there are two important factors in the causation of the good results obtained from the grape-cure. The fruit itself by the saline elements which it introduces acts favourably on the surface of the digestive tube, and the sojourn (with active exercise) in the open air has an invigorating effect. It is, in fact, in the midst of the most beautiful scenery of Germany, Switzerland, Silesia, and Tyrol that the grape-cure is carried out. This completes what I have to say about vegetable foods, and I pass on to the consideration of fatty foods.

The fatty aliments consist of butter, fats and oils. When I was on the subject of primordial alimentary principles, I reminded you of the importance of these fatty aliments in nutrition. Not only do they furnish to the economy the hydro-carbonaceous materials which it needs, but they oppose, in a certain measure, if we may trust the experiments of Debove and Flamant, the destruction of albuminoid elements, so that we may consider them as *sparing* aliments (*aliments d'épargne*). If their nutritive value is great, their digestibility is

* Carrière, 'Grape-Cure in Switzerland in the Treatment of Chronic Diseases;' Curchod, 'Theoretical and Practical Treatise on Grape-Fruit.' Vevay, 1860.

feeble; hence it is that these fatty foods quite often prove to be the most indigestible, and when eaten in moderation they are a source of irritation and discomfort in the digestive tube, and, if taken in considerable quantity, they become real cathartics, constituting what has been described under the name of oily purgatives.

All these fatty substances are of vegetable or animal origin, constituting the fixed oils or fats. We may even add a third group,—the mineral fatty bodies, such as vaseline, a product of petroleum, and which, by a curious artificial process of refinement (as Riche has lately shown) has become an article of food. It has, however, been shown by experiments on animals that if vaseline be not toxic it does not possess any nutritive properties.

Among these fatty bodies there is one which plays a considerable *rôle* in therapeutics. I refer to cod liver oil. From time immemorial among the maritime populations of the extreme north—in Iceland, in Greenland, in Norway—cod liver oil has not only formed an important article of food, but has been applied to medical uses, special curative virtues having been attributed to it in rheumatism, neuralgia and consumption. Percival and Darbey, at the end of the last century, called the attention of physicians to these remedial properties, but it was not till 1822, and consecutive to the work of Schenck, that the employment of this oil became general; and in France its speedy popularity was due to the labours of Bretonneau and Duclos.

To-day everybody is agreed in ascribing to cod liver oil physiological properties clearly defined, and which consist especially in an increase of the weight of individuals to whom this oil is administered. We have here one of the results, the best demonstrated of late years, as you will see by the monograph of Rendu, of Lyons, which shows that in promoting increase of weight and fattening in the tuberculous, cod liver oil is vastly superior to arsenic.*

Since Hoffer, of Lorme, found iodine in cod liver oil, there has been a disposition to attribute to this metalloid, as well as to the bromine, sulphur and phosphorus which the oil contains, the curative action which it possesses. I believe that this is a mistake, and I am persuaded that it is for the most part as fatty substances that these oils do good in the treatment of tuberculosis; and if I insist on this point, it is because the attempt has been made to substitute for cod liver oil certain iodized oils, which are far from having the same effects.

The question has been often asked, What kinds of cod liver oil are the best? Shall we give the preference to the pale over the brown oils? I do not think that there is now any doubt as to the answer which should be given to this, and everybody is agreed that the pale oils, known as *virgin oils*, are better tolerated by the stomach than the brown oils, and are more palatable, while being of equal therapeutic value.

There has been some dispute as to whether it would do to substitute for cod liver oil oil obtained from other fishes, such as the skate and dog-fish. By referring to the comparative analysis of Delattre, you will see that the oils of the livers of the ray and dog-fish are almost identical in composition with cod liver oil:—

	Cod liver oil.	Ray liver oil.	Dog-fish liver oil.
Oleine . .	988·700	986·945	987·114
Margarine .	8·060	11·017	10·121
Chlorine . .	1·222	1·125	1·018
Iodine . .	0 327	0·105	0·345
Bromine . .	0 043	0·039	0·034
Sulphur . .	0·201	0·165	0·160
Phosphorus .	0·203	0·286	0 206
Loss . . .	1·344	0·238	0·942
	1000·000	1000·000	1000·000

* Joanny Rendu, 'Experimental and Comparative Study of Arsenic and Cod Liver Oil in the Treatment of Pulmonary Phthisis.' Lyons, 1878.

Moreover, the fabrication of these cod liver oils has undergone great improvement, and to-day, with the exception of oleum morrhuæ of Berthé, which is still made in Paris, all the other oils are manufactured at the fishing stations in Sweden and Norway. Instead of making use of livers that have undergone partial decomposition, as was the custom formerly, only fresh livers are now used. These are thoroughly heated over a sea-bath and subjected to pressure. It is, then, the fresh virgin oi which you should always prescribe. The following analysis gives you the composition of these different oils:—

	Cod liver oil.				
	White.	Amber coloured.	Pale yellow.	Brown.	Dark brown.
Oleine . .	988·700	988·675	988·695	987·449	988·957
Margarine .	8·060	8·066	8·089	9·264	8·323
Chlorine .	1·122	1·122	1·116	1·018	1·005
Iodine . .	0·027	0·327	0·322	0·310	0·201
Bromine .	0·043	0·043	0·030	0·031	0·016
Sulphur .	3·201	0·200	0·196	0·156	0·142
Phosphorus	0 203	0·204	0·200	0·196	0·076
Acids . .	0·000	0·439	0·897	0·924	0·838
Loss . . .	1·344	0·924	0·449	0·102	0·437
	1000·000	1000·000	1000·000	1000·000	1000·000

I do not propose here to enter into the detail of the administration of cod liver oil. A multitute of processes have been devised, which belong rather to pharmacy than to dietetics. There are, however, two points pertaining to the latter to which I desire to call your attention.

First, I cannot too much urge the importance of giving cod liver oil at meal time, for when mixed with the whole mass of the food, and at the moment of the digestive process, these oils are better supported than when given on a empty stomach. Some have even gone so far as to recommend the incorporation of cod liver oil with bread, but this combination is far from being palatable, and those who have used it have soon taken a disgust to both cod liver oil and bread. The only association which seems to me a happy one is that which consists in the union of cod liver oil with sardines, the latter oil being used instead of the oil in which sardines are ordinarily preserved.

You know, also, that the instrument-makers have devised spoons tapering towards the end, which enable you almost to pour the oil into the throats of your patients, and thus avoid the disagreeable taste which cod liver oil leaves in the buccal cavity. Habit, moreover, has a good deal to do with the repugnance which persons have to taking cod liver oil, and while the people of the north relish it, the inhabitants of Central Europe find it very disagreeable. But it is a fact that children generally imbibe the oil with willingness, and, when the habit of taking it is formed, with avidity.

I advise you to discard all those pharmaceutical emulsions which have been devised to mask the taste of cod liver oil. There are two of these mixtures, nevertheless, which deserve to remain, as they associate with the oil principles which are of use in the treatment of scrofula and tuberculosis. I refer to the preparations of oleum morrhuæ with iodoform and eucalyptol. The first, highly recommended by Fonssagrives, has the following formula:—

℞ Pale ol. morrhuæ . . . 100 grms. (f℥iiiss.).
Iodoform . . . . . 0·25 grm. (3½ grs.).
Essential oil of anise . . gtt. x.
M.

The preparation with eucalyptol is as follows:—

℞ Pale cod liver oil . . . . . 100 parts.
Eucalyptol . . . . . 1 part.
M.

As for the dose of cod liver oil and the quantity to be administered daily, this is very variable. Jaccoud, who is one of the most strenuous advocates of this remedial

agent in the treatment of tuberculosis, has gone as far as 300 grams (or about 10 ounces) per day. This is very large dosing, and few stomachs can bear anything like this quantity. Generally one is obliged to be satisfied with the moderate dose of a tablespoonful after each meal.

My regretted master, Behier, had an instinctive horror of cod liver oil, and would never prescribe it; as a substitute, he recommended butter. Butter is, in fact, an excellent aliment, but very inferior as a fatty principle to fish oils.

Butter is constituted, as you know, of those oil corpuscles which are in suspension in milk. It contains 83·35 per cent. of pure butter and 16·25 of buttermilk. The composition of butter is very complex. What especially characterizes it is a sweet oil formed of a mixture of oleine and butyrine. Butyrine, in contact with air, undergoes transformation into butyric acid, which gives to rancid butter its disagreeable taste and smell. Bromeis has completed the analysis of Chevreuil, and gives the following as the composition of good butter:—

Margarine	68 per cent.
Butroleine	30 ,,
Butyrine, caproine and caprine .	2 ,,

Butter is an excellent fatty aliment, the usage of which you will do well to recommend to feeble and emaciated persons. It enters into several pharmaceutical preparations. It is made the basis of several ophthalmic salves, such as the pomade of Regent, the pomade of Benedict, the pomade of St. André, of Bordeaux. These preparations ought every one of them to be now abandoned, for the tendency of butter to become rancid makes it a bad excipient, and the unalterable minerable fats are far preferable.

Under the name of *bromo-iodized butter*, Trousseau proposed the following mixture, which he designed to replace cod liver oil:—

℞ Iodide of potassium	0·05 grm.
Bromide of potassium	0·20 ,,
Chloride of sodium	2 grms.
Fresh butter	125 ,,

M.

S.—To be spread on the bread like butter.

I have, however, very little faith in any of the substitutes for cod liver oil.

As intermediate between butter and milk should be mentioned cream, which has been vaunted in the treatment of certain consumptive affections and gastro-intestinal disorders. The following is Hasson's analysis of cream:—

Butter . . .	20 and sometimes	30	per cent.
Caseine . . .	29 ,,	,,	11	,,
Serum . . .	51 ,,	,,	59	,,
	100		100	

Cream is, then, a mixture of butter, caseine and serum. It is easily borne by weak stomachs, and doubtless sometimes renders service where other fats cannot be tolerated.

Such are the different points to which I desired to call your attention *à propos* of vegetable and fatty aliments. Now that you understand their composition, before studying the bases of dietetics I must speak of beverages.

This shall I do in the next lecture.

BEESWAX.*

BY GEORGE A. STOCKWELL.

A writer on bees in the *Examiner*, a New York religious newspaper, says that bees make wax from honey. He must reason thus: honey sustains the bee, the bee produces wax, therefore wax comes from honey. Before the habits of bees had been studied, it was supposed that wax was collected from flowers, but later investigation shows that wax is a natural secretion of the bee. It exudes from the body between the rings, in minute scales. These the bee takes in "hands," works like a piece of dough, and places it where it is needed. If comb building is in process, he deposits the piece of wax on the edge of a partly-built cell; another bee then attacks it, gives it a twist or a pinch, and smooths it with his mandibles. Sometimes three or four bees will find something to do with that particular crumb of wax. The workers are so many and work with such rapidity, and do individually apparently so little, that the eye hardly perceives, in a short interval of time, that the structure, the comb, increases in size; but close the hive, examine the same cell in an hour, and its greater length is seen at once. Evidently wax is present when it is wanted, and absent when there is no use for it. This may not be the case, but appearances favour it. If there be no more room in a hive for comb, no wax, or very little, is needed; but if an empty frame be placed in this hive, the bees begin at once to fill it with comb. If the bees secrete wax in a full hive, what becomes of it? Does the bee dislodge the wax scales on the wings? Sometimes these tiny scales are found in the bottom of the hive, but the quantity found there would build only a fraction of the comb built in one night if space is provided for it.

The wax as it comes from the bee is white, and the comb is white for a while, but the bees use no doormat, and after 25,000 bees—six feet a piece make 150,000 soiled feet—have run over the comb, it becomes yellow, and finally black, or nearly so. Persons who have seen a comb from the brood chamber for the first time are surprised that it is not white—"like wax." The comb in the sample boxes remains white, or nearly so. The bees appear to be more careful in their spare chamber, but as this surplus room is on the top of the brood comb usually they clean their feet as they ascend to it. But even this comb would become soiled if left in the hive. On some hives thirty-two surplus 1 lb. boxes are placed, and on the top of these may be placed as many more, making sixty-four in all. The first lot put on are not taken off until the outside boxes are full. This allows the bees to run over many of the boxes after they are capped, and hence it would be better to place a less number of boxes in the surplus chamber, and remove before the comb may be soiled. But this would interfere with the theory that the more room the bees have the better they work, and the less are they inclined to swarm.

If the bees be fed liberally with honey or syrup, they secrete wax more rapidly. The amount of honey fed to produce a pound of wax is not less than 15 lbs., hence at the present price of best honey, 25 cents, the cost of a pound of wax, worth to-day about 30 cents, is 3 dollars at least. Notwithstanding the apparent high cost, surplus wax in an apiary is a source of profit. Every bit is preserved, melted down and sold. There has never been too much beeswax in the market, although it is imported from foreign countries. Wax is insoluble in water, and may be melted in water and skimmed from the surface. Cooled in pans of any shape it is ready for the market. But the bee-keeper does not render into wax any comb that can be used again, and it is a very old and black piece that cannot be serviceable. Advertisements read, "Bees on straight worker combs." These straight combs are in harmony with men's ideas, and better for man's manipulation, but the bees may prefer a different arrangement. The writer purchased this spring black bees in a double box hive, that is, one box above another with passage-way between. The upper part was full of comb, and the comb was full of honey. On one side were three straight combs 12 inches wide and 16 inches long, solid slabs of honey, but the rest of the comb, about two-thirds of the whole, was a labyrinth of alleys, passage-ways, vaulted chambers and cuddy holes, from which it was difficult to drive the bees even with smoke. Two days after they had been expelled, lingering bees continued to appear. Their home was a most curious structure, and was evidently to supply just what was needed by a numerous household.

* From the *New England Farmer*.

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NON-OFFICIAL PR PARATIONS AND THE SUPPLY OF MEDICINES.

WE understand from one of the Honorary Secretaries of the British Pharmaceutical Conference Formulary Committee that a meeting of the Committee was held last Wednesday week, and adjourned to Thursday, the sitting on each occasion lasting for upwards of three hours. The members present were the Chairman, Mr. MARTINDALE, Messrs. ABRAHAM, GREENISH, GROVES, MARTIN, REYNOLDS and THRESH, with the Honorary Secretary, Mr. NAYLOR. Letters of apology for inability to attend were received from Messrs. MABEN and SYMES. Lists of suggested preparations and formulæ were submitted, and after being discussed, it was decided that they should be reported upon. It may be expected, therefore, that some decisive action will soon be taken by the Committee towards carrying out the views put forward by some of the speakers at the last meeting of the Conference. Indeed, if the publication of Mr. MARTINDALE'S letter on tincture of strophanthus in this week's Journal is not merely an accidental coincidence, it may be assumed that the labours of the Committee have already led to some result in the direction of establishing definite standard formulæ for non-official preparations. That object should, we think, meet with a considerable amount of sympathy from physicians, and its attainment to any extent would ensure to them a proportionate degree of certainty as to the mode in which prescriptions ordering non-official preparations would be dispensed. This is a matter of great importance in regard to the use of certain potent drugs, such for instance as strophanthus. But there are other directions in which there is at the present time great need for the authoritative adoption of standard formulæ for non-official preparations. The endeavour to anticipate and provide for the requirements of the physician by offering in a proprietary form ready-made medicines has been carried to such an extent as not only to realize its avowed object of making prescribing easy, but also to contribute by its success, as Dr. QUAIN has pointed out, towards effacing the art of prescribing. In America this pernicious system has attained a high development, which has become not only the source of great perplexity and embarrassment to pharmacists, but in all probability also detrimental to the interests of patients whose medical treatment is carried out in what may be termed this second-hand manner.

In a paper recently read before the New York State Medical Association by Dr. SQUIBB the evil effects of this system have been forcibly pointed out. He speaks of the ready-made medicines, of which there are such a multitude in the form of beautifully coated and coloured pills or palatable solutions and mixtures, as recommending themselves to prescribers, not only by gratifying various degrees of laziness or indisposition to think for themselves, but also as true labour-saving devices skilfully prepared for overworked ability to use them, and as giving more time for the higher and more scientific reaches of professional work. With a large number of physicians in America such preparations are looked upon with favour. Depending largely, if not mainly, for both therapeutics and materia medica upon the travelling salesmen and their pamphlets and lists, and on the advertising medical journals, the relation of this class to their supplies of medicine is most simple and it involves little trouble. With others smarter, more ingenious, and more plausible than they, to think for them and then to apply vigorous mercantile principles to the wants thus suggested for them, they have the least practicable amount of thinking to do for themselves in regard to their remedies and the novelties of the day, and therefore, as they argue, more time to think of and study out their cases. To such a class of practitioners what can be more convenient or more desirable than supplies of ready-made medicine in an attractive form and easily accessible? In cases of the fashionable "nervous prostration" what can be more simple or more easy than to order Smith's "coated pills of valerian, quinine, iron and zinc, No. 1," to be taken three times a day with a draught of Jones's "effervescent salts of bromide of potassium, caffeine and cocaine," at bedtime. There are few difficulties in this practice of medicine, and none in the way of medical supplies. The great extent to which such a practice is now carried in America tends to a constant increase in the number of manufacturers of such articles, while the intense competition in trade introduces a great deal of what is called "undercutting" of prices, to meet the demands of which there is every probability that the quality of the articles supplied will be affected to the detriment of patients to whom they are administered.

As a contrast to this unsatisfactory picture of the consequences likely to result from reliance upon ready-made specialities, Dr. SQUIBB refers to another class of physicians who hold themselves independent of the travelling salesman and of the advertising pages of their journals, doing more of their own thinking, but still finding time to study out their cases, and give equal attention to the selection and

adjustment of their remedies to individual cases. By such men, complex prescriptions and combinations are very rarely used. If more than one therapeutic effect be required, the agents needed are used, not together, but alternately, thus avoiding the risks of chemical and physiological incompatibility and allowing the doses to be varied as the case requires. In all such practice each agent of the materia medica acquires its maximum importance, and, as an indispensable condition, it must be of standard quality. Such practice induces a suspicion of novelties, as having no standard of identity or quality, and especially caution as to those of the catchpenny order. Extending the consideration of this subject to the conditions under which it may be reasonably expected that the supplies of medicines will be of such a nature as to satisfy all requirements as to quality, Dr. SQUIBB considers that, though the physicians and patients who want the highest quality may not be in largest number, they are yet sufficiently numerous to create an active, earnest, and large demand. He also believes that by the laws of trade this demand is met, and that there is always an abundant supply of excellent medicines in all the mercantile centres of trade. Away from those centres the difficulty of obtaining them is increased, but the difficulty of access to the stock is simply a difficulty of distribution. In his opinion one reason is that wholesale dealers, and agents who represent them, do not favour the distribution of the highest class of supplies, because they are not permitted to make as much money on good as on inferior articles. In conformity with that law of trade according to which dealers give a preference to articles upon which most money is to be made, the best goods would always lead in all markets if most money could be made from them. But since superiority in quality necessarily involves a proportionately higher cost of production, Dr. SQUIBB thinks an antagonistic influence then comes into play. He illustrates his view by referring to digitalis, which is simply an article of merchandize until it reaches the hands of the pharmacist and the physician, by whom the whole character of the commodity is changed through acquiring another kind of value with them as the direct and close representatives of patients suffering from diseased heart-action, curable or controllable by this agent. Digitalis collected in the proper season of maturity, packed, transported, and preserved with proper skill and care, costs much more than the same drug mowed down with less regard to season and age of plant, and pushed through the markets with the least possible expense, though both may be regarded by the dealers simply as the merchandise to be bought as cheaply and sold as dearly as practicable. From the mode in which digitalis is used, someone to make money of it must convert it into powder or extract, etc., and up to this point there will have been a fair chance of discriminating between good digitalis and bad; but here almost all landmarks of quality, and even of identity, are lost, so that the most expert pharmacist or physician cannot tell whether the preparation is made from good or bad digitalis. Of two such preparations, one from good and the other from bad digitalis, supplied at the same cost, those who supplied them all the way along the line of distribution will have made more money upon the bad than upon the good, and every discrimination of quality being impossible, each dealer will favour that preparation upon which he makes most profit. This rule in itself is not immoral, and any injustice due to it is commonly too remote to have a strong influence in the competition of trade. Hence the pecuniary interests of trade are perhaps the safest and surest upon which to rely for securing superior quality in merchandise, by insuring for such quality superior profit to the dealers. In the same manner, the best inducement for the pharmacist to buy the better quality of drugs, rather than the inferior, is to offer him better prices, and therefore more profit, and it is at this point, as Dr. SQUIBB points out, that the physician is reached in his relation to his medical supplies. There is no doubt as to where the true interests of his patients lie, and their interests and his are the same. If he keeps the screw of price and cost applied to the druggist and the pharmacist, he should recognize that at least an important share of the responsibility for inferior medical supplies rests upon him. As a conclusion of the paper Dr. SQUIBB remarks that the evils of ignorance and excessive over-competition, and even of mild degrees of fraud, are so general as to seem, at present, inevitable, and the surest safeguard against their influences upon so important an interest as that of the sick and suffering would seem to be to make the better way pay better. Physicians themselves are generally poorly paid for their art and skill, yet their art and skill will come to be worth to their communities still less than they receive for them if they gradually more and more lose control of the quality of the supplies which render their knowledge and skill available in the treatment of disease.

TECHNICAL EDUCATION.

THOUGH the subject of technical education is frequently referred to in the newspapers and some attempts are being made by the Corporate bodies of the City of London to provide means for the purpose, it is probable that some time will yet elapse before the need of improvement in this respect is so thoroughly recognized by the general public as it requires to be. To take that class of industries which involve acquaintance with chemical science as examples of the want of any adequate appreciation of what is required for the maintenance of those industries in this country upon a level with their progress in Germany and other

continental countries, it cannot be too strongly urged that we are without any such systematic plan of training as would produce chemists qualified to perform the duties of a manager of chemical works of any description. South Kensington and the Science and Art Schools have sent out a flood of superficially instructed young men with a belief that, having passed the examination and obtained the certificate of that department, they are fit to be employed as technical chemists; but, in most instances, they find their services are not readily looked upon as worth the remuneration they expect. Hence there is often a complaint of the employment of Germans instead of Englishmen in works where intelligent skilled knowledge of chemistry is required. In a recent address delivered by Professor CAMPBELL BROWN before the Liverpool section of the Society of Chemical Industry reference was made to this point by the lecturer, and in his opinion the preference notoriously given to Germans is due to the fact that they are as a rule better trained and more competent for the work to be done than Englishmen. Speaking of the imperfections of the Science and Art Schools Professor BROWN expressed the opinion that while these organizations had done a great deal in the way of spreading the desire for and opportunities of learning something about chemical science, one of their defects was that they have unintentionally fostered the idea that when a student has got to the upper end of their system he is a chemist. It is therefore well worthy of consideration whether any reasonable hope of improvement in the chemical education of pharmacists can be entertained as likely to result from having recourse to the Science Schools of this department, and as the suggestion has lately been made to take advantage of them for the purpose, it is desirable that the practical failure of the system to produce well qualified chemists suited for employment in other kinds of business should be well borne in mind.

According to the *Druggists' Circular*, certain liquids have recently made their appearance in United States commerce as solvents, under such designations as "methylene," "pure methyl," "alcoholene," "inodorene," "just-as-good-as-ethylene," and other similar fancy names, which have been put forward as the products of improved methods of rectification of wood naphtha. They are met with as clear colourless liquids with comparatively little odour, and so much have they come into favour that the output hardly equals the demand. On behalf of the better brands it is claimed that they are "similar to grain alcohol in odour," and "in chemical composition nearly identical," and it is asserted on good authority that they are already used largely in the making of liniments and other preparations for external application, and even in some popular proprietary remedies. Indeed, unlike many claims put forward by advertisers, this one of similarity to a product from grain appears to be so far warranted that Professor Parsons has found in some samples a fair proportion of ethyl alcohol. But as the production of this article in the rectification of wood naphtha, even by improved methods, is difficult of explanation, it is possible that it may result in some differences of opinion between the manufacturers and the Excise authorities.

* * *

A few weeks since, under the heading "Teleotherapeutics" (see before, p. 265), reference was made to a method of treatment described before a scientific society in France, which consisted in simply bringing a drug of which the therapeutic effect was desired within a certain distance of the unsuspecting patient. From the same country now comes a report of another method of treatment, recently brought under the notice of the Société de Biologie by Messrs. Fontan and Legard, which dispenses with the use of drugs altogether, and replaces it by what is laconically described as "suggestion." It appears to consist in placing the patient in a condition of hypnotism, and then making the suitable therapeutic suggestions, which are said to be certain in their effect. The cases that were alleged to have been successfully treated in this way, it was explained, were not those of mere functional disturbances of the nervous system, in respect to which the faith of the patient might play an important part, but included "circulatory and secretory disorders depending upon anatomical lesions." For instance, a patient suffering from acute urethritis and prostatitis, attended by very painful symptoms, was described as having been cured in three sittings, in the first two of which it was "suggested" that the painful symptoms should be abated, and in the third that there should be no more discharge and that the cure was to be absolute. "And the next day it was so!" Dyspepsia, with vomiting and obstinate constipation, is said to be curable in this way instantly.

* * *

A telegram from New York reports that Professor Thomson has extended the scope of the observations made by Professor Spring, of Liége, upon the behaviour of metals under pressure, by bringing in the aid of electricity. In this way he has found that by placing pieces of metal end to end under pressure, and passing an electrical current through them, perfect weldings are effected, even between metals hitherto supposed to be incapable of being welded together.

* * *

At a recent meeting of the Gottingen Chemical Society, Professor Victor Meyer stated that in conjunction with Student E. Mensching, he had succeeded in estimating the vapour density of zinc, according to which the molecular weight and the atomic weight of that metal are the same.

* * *

At a final meeting on Wednesday of the Local Executive Committee which was entrusted with the arrangements for the meeting of the British Association at Birmingham, it was announced that the exhibition at Bingley Hall had yielded a profit of £5200. After defraying out of this sum all the charges due on account of expenses incurred in connection with the meeting, there remains an available surplus amounting to £1311 1*s.* 5*d.* This sum it has been resolved to invest in the purchase of illustrations of art among the metal work exhibits, which are to be placed in the Museum and Art Gallery as a permanent record of the meeting of the Association and the exhibition to which it gave rise.

Provincial Transactions.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The fourth meeting of the ninth session was held in the Society's House, 36, York Place, on the evening of Wednesday, December 8, Mr. William Duncan, President, in the chair.

The minutes of last meeting having been read and confirmed, the Chairman called upon Mr. Thomas Stephenson, Pharmaceutical Chemist, to read the following communication on—

Tinctura Ferri Acetatis, B.P. 1885.

Tincture of acetate of iron is one of the few preparations which have escaped the clutches of those pharmaceutical critics who, apparently for want of better employment in these dull times, have ceased not, ever since the publication of the Pharmacopœia, to hunt for clerical errors and impracticable formulæ in such a fruitful field as it affords.

This is certainly not owing to any merit in the preparation itself, as the new tincture, although undoubtedly superior to the old one in keeping properties, still throws down a similar deposit; and it is my intention in this short note to detail a few experiments made with the view of shedding some light on the nature and cause of this deposit, and, if possible, finding a remedy for it.

The old tincture was prepared by mixing in equivalent proportions solutions of persulphate of iron and acetate of potassium, filtering, and washing the precipitated potassic sulphate with rectified spirit to make the required quantity. This gave a tincture which invariably deposited and was therefore a very unsatisfactory preparation. The cause of this deposit has been inquired into by several chemists since it was introduced, notably in an exhaustive paper by Wellborn (*Pharm. Journ.*, [3], v., p. 241), and the general conclusion seems to be that there is a constant tendency to form a basic or oxyacetate, the liberated acetic acid combining with the alcohol to form acetic ether.

The object of this paper, however, is not to treat of the old tincture, which has already received the treatment it deserved in being expunged from the Pharmacopœia.

The new process consists in diluting a strong solution, after the same fashion as tinct. ferri perchlorid., the strong liquor being prepared by precipitating the ferric hydrate from solution of persulphate of iron by means of ammonia, filtering, washing, dissolving in glacial acetic acid, and making up to the required bulk with water.

This process was first suggested by Messrs. Deane and Jefferson in a paper read before the British Pharmaceutical Conference, in 1869 (*Pharm. Journ.*, [2], xi., p. 196). Their formula, however, allowed only a chemically equivalent proportion of glacial acid for dissolving the ferric hydrate, whereas the B.P. orders a considerable excess. Messrs. Deane and Jefferson claimed for their preparation that it would keep indefinitely in the strong state; but as, after dilution with water or spirit, it gradually threw down a deposit, they suggested that the strong solution only should be kept and diluted as required for dispensing.

The Pharmacopœia authorities have followed their suggestions so far, but have evidently supposed that by ordering an excess of acid any tendency to deposit would be avoided, and they have therefore not only put excess of acid in the strong solution, but have also put additional acetic acid in the tincture. A simple experiment would have shown them that this was nothing more than a theory, and this is just another instance of the much complained of "easy-chair work" in our new Pharmacopœia.

When the B.P. tincture is kept for about a week it gradually throws down a reddish-white deposit, without however affecting the appearance of the supernatant liquid.

In order to ascertain the nature of this deposit, as much as could be obtained was filtered off, and it having been ascertained that it was insoluble in water, was well washed with that liquid and dissolved in hydrochloric acid. The solution gave with the ferrocyanide test abundant evidence of iron. Another portion of the deposit gave, when treated first with an alkaline carbonate and subsequently with ferric chloride, the ordinary reaction for acetic acid.

The deposit obtainable was too small to admit of a quantitative estimation being made, but it is very probable that it consists of ferric oxyacetate, with a variable proportion of ferric oxide, as will be seen hereafter.

A number of samples of tincture and liquor were prepared as follows and kept for a time in a warm place, but away from direct light:—

1. Tinct. ferri acetatis, B.P., 1885.
2. „ „ „ but without extra acid.
3. „ „ „ made with sp. vin. rect., and without extra acid.
4. „ „ „ made with sp. vin. rect., and with extra acid.
5. Liquor „ „ B.P.
6. „ „ „ with extra acid like the tincture.

In about ten days all had deposited more or less. Nos. 3 and 4 deposited abundantly in a few hours; Nos. 1 and 2 not so much in a few days; and Nos. 5 and 6 only slightly at the end of ten days.

Samples 5 and 6 were then placed in full light and near a stove, the result being that they began in a short time to deposit much more abundantly. A clear sample of either liquor or tincture heated in a test tube and set aside also deposited. From these facts it would appear that time and heat, and probably also light, are the chief factors in this decomposition.

As regards the chemical cause I am afraid I cannot offer a satisfactory explanation further than what follows. It is evident that an alcoholic mixture has a greater tendency to deposit than an aqueous one, but as the deposit was found to be insoluble in water the suggestion that the spirit throws it out of solution cannot be accepted as the true explanation. It may be that the heat caused by mixing the spirit and water hastens the decomposition, but this would hardly account for the more rapid deposition from a pure alcoholic tincture. The most likely explanation is that the alcohol acts chemically on the ferric acetate, forming ethylacetate (acetic ether) and ferric oxyacetate and oxide, thus:—

$$(1)\ Fe_2(C_2H_3O_2)_6 + 2C_2H_6O = Fe_2O(C_2H_3O_2)_4 + 2C_2H_5C_2H_3O_2 + H_2O$$

$$(2)\ Fe_2O(C_2H_3O_2)_4 + 4C_2H_6O = 4C_2H_5C_2H_3O_2 + Fe_2O_3 + 2H_2O.$$

From the above equation it would appear that ferric oxyacetate is only an intermediate product, the ultimate product being ferric oxide; and this would account for the varying statements made by different authorities regarding the composition of the deposit.

This reaction, however, will not account for the deposit in the aqueous preparation, so another explanation must be looked for.

It being supposed that impurity in the strong liquor might cause deposition, this was accordingly tested for such impurities as might be present, and ammonia was found in appreciable quantity. A portion of the liq. ferri acetatis when heated alone deposited slightly, but when heated with an ammonia salt, such as chloride or acetate, it at once deposited abundantly, the liquid still remaining acid. As liquor ferri perchlorid. gave no precipitate when heated, either alone or with ammonia salts, it is more than probable that alkaline salts have some specific action on ferric acetate.

In order to obtain a pure liquor, a portion was prepared by washing the precipitated ferric hydrate with *hot* water, and dissolving in warm glacial acetic acid—a process,

which, according to Reinitzer (*New Remedies*, 1882), gives a pure liquor. This, although slightly better than the last, was still unsatisfactory, and ammonia could still be detected in the liquid. Another sample was prepared by a similar process, but the precipitate was washed with hot water for several days until the washings gave no indication of ammonia when heated with KHO; but this treatment seemed to alter the precipitate, rendering it only partly soluble in glacial acetic acid. I regret that want of time prevented my making any further experiments in this direction, but it is certain that until a pure liquor can be obtained, the best plan is to dilute it as required.

Lastly, we come to the point of most practical importance, viz., the remedy for, or rather, the prevention of the deposit. From what has been already said it will be seen that the decomposition may, to a certain extent, be retarded by keeping in a cool, dark place. It will also be seen that the "liquor" is a superior preparation to the tincture as regards keeping properties, and should therefore be prescribed in preference to the latter. We have Professor Attfield's authority (*Pharm. Journ.*, [2], xi., p. 197) for saying that the spirit is quite unnecessary in this preparation. All other Pharmacopœias order acetic ether to be added to the tincture. The object of this I fail to see. As acetic ether is continually being formed in tincture which is depositing, it cannot be to prevent the deposit; and if it is intended to have any therapeutic effect, it is a very uncertain way of prescribing it to add it to a preparation already containing a doubtful quantity of the same substance.

Glycerine having been recommended as a preventive of the deposit, from the fact that it prevents dialysed iron depositing when diluted, a sample of tincture was prepared according to the B.P., but with the addition of half a drachm of glycerine to the fluid ounce. This, however, gave no better results, the tincture depositing as much as ever.

Rother recommends the following rather peculiar formula:—

Take of—

Ferrous sulphate	2 oz.
Plumbic acetate	3 oz.
Citric acid	1 oz.
Rectified spirit	12 oz.
Acetic ether	2 drs.
Chlorate of potassium	1 dr.
Water	q.s.

Dissolve the $FeSO_4$ and $Pb(C_2H_3O_2)_2$ each in 8 ounces of water and mix the solutions. Filter and wash the precipitate with water to make 20 ounces, and add the spirit and chlorate of potassium. Shake occasionally during twenty-four hours and add the acetic ether.

It will be seen that 1 ounce of citric acid is ordered, but nothing is said as to what is to be done with it. As citric acid is used to dissolve iron precipitates, it may be intended to prevent the deposit. If so, it is a mistake, as, if added in anything like the quantity ordered, it alters the preparation chemically, changing the colour from the well-known cherry-red to orange-brown, unless added in very small quantity, in which case it cannot be of much use. Moreover it is hardly safe to use a lead salt in such a process.

The most practical way of meeting the difficulty appears, as already indicated, to be that of keeping the strong liquor and diluting as required. It is also desirable that the liquor should be as free as possible from ammonia and for this purpose the ferric hydrate precipitate must be washed with hot water for some time, but not too long, after the washings "cease to give a precipitate with chloride of barium," as the ferric hydrate seems to have a great affinity for ammonia. A simple test for ammonia, such as heating with KHO, might with advantage be introduced under the "characters and tests" of liquor ferri acetatis, and let us hope that in our next Pharmacopœia we shall see some such addition, and the tincture, which has long since been condemned by Christison in his 'Dispensatory' as a superfluous preparation, expunged altogether.

On the motion of the Chairman a cordial vote of thanks was awarded to Mr. Stephenson, and a discussion followed which was taken part in by Messrs. Duncan, Henry, Hill, Lunan, Macdonald and McInroy. Mr. Macdonald mentioned that he had seen a sample of tinctura ferri acetatis, B.P. 1885, which had kept for about six months without depositing.

The Chairman then called upon Mr. Robbie to introduce the adjourned discussion on the paper on "Apprentices," read by him at the last meeting, by reading a short summary of the views then presented to the Association.

A protracted and animated discussion then took place, in which Messrs. Duncan, Govan, Henry, Hill, Macdonald, McInroy and Stephenson took part. The general opinion seemed to be that though Mr. Robbie had somewhat exaggerated the existing condition of things, both as regarded employers and apprentices, there was nevertheless room for improvement, and it was thought that employers would find it to their own interest in the long run to encourage their apprentices, and, so far as time and opportunity would admit, to guide them in their course of study.

A motion by Mr. T. Stephenson that the Association have a smoking concert was withdrawn after discussion.

Owing to the lateness of the hour the remaining business had to be postponed till next meeting, which will be held on Wednesday, December 22. A paper will be read by Mr. A. M. Macdonald on "Light—Natural and Artificial; Its Properties and Uses," and also a note on "Recent Donations to the Herbarium," by Mr. J. Rutherford Hill. The donations will be shown at the meeting.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

The general monthly meeting of the above Society took place in the Lecture Room, Norfolk Row, on Wednesday evening, December 8, when, notwithstanding the very inclement weather, there was a good attendance.

The Secretary announced a donation to the Society's library of a book, Allen's 'Commercial Analysis,' second volume, from the author, who is the Borough Analyst. Mr. Allen presented the first volume to the Society on its publication some months ago.

A vote of thanks to the donor was passed.

A paper was then read entitled,

Pepsine and Commercial Pepsines.

BY J. A. GRIERSON.

It was at one time supposed, indeed was affirmed by Liebig, that the digestive process was accomplished by a kind of fermentation, this fermentation being due to the destruction of epithelial tissue. A later writer takes upon his shoulders the task of proving that the digestion of fibrin and albumen is accomplished by a physical entity called pepsine. It has also been shown that this entity is secreted by specialized cells. The fact of pepsine being a material substance is so familiar to us as pharmacists that we wonder how its existence could ever have been doubted. It does not follow, however, that because pepsine is a "physical entity," and is secreted by specialized cells, it is not a product of the degradation of tissue. The assertion of Liebig, therefore, remains practically unassailed, at least in the light of pharmaceutical research. I mention this, because some results obtained in my experiments, before I knew of Liebig's statement, seem to point in the same direction. It is a question, however, which is quite beyond the scope of the present paper.

On the subject of pepsine and its preparation, numerous articles, historical, critical, and practical, have

been written. The activity of commercial samples of the same has also furnished material for discussion in journals medical and pharmaceutical. It will serve no useful purpose to recapitulate all that has been said on these subjects, and I will therefore content myself with mentioning only those which have an obvious bearing on the facts which I have to place before you. The paper naturally divides itself into two sections,—(1) The composition and digestive power of commercial pepsines, and (2) The bearing which the results here obtained have on the best methods for its preparation.

1. *The Composition and Digestive Power of Commercial Pepsines.*—As it was necessary to arrive at their composition approximately, the following method was adopted. The samples were first tested as to solubility in water, and in acidulated water. Ten grains of each were mixed with 1 ounce of water, and a like quantity with 1 ounce of water to which had been added 8 minims of acid. hydrochlor., B.P. The mixtures were occasionally shaken for twelve hours, placed on counterbalanced filters, the liquid allowed to drain off, and the residue dried and weighed. The general results arrived at by this process were then specialized by testing with iodine and Febling's solution respectively, and by microscopic examination.

To test the digestive power of pepsine several methods have been recommended. One writer recommended fibrin, another, desiccated and powdered albumen, but the favourite method seems to be that in which hard-boiled white of egg is the substance acted upon, and this was the one which was chosen. The first method was discarded because results obtained by it could not well be compared with official standards; the second, because, apart from the difficulty of powdering the desiccated albumen, it appeared to have lost, to a great extent, its solubility in peptic solutions. Had the second method been practicable, it would have yielded mathematically accurate results, but as the experiments are comparative only, mathematical accuracy is not a *sine quâ non*. Two grains of each sample were placed in a 12-ounce earthenware jar with 8 ounces water, 1 drachm acid. hydroch., B.P., and 500 grains hard-boiled white of egg, which had previously been passed through a hair sieve. Before the pepsine was added, however, the jars with the water, acid and white of egg were all raised to a temperature of 110° F. by means of a water-bath. After addding the pepsine the temperature was graduaily raised to 130° F., the mixtures being, of course, constantly stirred. This part of the process took half an hour, and the temperature was maintained at 130° for another half-hour, so that the whole process lasted one hour. The undissolved albumen was then thrown on muslin, and allowed to dry in the air for about twenty-four hours. As nearly as could be judged it had then arrived at its original consistency. The amount left undissolved subtracted from the original amount of course gave the amount dissolved, and so an approximate opinion could be formed of the proteolytic power of the different samples. It should here be noted that the figures obtained simply show the solvent power of the pepsines, not their absolute peptonizing power, but for practical purposes this is quite sufficient. It should also be noted that it is always advisable to use a larger quantity of albumen than the sample is expected to dissolve, as in the initial stages of the process the pepsine is more active than in the later. That is to say, that a pepsine which when allowed five hundred grains of albumen dissolved two hundred might not dissolve one hundred if only started with that amount.

In the following table are embodied the results of the different tests employed.

Some instruction may be derived from a study of the

No. of sample.	Quantity dissolved from 10 grains macerated in		Difference.	Albumen dissolved by 2 grains.	Chemical and microscopical examination.
	Acidulated water.	Water.			
	Grains.			Grains.	
1 . .	7	—	—	500	Maceration in ether removes 10 per cent. fatty matter. Microscopical examination reveals presence of columnar epithelium in quantity. No starch. No milk-sugar.
2 . .	7	4	3	340	Blue with I. Microscopical examination shows starch in small quantity and columnar epithelium. No milk-sugar.
3 . .	6	10	−4	370	Fehling's solution and microscopical examination show milk-sugar.
4 . .	4½	3	1½	100	Blue with I. Microscopical examination shows starch. No milk-sugar.
5 . .	4	0	4	130	Blue with I. Microscope shows starch in large quantity.
6 . .	8	4	4	400	Microscope shows starch in small quantity and epithelium.
7 . .	7½	6½	1	80	No starch. Fehling's solution and microscopical examination show milk-sugar.
8 . .	8	2	6	500	No starch. No milk-sugar. Microscopical examination of residue from acid shows epithelium.
9 . .	5	3½	1½	380	No milk-sugar. Blue with I. Microscopical examination shows starch.
10 . .	10	10	0	120	No starch. Fehling's solution shows milk-sugar. Microscopical examination shows this to be present in quantity.
11 . .	3	1	2	140	No starch. No milk-sugar. Microscopical examination shows it to be almost entirely composed of nucleated cells.

connection between the different figures in this table. In all cases where the proteolytic power is high the difference between the solubility in water and in acid is comparatively great. This is what we might naturally expect if we grant that pure pepsine is more soluble in acidulated than in ordinary water, and I certainly think all the evidence points in this direction. Take for instance the two most active pepsines, Nos. 1 and 8. Note first that they contain no starch, the presence of which would lead to error. It will be found that 7 grains of one and 8 grains of the other are soluble in the acid medium, while only a very small proportion is soluble in water. In order further to confirm this greater solubility of pepsine in acid than in neutral media, two pigs' stomachs were macerated for twenty-four hours with occasional stirring, one in 6 ounces of water, and the other in 6 ounces of water with the addition of 2 drachms hydrochloric acid. The action of 1 drachm of each was then tried on 500 grams coagulated albumen, each mixture being of course acidulated. The neutral sample dissolved 180 grams, and the acid one 220 grams, but the neutral sample contained a considerable amount of mucus in sus-

pension, which if it had been removed by filtration would have very much lowered the recorded power.

Taking the samples of lowest proteolytic power, two of them, Nos. 7 and 10, are very soluble in water, the bulk of them being in fact milk-sugar; two more, Nos. 4 and 5, are very insoluble, both in water and acidulated water, the bulk of them being starchy matter. It should be stated that No. 10 is not sold as pure pepsine, nor even as "Pepsine, B.P.," but as a digestive powder containing in their natural condition the ferments and acids of the digestive organs. No. 8 is in scales. No. 11 purports to be made from the stomach of the fowl, but I have not been able to come to any definite conclusion as to source from its appearance under the microscope.

The ridiculously low standard set down for pepsine in the Pharmacopœia has almost made the term "B.P. Pepsine" a bye-word for any pepsine of inferior quality. It is the aim of the Pharmacopœia, I take it, to exclude adulterated articles, and make its definitions apply only to the best of everything. If this is so, and a pepsine can be found to dissolve 500 grams of albumen under given conditions, surely that cannot be a genuine article which only dissolves one-fifth of this. It should be noted, however, that the time taken in my experiments is double that allowed by the Pharmacopœia. I think the longer time gives more uniform results. The experiments on solubility have an obvious bearing on another point in the official test. This says that pepsine should be very little soluble in water, which, of course, excludes all samples containing a large proportion of milk-sugar, but it is rendered valueless when we find that starch is frequently used. This difficulty would be got rid of by adding that three-fifths of it should be soluble in water acidulated with hydrochloric acid. I would not exclude starchy matter entirely, because it may sometimes prove useful in rendering the drying process simpler, and in making the resultant powder less hygroscopic. That the presence of an inert powder, however, is not absolutely necessary is evident from the fact that the two best pepsines contain neither starch nor sugar.

2. *Bearing of Experimental Results on the Best Method for the Preparation of Pepsine.*—The presence of epithelium in the best samples renders it evident that they are prepared in some way direct from the stomach without undergoing any previous solution and filtration. Whether prepared strictly according to the official process (Beale's) or by some modification of it, whereby the, in my experience, impracticable method of scraping is done away with, there is no evidence to show. Much fun has been poked at this process, the best example I remember being a humorous article, with illustrations, which appeared in one of the trade journals some little time since, and I must say that previous to undertaking this research I was exceedingly sceptical about it ever being used; but there is no gainsaying facts. From the fact that pepsine is so much more soluble in acid than in neutral media it is difficult to see how Petit's process* is applicable on a commercial scale. Scheffer's process† has not in my hands yielded satisfactory results; salt does not seem to throw out all the pepsine in an acid solution.

Liquid Pepsines.—A report on commercial pepsines would obviously be incomplete without the inclusion of the liquid variety. Nine samples of this were examined. The method of testing was the same as for the solid, 1 drachm of the fluid being substituted for the two grains of the latter employed. The following shows the result:—

No. of sample.	Albumen dissolved.
1	500 grains.
2	500 „
3	500 „
4	300 „
5	70 „
6	140 grains.
7	70 „
8	110 „
9	100 „

Nos. 1 to 4 were evidently acidulated glycerine extracts, the last of them being sold as a mixture of pepsine and pancreatine. No. 5 was sold as a compound wine containing pancreatine as well as pepsine and the natural acids of the stomach. Its action on albumen does not say much for the activity of ferments in their natural condition. It also contained iron as an impurity, probably the result of being made in an enamelled pan which had seen better days. No. 6 was also an acidulated glycerine extract; considering the menstruum, it appears as if philanthropic motives had been lost sight of in commercial. Nos. 7, 8 and 9 were ordinary wines, 9 being a foreign make of some repute.

It appears from data that wines are much inferior to glycerine preparations in digestive power. It should be borne in mind, however, that they are given in larger doses. The great activity of the first four samples goes a long way towards disproving the statement made by Dr. Morrell,* that liquid preparations of pepsine are unsatisfactory. Indeed the figures given for the best liquid pepsines do not represent their total solvent power (although this also holds good for the best solid pepsines). If longer time were given, more albumen would be dissolved, but in comparative experiments this is necessarily of no moment. I do not think the want of activity of pepsine wines is due to the action of the alcohol on the ferment in the finished preparation. Although a contrary statement has frequently been made, it would appear that the presence of alcohol, even in large proportion, does not destroy the peptic ferment. The weakness in the wines may, I think, be traced to one or all of three causes; either the crude material has been deficient or faulty, or, the hardening effect of alcohol on animal tissues has prevented the menstruum exerting its solvent action, or there has not been sufficient acid in the menstruum. It is very probable that in the majority of cases each of these causes has some influence.

In conclusion, I cannot help expressing the belief that pepsine is destined to take a more important place in the therapeutics of the future than it has those in the past. The only elements necessary for its success are, in the words of Dr. Morrell, first to test your pepsine, and then to give plenty of it. Its value as a palliative cannot be doubted, and palliative medicines, although not acting as specifics on the diseases they are intended to combat, tend to restore general normal conditions by diminishing the friction caused by local abnormalities.

A discussion followed, which was taken part in by Messrs. Ellinor, Furness, Bradwall, and others, and a vote of thanks to Mr. Grierson was passed. The chair was occupied by the President, Mr. Newsholme.

* 'Year-Book of Pharmacy,' 1881, p. 228.
† *Ibid.*, 1872, p. 268.

* *Lancet*, February 27, 1886

Proceedings of Societies in London.

BRITISH PHARMACEUTICAL CONFERENCE.

A meeting of the Executive Committee was held at 17, Bloomsbury Square, on Wednesday, December 15, at 4 p.m. Present—Mr. Atkins (President); Messrs. Attfield, Carteighe, Gerrard, Plowman, Symons and Williams; Dr Thresh and Mr. Naylor, Hon. Gen. Secs., and Mr. W. H. Ince, Assistant Secretary.

Mr. L. Siebold, F.C.S., F.I.C., was reappointed Editor of the 'Year-Book.'

The Secretaries reported that the 'Year-Book' was so far advanced that the printers would be able to commence

its delivery in the first week in January. Estimates for the printing of circulars for home and foreign distribution were submitted and accepted. A provisional grant of £10 was made to Mr. Holmes, F.L.S., for purchasing or cultivating specimens of *Aconitum Napellus*. It was decided that the Manchester Conference should be held on August 30 and 31, 1887, and a letter was read from Mr. Benger, the Hon. Sec. of the Manchester Committee, mentioning some of the proposed arrangements for the 1887 Conference, and giving a gratifying account of its prospects of success.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting was held on Thursday, December 9, Mr. E. G. Baker, Vice-President, in the chair.

Mr. E. J. Millard read a note on the "Examination of the Fruit of *Erythroxylon Coca* for Cocaine," in which he detailed the experiments made with about 100 grams of the fruit obtained from a bale of the leaves. He found these fruits to be one-celled, one-seeded, ovoid drupes, having a longitudinally furrowed red or reddish-brown pericarp (black when ripe). The seeds were also furrowed, containing farinaceous albumen and an embryo leaf, a microscopic slide of which was shown. These fruits were finely powdered and treated in the manner recommended by Squibb (*Ephemeris*, May, 1885) for the assay of coca leaves, the result being a small amount (0·073 per cent.) of a light-brown varnish-like body, soluble in acidulated water, and giving precipitates with potassio-mercuric iodide, iodine in potassium iodide, picric acid, chloride of gold, and phosphomolybdic acid. Its solution had not the anæsthetic property of cocaine, nor had it the well-marked odour and taste of hygrine, and attempts to obtain it in a crystalline state were unsuccessful.

The paper was followed by a discussion, in which the Chairman, Secretary, Messrs. Farr and Hawkins joined.

Mr. Petter then took the chair, and Mr. Baker proceeded to read the following Report on Botany :—

Note on the Formation of Organic Acids in Plants.

The formation in plant tissues of various chemical substances, with some of which we are so well acquainted, has always appeared to me a subject of great interest, and one on which new lights will be thrown as the science of chemistry advances. I propose this evening to put forward one or two rather prospective ideas as to how some of the various organic acids might be formed in the plant. I say *might* be formed, because in several instances I have taken, the reaction may look very well on paper, but whether it really takes place in the plant has yet to be proved.

In the first place then let us briefly consider some of the principal elements and compounds we have present in the plant, and from which the more complex bodies will be formed.

Water is always present ; also carbonic acid, which is absorbed by the leaves and disintegrated, yielding free carbon and oxygen. By a union of water and carbonic acid we get various carbohydrates, such as starch and sugar—

(1) (*a*) $6CO_2 + 5H_2O = C_6H_{10}O_5 + 6O_2$

(*b*) $6CO_2 + 6H_2O = C_6H_{12}O_6 + 6O_2$

or, with previous formation of formic aldehyde, thus—

(2) (*a*) $CO_2 + OH_2 = HCOH + O_2$

(*b*) $6HCOH = C_6H_{12}O_6$

(*c*) $C_6H_{12}O_6 - OH_2 = C_6H_{10}O_5$.

Hydrogen also is an element that occurs free, and in the case of aquatic plants it has frequently been collected and proved to be such.

These then constitute the chief bodies we have to deal with. I might mention many others of less certain compos tion, but for the sake of simplicity will not do so.

The organic acids occur either very generally in plants, free, or in combination with organic bases, forming frequently acid salts, or in combination with organic bases (alkaloids). It is to the presence of these acids or of their acid salts, that the acid reaction of plant tissues is due.

Taking oxalic acid as a typical example, let us consider its formation. It occurs in combination with sodium or potassium in leaves—especially in the wood sorrel, the dock, and their allies. Often it is found precipitated in the form of crystals of calcium oxalate.

The first to attempt to explain its presence was Liebig. He considered it was formed from water and carbonic acid in those cells of the plant which contain chlorophyll The reaction representing this would be as follows :—

$$2CO_2 + H_2O = \begin{cases} COOH \\ COOH \end{cases} + O.$$

This, however, is now doubted, and it is more probable that instead of being formed synthetically, a more complex body breaks up, and oxalic acid is one of the products of the decomposition.

It is more commonly held now that the acids, and this acid in particular, are produced by the oxidation of carbohydrates, especially sugar ; but there is no direct evidence to show that this is ac ually the case, though from the facility with which acids can be formed artificially from carbohydrates, it may be assumed quite possible. The oxidation is usually supposed to be more or less direct, and is expressed by the following equation :—

Sugar. Oxalic acid.

$$C_6H_{12}O_6 + 9O = 3\begin{cases} COOH \\ COOH \end{cases} + 3H_2O.$$

But even admitting carbohydrate is thus directly oxidized, it is hardly probable that the process is so simple as this. More probably an acid, such as succinic, is first formed, and from this by successive decomposition the more highly oxidized acids are derived. Moreover, all the more complex acids yield the simpler ones on oxidation ; thus, when succinic acid is fused with potassium hydrate, a mixture of potassium propionate and carbonate is formed ; when malic, tartaric, or citric acid is similarly treated it yields a mixture of potassium acetate and oxalate.

But if it be admitted that the carbohydrates undergo oxidative decomposition in the plant it must be true of other substances also. The alcohols which are doubtless formed in the plant would yield acids. Take glycerine as an example : This alcohol is set free on the decomposition of fats. But free glycerine has never been detected in any plant ; it probably undergoes decomposition as soon as it is formed. It is well known that glycerine is readily oxidized to carbon dioxide and water, and that it is susceptible of more gradual oxidation, a number of acids (oxalic, formic, etc.) being produced ; this is probably its fate in the plant.

As an example of the change of one acid into another, it has been observed in the case of lemon juice which has been allowed to stand, that the citric acid is gradually transformed into tartaric.

By a process of fermentation, this transformation of one acid into another takes place to a very large extent ; thus, malic acid yields on fermentation either—

(*a*) Succinic acid, acetic acid, carbon dioxide and water, or

(*b*) Propionic, acetic and succinic acids, or

(*c*) Butyric acid, carbon dioxide and water.

This process of fermentation would, therefore, account for a number of acids found in plants.

In the following list, taken from a paper by Messrs. Brunard and Chuard, are represented a series of acids, which differ from one another by a molecule of hydrogen or a molecule of water. All the series have been found in plants, and starting from oxalic acid or formic acid, formed from carbon dioxide and water, or by the oxidation of carbohydrate, it does not seem a very difficult matter to reach citric, tartaric or aconitic acids.

$$CO_2 + OH_2 = \underset{\text{Formic.}}{HCOOH} + H_2O$$

$$2CO_2 + 2OH_2 + H_2 = \underset{\text{Oxalic.}}{\begin{cases} COOH \\ COOH \end{cases}} + 2H_2O$$

$$\underset{\text{Glyoxalic.}}{\begin{cases} COOH \\ COOH \end{cases}} + H_2 = C_2H_2O_3 + H_2O$$

$$\underset{\text{Glycollic.}}{C_2H_2O_3} + H_2 = C_2H_4O_3 +$$

$$2C_2H_2O_3 + 3H_2 = \underset{\text{Succinic.}}{C_4H_6O_4} + 2H_2O$$

$$2C_2H_2O_3 + 2H_2 = \underset{\text{Malic.}}{C_4H_6O_5} + H_2O$$

$$C_4H_6O_5 - H_2C = \underset{\text{Fumaric.}}{C_4H_4O_4}$$

$$2C_2H_2O_3 + H_2 = \underset{\text{Tartaric.}}{C_4H_6O_6}$$

$$3C_2H_2O_3 + 3H_2 = \underset{\text{Citric.}}{C_6H_8O_7} + 2H_2O$$

$$C_6H_8O_7 - H_2O = \underset{\text{Aconitic.}}{C_6H_6O_6}$$

But if the plant forms them in this way, why cannot they be so made in the laboratory? Under what special physical conditions is the process accomplished? and why cannot these be imitated? are queries worthy of the notice of every pharmacist.

There is another class of organic bodies existing in plants which are of special importance. I refer to the amides or amidated acids. When substances of this kind break up, ammonia is one of the products of the decomposition. Take for example, asparagin, which yields free ammonia and aspartic acid. And there can be very little doubt that this free ammonia plays an important part in the formation of alkaloids, a class of bodies the importance of which it is unnecessary to dwell upon.

A discussion ensued in which the Chairman, Secretary, Messrs. Daintree, Eastes, Farr and White joined.

The meeting then adjourned.

Parliamentary and Law Proceedings.

Prosecution under the Pharmacy Act.

The Pharmaceutical Society of Great Britain *v.* Jarman.

At the Salford County Court, on the 13th instant, before His Honour Judge Russell, the Council of the Pharmaceutical Society of Great Britain sued C. J. Jarman, of 20, Montague Street, Lower Broughton, Manchester, for two penalties incurred under section 15 of the Pharmacy Act, 1868.

Mr. Yates, barrister, appeared for the Council; the defendant appeared in person.

In opening the case Mr. Yates stated that defendant was sued for a penalty of £5 for keeping open shop for the sale of poison, some laudanum having been purchased at his shop on September 27 last, and he was also sued for a further penalty of £5 for using the title of "Druggist," such title being used by defendant in conjunction with the word wholesale. The Pharmacy Act provided that no person should sell or keep open shop for the sale of poison, or use the title of "Druggist," unless he was registered under that Act. He would put in a print of the Register upon which defendant's name did not appear.

David Grierson, examined by Mr. Yates: On September 27 last, I went to the shop, 20, Montague Street, Lower Broughton. I purchased some laudanum; it was served to me by a female, without any label being placed on the bottle. I subsequently handed it to Mr. Hart for analysis.

Cross-examined by defendant: It was late in the evening when I made the purchase.

James Hart, examined by Mr. Yates, said: I am a pharmaceutical chemist; I tested the contents of the bottle handed to me by the last witness and found it to be laudanum; laudanum is a preparation from opium.

Henry Swift, examined by Mr. Yates, said: I am agent to the Manchester and Salford Building Society. Defendant was the tenant of 20, Montague Street up to September 29 last.

Defendant was then called and examined by Mr. Yates, and he admitted that for four years he had used the description of "Drysalter and Wholesale Druggist."

Defendant submitted that the laudanum on his premises had been purchased for his own use, and that his wife ought not to have sold any of it; he had now given up his business altogether.

His Honour found for the plaintiffs for both penalties, remarking that there was no more dangerous trade than dealing in poisons, and for poison to be sold by a female, without any label indicating what it was, was a serious matter.

Judgment for plaintiffs, £10, with costs.

Action for Negligence in Supplying Wrong Medicine.

Bowater *v.* Smith.

This case came on for hearing in the High Court of Justice, Queen's Bench Division, on Thursday, Dec. 9, before Mr. Justice Day, and a common jury.

It was an action for negligence, the damages claimed being £500 and the ground of complaint that the defendant had supplied to the plaintiff's wife, in lieu of confection of senna, belladonna leaves, or some other poisonous substance, by which she was injured in health. Mr. J. L. Walton appeared for the plaintiff; Mr. Jelf, Q.C., and Mr. Herbert for the defendant.

Mr. Walton, in opening the case, said the plaintiffs were Mr. John Bowater and his wife. They were in a humble walk of life, and resided at Woolwich. The defendant, Mrs. Smith, carried on the business of a chemist, although as far as he knew she had no qualification. Mrs. Bowater was confined of a child on February 20, of this year, and a few days afterwards, requiring a mild aperient, she sent a little girl to defendant's shop for one pennyworth of confection of senna. The defendant took down a jar which contained a jammy substance, out of which she filled a chip box, which was taken home by the little girl. It was placed on a sideboard, and later in the afternoon the mother took the greater portion of it, giving a little to the child, who had asked for some. The child spat it out, saying it was nasty, and the mother also noticed then that it had not the usual taste, and she told the child to throw the box into the fire. Shortly afterwards, Mrs. Bowater was in great pain; her eyes and brain were affected, and she ultimately lost consciousness. Mr. Baxter, an assistant to a medical man, was called in. The spoon, still retaining a small quantity of the substance taken, was found, and Mr. Baxter immediately suspected it was belladonna. It had since been examined by two analysts who he believed agreed in the opinion that the substance in question was extract of belladonna. Mrs. Bowater was seriously ill for some time, and had suffered ever since from a derangement of the digestive and nervous systems. She was put to expense for medical attendance and in other ways, and for this she claimed compensation.

Mrs. Jane Bowater, examined by Mr. Walton, said she lived with her husband in Albert Road, North Woolwich. On February 24 she sent her daughter for some confection of senna to Mrs. Smith, having frequently done so before. The witness narrated what took place as stated in the opening speech of counsel; the spoon was perfectly clean when it was used. After having taken it a few minutes she felt very uncomfortable, and after taking some tea got much worse; her eyes got bad; she could

not look at the light. Her next-door neighbour came in and sent for her husband, and when he came in he sent for a doctor, who ordered an emetic. Before that she felt "as if she had had hot coals shovelled into her, and she swelled and her eyes were almost starting out of her head." After vomiting she felt better, but the symptoms returned day after day at about the same time. She had to remain upstairs for three weeks; at her previous confinement she went out on the tenth day. Ever since she had felt pain after taking a good meal. She had had to bring up the baby on a bottle in consequence and had been put to other expenses amounting to about £5; extra nourishment for herself and baby had cost about £10, and there was a doctor's bill which she had not been able to pay. About a month after her confinement she called on defendant; she would not admit that she had sold anything but confection of senna.

Cross-examined by Mr. Jelf: She had not been nervous before this happened. The sideboard was in the bedroom; she had never used belladonna, or heard of it. This was the fourth child: she was attended by a doctor for the first confinement, but afterwards by a midwife, Mrs. Witsey; she never used any ointment. When she weaned a child she never used any ointment to her breast. The box was on the sideboard about two hours; the little girl fetched the teaspoon herself from downstairs. She took the stuff out of the box with the handle of the spoon; the little girl liked taking confection of senna usually. She herself noticed that it tasted nasty, and told the girl to throw away the box, before she felt the painful sensations; they began to come on in a few minutes. She got very nervous and anxious, and thought she was going to die. She knew Mr. Baxter had been to defendant's before she went there herself. She went to ask for compensation, but defendant would not hear anything about it. Dr. Vance called on behalf of defendant to see witness three days after the accident. He said there was every symptom of poisoning, and that her eyes were bad then.

Mr. Robert Henry Harland, analyst, proved attending an examination made of the spoon by Professor Attfield. The spoon was produced, sealed up by the clerk to the plaintiff's solicitor. He formed the opinion that the stuff on the spoon was not confection of senna, but that it was extract of belladonna. That opinion was confirmed by a second examination also made in conjunction with Professor Attfield.

Cross-examined by Mr. Jelf: On the second examination witness had with him some ivory slips with extracts of various drugs on them. He had not analysed the contents of the jar in defendant's shop.

Re-examined: He was satisfied the drug was belladonna, and not hyoscyamus.

Mr. John Bowater stated that he remembered being fetched from his work and finding his wife very ill. In consequence of her illness he had been put to great expense.

Eliza Jane Bowater, a child, eight years of age, proved that she went to the defendant's shop for a pennyworth of confection of senna, which, having been supplied, she took home and put on the sideboard. Her mother gave witness some, but she did not like it; it was not like confection of senna, and she spat it out into her hand and threw it into the fire. The box was thrown in the fire.

Cross-examined: The stuff was taken out of a jar like the one produced (an earthenware jar).

Mrs. Ann Bailey, the nurse who attended Mrs. Bowater, described the symptoms which appeared after the confection had been taken. The doctor administered an emetic. The spoon with the stuff on it was brought upstairs and handed to the doctor, and he took it away with him.

Mrs. Ellen Eeles, a neighbour, who was fetched in when the plaintiff was taken bad, gave corroborative evidence.

Mr. H. F. Baxter, assistant to Mr. Bryceson, stated that he was called in to the plaintiff, whom he found sitting up in bed in an excited state, complaining of a burning sensation. There was a swelling in the throat and abdomen, and the hands and arms. He asked what she had taken and was told confection of senna. Upon asking for the box he was told it had been destroyed. Upon asking for a spoon to look down her throat, he was handed two spoons, one having on it a portion of the stuff. From the smell of the stuff and the symptoms, he came to the conclusion that the plaintiff was suffering from belladonna poisoning. The spoon was sealed up by witness in the presence of a witness.

Cross-examined: When he called on defendant she said she had no belladonna in the shop and asked witness to look for himself, which he did not do as it was nothing to do with him; he merely called as a friend to say that a mistake had been made, with a view to prevent a similar mistake occurring. Neither he nor Mr. Bryceson had been trying to get the defendant out of her business.

By the Jury: The vomit had been thrown away before he returned a second time. Had he thought of it at the time he would have had it kept for analysis.

Mrs. Wilson, a neighbour, also described the symptoms of the plaintiff's illness after taking the confection.

The further hearing of the case was adjourned.

This case was continued on Friday, December 10.

Mr. Wyatt, of North Woolwich, was called to prove the sealing up of the spoon by Mr. Baxter.

Mr. Ebenezer Bryceson, a medical man, Herbert Road, Plumstead, having a dispensary at North Woolwich, deposed to attending the plaintiff and finding her in a state similar to that of a person suffering from *delirium tremens*. He described the symptoms in detail, including dilatation of the pupils, swelling of the limbs and abdomen, etc. The symptoms were exactly those of poisoning by one of the belladonna group of poisons, but he could not say at the time whether belladonna or hyoscyamus. He saw her more than once a day for several days. The flow of milk was stopped and the symptoms returned each day, gradually diminishing in severity. For a week she was in a highly critical condition; her convalescence was very slow, and she was still in a highly nervous condition and suffering from indigestion. He believed it would still be some time before she recovered her normal state of health. He received the spoon from Mr. Baxter, and handed it to the solicitor's clerk. His charges down to the present time would be about £5.

Cross-examined by Mr. Herbert: The symptoms were not inconsistent with any great shock to the nervous system. He had been in practice since 1884; he was M.A. of Cambridge and Licentiate of the Society of Apothecaries; he had been a Member of the Royal College of Surgeons, but his name had been removed from the schedule in consequence of an irregularity. He had had no dealings with defendant, and did not know her by sight. He should think the spoon was in his possession about six weeks; it was locked up in a drawer. He never saw the spoon itself, it was enclosed in the paper and sealed up. He should think from plaintiff's description she had taken about 2 drachms; there were other cases on record of persons recovering after taking as much belladonna as that.

Re-examined: His position as a medical man was not affected by his name being removed from membership of the College of Surgeons. The irregularity had no connection with his medical qualifications.

Mr. G. G. Giller, managing clerk to the solicitor for plaintiff, proved receiving the spoon and keeping it until opened by Professor Attfield.

Mr. Herbert, in opening the defendant's case, said Mrs. Smith had been registered as a chemist and druggist, having been in business before 1868. He should prove that she had not only never purchased any belladonna since 1872, when her son, who had assisted her, died, but

that since that date she had never made up any prescription containing poison. The only belladonna on her premises was a small quantity almost dried up in what was called the "poison cupboard" in a back room. He suggested that the case had been greatly exaggerated by Mr. Bryceson, actuated by interested motives, defendant's shop being in the immediate neighbourhood of his dispensary.

Mrs. Clara Brook Smith, the defendant, who was examined with difficulty, owing to extreme deafness, said she remembered on February 24 selling some confection to a child, but she did not know the child. She would swear with her dying breath it contained no belladonna. She took it from a pot in a cupboard behind the counter; the pot was fastened up afterwards by Dr. Vance. She had at that time only a little belladonna in the place; a hard lump in a jar turned upside down, just as it was left by her son fourteen years ago when he died. It was in a cupboard in the sitting room. She had never purchased any belladonna, and never sold or supplied it to anyone. She never made up prescriptions containing poison; when she got one, which was very seldom, she sent it to Mr. Parks, of Woolwich Town. Mrs. Bowater called and complained, but she did not remember her mentioning belladonna or anything about the spoon. Had never had complaints about her confection of senna.

Cross-examined by Mr. Walton: She had been registered since this case arose; there had been a mistake about it before; she had no qualification, but her friends had always been in the medical profession. She had no assistant except Mrs. Vance; she came and helped occasionally. She sent for her drugs to Messrs. Herring by post. Mrs. Vance sold articles and helped generally in her spare time; she could not say whether she was present when the confection was sold to the little girl. She knew what belladonna was. The ointment was frequently used by married women to stop the secretion of milk; she had never been asked for it, but since this case several pieces of paper had been sent for it. She had never supplied belladonna ointment; she did not know what it was used for until lately; she did not know who told her its use. The pot with the belladonna in was in the same state as it had been for fourteen years, except that she had put a clean piece of paper on it in place of a piece which had become very dirty. She looked at it after hearing of this accusation by Mr. Baxter, that she had poisoned Mrs. Bowater with belladonna. She told him she had none; she had forgotten it; it was quite unsaleable. She always sent out prescriptions containing poisons.

Mr. Justice Day asked where she drew the line with regard to poisons; he thought all medicines were poisonous, more or less.

Mr. Herbert informed his lordship that the Pharmacy Act contained a schedule of poisons.

In reply to the Jury, the witness said she did not sell any ointment for women for the purpose previously referred to.

By Mr. Justice Day: She knew the composition of some of the drugs she sold, but not all; she never meddled with poisons.

Re-examined by Mr. Herbert: Two slips of paper produced had been sent to her shop since this case occurred, asking for belladonna, one was signed J. J. B., or J. F. B. When Mr. Baxter called she invited him to look in her cupboard, but he declined.

Mrs. Wilhelmina Vance said she assisted defendant; she often sold confection of senna; she sold two pennyworth the same evening out of the same jar, and the woman took it all; she never heard any complaint about it. She remembered coming into the shop when plaintiff was complaining; she told her she must be mistaken, that Mrs. Smith could not have sold her what she had not got; that the child must have got a dirty spoon. Plaintiff was offended at this, and said she had not a dirty spoon in the house.

Cross-examined by Mr. Walton: She could not say what was in the box now shown her; it smelt like hyoscyamus, she knew that by making it up into pills. Her husband was registered as a chemist, but practised as a medical man; he was now dead.

In reply to the Judge, witness mentioned several scheduled poisons which were sold by defendant.

Mrs. Clara Brook Spratt, daughter of defendant, said she had served in her mother's shop for nearly twenty years. She never sold any belladonna.

Cross-examined by Mr. Walton: She was now a registered chemist. She commenced to assist her mother at an early period of her life. She was not living with her mother now, but visited her occasionally; the business would eventually be hers, possibly. She had no business of her own; she had been away from home twelve years. She had seen the small pot with the belladonna in it at intervals during fourteen years; she could not specify any particular occasion.

Re-examined: She lived with her husband, who is a physician.

Mrs. Jane Witsey, the midwife who attended the plaintiff, said she could not speak to the exact date, as she had so many about that time. She could not say anything about the illness, because she did not see any illness. The nurse told her how bad she had been.

Dr. Vance, physician and surgeon, said he saw plaintiff and examined her on February 27; he found nothing particular the matter with her. The taking of 2 drachms of belladonna would have been very dangerous, if not fatal. He had heard the symptoms described by plaintiff's witnesses. They were only consistent, in the highly coloured language in which they had been described, with belladonna poisoning; but in a modified form they might be produced by fright or indiscretion in diet.

Cross-examined: He did not tell Mr. Bryceson he was going to visit his patient.

By the Judge: He told the plaintiff he called at the request of Mrs. Smith. He had known Mrs. Bowater some time, and believed she was a honourable woman, who would not impose upon any one.

Re-examined: He did not communicate with Mr. Bryceson, because he did not consider he carried out the etiquette of the profession. He had a long talk with the plaintiff and heard her own account of her symptoms.

Professor Attfield was called, but Mr. Walton saying he admitted the senna pot contained only confection of senna, his evidence was not taken.

Mr. Monk, clerk to defendant's solicitors, proved sealing up the pot of confection of senna at the defendant's premises and handing it to Professor Attfield.

This concluded the evidence.

The learned counsel on each side having addressed the jury,

The learned Judge, in summing up, said the question had to be considered under two heads. Firstly, was the plaintiff injured by taking some poisonous drug; and secondly, if so, was that drug supplied by the defendant, because if so it was not denied that the defendant had been guilty of negligence. He then went through the evidence carefully, pointing out that there was no dispute that what was found on the spoon was belladonna, and that the symptoms described answered to those which the drug would produce. He also remarked on the number of female chemists who had appeared as witnesses, their only qualifications apparently being that their friends or husbands were in the medical profession, and also that the deafness of the defendant seemed a very undesirable quality in a person keeping a chemist's shop. No one from Messrs. Herring had been called to corroborate the defendant's statement that she had never purchased belladonna; and no evidence had been given tending to show that the little girl had been to any other shop where she could have obtained belladonna.

The Jury expressed a desire to examine the spoon and the jars which had been produced during the course of

the trial, and at their request the plaintiff was recalled and stated that she put the handle of the spoon into the box when she took the medicine.

The Jury then expressed a wish to retire, but after being absent about a quarter of an hour they returned a verdict for plaintiff for £75, for which sum his lordship gave judgment.

Obituary.

Notice has been received of the death of the following:—

On the 4th of December, Mr. Joseph Roberts, Chemist and Druggist, Liverpool. Aged 48 years.

On the 5th of December, Mr. Frederick Lawrence, Pharmaceutical Chemist, Kentish Town Road, London. Aged 60 years. Mr. Lawrence had been a Member of the Pharmaceutical Society since 1855.

On the 7th of December, Mr. Peter Gellatly Donald Chemist and Druggist, Bethnal Green Road, London' Aged 46 years.

On the 9th of December, Mr. George Beaver Brown, Chemist and Druggist, Sheffield. Aged 71 years.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Examination of the Pharmaceutical Society of Ireland.

Sir,—In your report of the proceedings at the last meeting of Council there is a slight omission which might lead to some misconception.

One of my notices of motion submitted to the "Examination Improvement Committee" was that extra benches should be provided so that all candidates undergoing the practical chemical examination should be examined at the same time, and not divided into batches. This was unanimously passed in Committe, and came up with other recommendations to the Council for approval. After saying that the other recommendations were passed, your report states "that the matter was referred to the House Committee."

The inference would be from this wording, that the consideration of this recommendation had been postponed. I wish, therefore, to explain, as far as my recollection goes, that this recommendation of the Committee was also adopted by the Council, and merely referred to the House Committee to carry out.

The position as it now stands is as follows:—Notices of motion of two improvements were handed in by myself, *i.e.*—

1. The one referred to above, namely, regarding simultaneous examination of the chemical candidates.
2. That a conference of the examiners should be held.

Both these suggestions were ultimately unanimously recommended by the Examination Committee, and adopted by the Council. The same remarks apply to a third notice brought before the Committee by myself, and which was afterwards adopted, viz., That the candidates should be entitled to their papers. There are other matters which are still *sub judice*.

The excellent mode in which these meetings are generally reported almost calls for an apology for drawing attention to what might at first sight appear a small matter, but I consider that there is more importance in these contemplated improvements than appears upon the surface.

C. R. C. Tichborne, Ex-Pres. P.S.I.

[*** The report was printed as supplied officially.—Ed. Ph. J.]

Tincture of Strophanthus.

Sir,—Referring to my note on the above (*Pharm. Journ.*, November 20, 1886, p. 411), although the subject has not been publicly discussed, I find there appears to be a consensus of opinion that, as a provisional formula, a 1 in 20 strength should be adopted, and that the seeds alone should be used and be first freed from their oil. The process would be as follows:—

℞ Strophanthus seeds, deprived of hairs . 1 part.
Reduce to powder—this is easiest done by pounding with broken glass—pack, and percolate with

Ether, specific gravity 0·720 . . . 6 fluid parts.
Then expose the marc to the air to dry and again pack, and percolate with

Rectified spirit, q.s., to produce . 20 fluid parts.
Dose 4 to 10 minims.

This tincture, I estimate, will be one-half the strength of a 1 in 8 tincture, as although two and a half times the quantity of product is obtained the drug is more nearly exhausted than by the less quantity of menstruum. It is important also that the preparation should not be so concentrated that a small dose cannot be easily and correctly apportioned. William Martindale.

Ung. Hydrarg. Ox. Rub. and Liniment. Ammoniæ.

Sir,—Some time since castor oil was suggested as an ingredient of the above ointment. It certainly greatly retards, if it does not prevent the discoloration. Is there any objection to its use? If not, may it not be made a note of for a new edition of the Pharmacopœia for some other ointment as well? The liniment. ammoniæ is very troublesome for the yet not quite extinct poor counter chemist. It is ordered to be shaken until it can be poured from the bottle. This is difficult, if not impossible, after it has been made a short time, especially in the winter. Some time since, a correspondent recommended adding a little spirit, but this seems useless. Why not add 10 per cent. or so of turpentine? Turpentine is a frequent ingredient in stimulating liniments, and it appears to keep the liniment. ammoniæ quite fluid, and will probably add to its efficacy. May I suggest that a note be also made of this for the new edition of the Pharmacopœia? My suggestion with regard to the liniment. terebinth. aceticum has been introduced already into the Pharmacopœia.

With regard to the misnaming of Mr. Groves's paper on the "Rancidity of Fats," it appeared in one of the Bath newspapers at the time as the "Racundity of Facts." I asked a scientific friend what he thought it treated on. He suggested that probably it was "The Fecundity of Rats."

In the same newspaper, in the reporting of the British Association, a paper appeared at the time on "The Electricity of Mars," meaning of course "Eccentricity." Such mistakes frequently happen with local reports when treating on scientific matters. In one of the Bath excursions I alluded to both the above blunders, and found I was talking to the reporter with whom they originated.

Barnstaple. W. Symons.

What is Laudanum?

Sir,—The above question needs only the coronation answer! If the editors of the B.P. will add after "Tincture of Opium" "Syn. Laudanum" the missing link will be supplied thereby, to the pleasure of all retail pharmacists, by establishing by "authority" (law) what is generally understood in practice.

Might the principle be applied to any other articles?

Sheffield. G. Ellinor, Ph.C.

Sir,—The evidence supporting what I have hitherto thought to be the most generally entertained view, that the name laudanum was derived from *laus*, seems to me quite conclusive.

On the other hand, the theory of its derivation from the name of the resinous juice of the *Cistus ladaniferus* appears to rest upon the smallest possible foundation, if any at all, as I hope to succeed in showing by quotations from trustworthy authoritative works.

First of which is the eighth edition of Hooper's 'Lexicon Medicum,' London, 1848, where I find the name referred to in these words,—"Laudanum (said to be from *laus*, praise, on account of its valuable properties)."

The next authority is Nicolas Lemery ('Pharmacopée Universelle,' Paris, 1716, 2nd edition), who expresses the same idea, though, in his day, the name itself was applied to the extract of opium, not the tincture. His definition is to be found at page 39, and is as much to the point as Dr. Hooper's was,—"Laudanum, quasi laudatum, est l'extrait de l'opium."

I venture to think that most of your readers who interest themselves in the early history of pharmacy will agree with me in considering Nicholas Lemery not an unsafe authority on such questions as the one now under discussion. Nevertheless, I do not base my opinion upon the testimony of these two authors only, because the further I went in my investigation the more decided was the evidence brought to light.

For instance, J. P. Bruno, in the 'Lexicon Castello-Brunonianum,' Norimbergæ, 1688, gives a definition which is equally clear:—"Laudanum, nomen medicamentorum encomiasticum, quasi laudatum medicamentum, ... Non minus verò illi hallucinantur, qui cum *ladano* confundunt," etc.

Next to Bruno there was J. Zwelfer, who, in his 'Animadversiones' on the seventh edition of the 'Augustan Pharmacopœia,' refers to the origin of the name in no less plain terms:—"Hoc divinum remedii genus, quod à laude meritò nomen accepit, ob effectus stupendos in mitigandis acutissimis totius corporis doloribus," etc.

Lastly, Oswald Crollius, a well-read man, an enthusiastic follower of Paracelsus and the author of 'Basilica Chymica' (Francofurti, 1611), gave in that work a formula for the preparation of a laudanum containing opium, designed as an imitation of Paracelsus's famous but secret preparation, and commences his description of its action and uses with—"Laudabile medicamentum, quod planè suo Nomine responderit, si Laudanum dicas."

This evidence both in quantity and quality seems to be sufficient to establish the truth of the *laus* theory.

Now I will turn to the claim of "ladanum." Having searched the works of several English writers on materia medica published during the last two centuries, without finding anything to prove that the name laudanum has, in England, ever been confounded with ladanum, or derived from it, I then consulted Littré and Robin's 'Dictionnaire de Médecine' (14me edition, Paris, 1877), wherein laudano is an Italian synonym for ladano. This clue led me to refer to Alberti's 'Grande Dizionario Italiano-Francese' (3za edizione Italiana, Bassano, 1811), and there it was likewise stated to be a synonym for ladano. This dictionary was, as probably some of your readers are already aware, not a mere school book, but, on the contrary, an important work of reference, enjoying a good reputation for many years, and I think it not improbable that the authors of Littré and Robin's 'Dictionnaire' got their information upon this point either from Alberti's book itself, or else from the same source as Alberti, because I can find nothing in the 'Dizionario dei Termini Antichi e Moderni delle Scienze Mediche e Veterinarie,' dai Dr. Loughi e Tirinanzi (Milano, F. Vallardi, 1882), confirmatory of what is stated by Littré and Robin. Fortunately, Alberti has given, in the Italian division of his dictionary, a full list of the names of writers whose works he had used, and amongst these occurs that of P. A. Mathiolus, whose 'Commentarii in libros sex P. Dioscoridis de Materia Medica,' Lugduni, 1563, were next referred to, with the result that I came upon what I am inclined to consider is the true source whence later writers got the idea that laudanum was derived from ladanum.

In commencing his annotation upon chapter 110 (Ledum, Ladanum) Mathiolus says—"Ladanum, quòd vulgò alii appellant Laudano, alii verò Odano," etc., etc., which means nothing more or less than that some Italians called the resinous juice of the *Cistus ladaniferus* Laudanum, and others Odanum. I ought perhaps to mention here a fact which, though probably known to the majority of the readers of the *Pharmaceutical Journal*, may not be familiar to every one of them, that is, Mathiolus wrote his Commentaries in Italian and the copy I am quoting from, as the above extract indicates, is one of the many Latin translations, the accuracy of which, however, I have never had any occasion to doubt. The reason why I am disposed to think this passage to have been the origin of the ladanum theory is this. Although several able men had published commentaries upon the Materia Medica of Dioscorides, Mathiolus's work alone became the standard book. It was, as I have just said, translated into Latin, at that period the language of all scientific men in every European country, and between the time of its publication in 1554 and the year 1561 attained a circulation of 32,000 copies. But whether that be a fact or not, it is certain Mathiolus's Commentaries became the leading work on materia medica during the latter half of the sixteenth century and was frequently quoted in medical and pharmaceutical books down to the close of the seventeenth century.

In support of this idea I will cite one or two more authors, to wit, Pomet. In the 'History of Drugs,' with additions from Lemery and Tournefort (London. 2nd edition. 1725), he tells us that the grease from the *Cistus ledum* is made into cakes and is called labdanum or laudanum, but on referring to the list of works quoted and consulted, I find Mathiolus's Commentaries amongst them.

From the 'History of Drugs' I turned to the 'Opera Medica' of Caspar Hoffman (Francofurti, 1667), where, in chapter 120, of book 2, he also tells us:—"Hoc significat vel succum resinosum et pinguem, foliis plantæ insidentem, qui in massas coactus Ladanum, vel corruptè Laudanum in Officinis dicitur."

Now on the face of it, this looks very like Mathiolus's own observation, and on coming to the end of the chapter behold! The name of our old friend, Mathiolus! Having at this moment an opportunity for looking into the 'Dictionnaire des Drogues Simples' of N. Lemery (3rd edition, Amsterdam, 1716), I referred to that, but without gleaning anything at all relating to the subject. This book possesses one important feature not to be found in his 'Pharmacopée Universelle.' It gives a list of authors and works quoted, and in this I again meet with the name of old friend Peter. So it is pretty evident that Lemery was, in this matter, more cautious than Pomet, and refrained from saying anything about the laudanum corruption, for it is scarcely likely he overlooked Mathiolus's statement thereon.

In addition to those of Mathiolus, Lemery appears to have consulted the Commentaries of Dr. Andrew Laguna, the first Spanish translator of Dioscorides. In his description of the book, however, there are two errors worthy of notice here. The first, spelling the name with a *c* instead of a *g* (Lacuna), the second, giving the date of publication as 1552 instead of 1555 (the first edition).

Laguna tells us that ladanum is, in the shops, called laudanum, and as he was a Spaniard, and wrote in Spanish, we might naturally conclude that such was the case in Spain; but on looking through the Castillian index only "Ladanum" is met with, while in the list of vulgar shop names, neither ladanum nor laudanum can be found. Moreover, in the 'Epistola Nuncupatoria' he acknowledges having received much assistance from the 'Commentaries of Mathiolus,' so I think we may safely consider that he was indebted to the latter for his information upon this point, notwithstanding the fact that Mathiolus includes Dr. Andrew Laguna among those to whom he was indebted for assistance during the progress of his own commentaries.

In conclusion I think there can be no doubt about the name laudanum being derived from *laus*, and it is almost equally certain that the idea of its derivation from the name ladanum took its origin from that statement of Mathiolus.

Middle Road, Roxeth. J. EAGLE.

Chemicus.—According to Coolley "egg powder" may be made from one of the ordinary baking powders by the addition of turmeric powder in the proportion of about ½ dr. to the pound.

Assistant.—A receipt for an aniline black marking ink will be found on p. 304 of the present volume. You are quite right in your conclusion that the word "indelible" is correct only in a relative sense.

H. C. B.—Possibly the use of a small excess of bicarbonate might give rise to the formation of ferrous carbonate that would at first be dissolved by the carbonic acid disengaged on dissolving the preparation.

Ink.—We fail to identify the particular ink referred to by you.

Drugs.—We are unable to advise you upon the subject of prescribing.

W. West.—There is nothing remarkable in the ingredients mentioned taking fire when mixed.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Lyle, Symes, Stoke, Rees, Trimen, Kent, Drew, Thompson, Dee, Parkinson, Farr, Serous, Assistant, H. C. B., V. Q. P.

"THE MONTH."

Sense of Smell.

The occurrence of idiosyncrasies in respect to the perception of odours has long been recognized, as well as that the keenness of the sense of smell varies very much in degree in different individuals. A recent request for information upon the subject has brought out several interesting observations. Mr. Mitchell mentions (*Nature*, Sept. 30, p. 521) a case of a person who was not conscious of the odour of mignonette and that of another who perceived no odour from a bean field, though both these persons had an acute and discriminating sense of smell in respect to other odours. Mr. George Henslow (*Nature*, Oct. 14, p. 572) says that after taking one good sniff at a musk plant, the nose fails to recognize the odour upon taking a second sniff. This would seem analogous to the tolerance which is so rapidly established in respect to an escape of coal gas. But the most interesting contribution has been made by Messrs. Nicholls and Bailey (*Nature*, Nov. 25, p. 74), giving the results of experiments with oil of cloves, nitrite of amyl, extract of garlic, bromine, cyanide of potassium, prussic acid, oil of lemon and oil of wintergreen. Series of solutions of each of these were prepared by successive dilutions with water until the limit of perception was reached, and then the bottles containing the solutions of the different substances were placed together indiscriminately and the test submitted to a number of persons of both sexes to classify them properly by the sense of smell. The results showed that on the average the sense of smell was much more delicate in the males tested than in the females; but the degrees of keenness ranged widely as between individuals. Thus three male observers were able to detect 1 part of prussic acid in 2,000,000 parts of water, though its presence was not revealed by a chemical test; but others, of both sexes, could not detect prussic acid in solutions of almost overpowering strength. The following figures give the average limit of delicacy in detecting these substances, the first five by seventeen and the other three by twenty-seven persons:—

	Average limit of perception.	
	Males.	Females.
Oil of cloves	1 in 88,128	1 in 50,667
Nitrite of amyl . . .	1 in 783,870	1 in 311,330
Extract of garlic . . .	1 in 57,927	1 in 43,900
Bromine	1 in 49,254	1 in 16,244
Potassium cyanide . .	1 in 109,140	1 in 9,000
Prussic acid	1 in 112,000	1 in 18,000
Oil of lemon	1 in 280,000	1 in 116,000
Oil of wintergreen . .	1 in 600,000	1 in 311,000

Human Milk and Cow's Milk.

The liability of hand-fed infants to suffer from dyspepsia has been referred with great probability to the ready coagulability of cow's milk—which ordinarily constitutes so important an ingredient in their diet—as compared with that of human milk. According to Dr. McNaught (*Med. Chron.*, Dec., p. 182) human milk is not coagulated by acid so dilute as that which occurs in the human stomach, whilst cow's milk is strongly coagulated by it even when mixed with water; further, whilst human milk, when acted upon by the rennet ferment, only shows a few shreddy coagula, cow's milk, under the same condition, sets into a firm coagulum. This difference has been attributed to the alkalinity of human milk; but fresh human milk, in Dr. McNaught's hands, has never manifested any alkalinity in the presence of phenolphthalein. Moreover, it does not become more coagulable when allowed to stand until it has become acid. From experiments made in digesting milk artifically, Dr. McNaught has arrived at the conclusion that in infantile dyspepsia there is an increase in the coagulative power of the juices of the stomach, as well as a decrease in the digestive power, and if this be correct the effect of this condition upon cow's milk would be obvious. He is led to believe, however, that it is not the action of the acid of the gastric juice, but that of the rennet ferment that produces the curdy masses vomited sometimes, which, when the gastric juice is normally active and in sufficient quantity, are digested almost as soon as formed, and do not, therefore, have the opportunity of developing into masses. In view, therefore, of this possibility, it is of interest to know that the addition of free alkali to milk—for instance, the addition of one-third its volume of good lime water—not only prevents coagulation by rennet, but the alkali appears to permanently enfeeble, if not destroy, the rennet ferment with which it comes into contact. Boiling also lessens the coagulability of cow's milk, presumably by destroying the ferment, and an admixture with arrowroot of suitable consistence reduces it to a minimum. Dr. McNaught has also found that condensed milk, apart from the smaller quantity of casein it contains, when mixed with the prescribed quantity of water is much less coagulable than ordinary milk.

Test for Quinine Sulphate.

Dr. de Vrij is not yet content with the laurels he has won in connection with the cultivation of cinchonas, and out of sympathy for the country to which the discoverers of quinine belonged, he has been forced to point out what he regards as a state of things injurious both to rational therapeutics and French industry, with the object of inducing French manufacturers of quinine sulphate to supply that article only in a state of absolute chemical purity. For that purpose he has recently communicated his views on this subject to the Academy of Medicine in Paris, and has described to that body a new method, which he recommends, for the determination of the amount of cinchonidine in the quinine sulphate of commerce, and also as a means of ascertaining the purity of this salt. This new test, as described by Dr. de Vrij, consists in dissolving a gram of the quinine sulphate in 100 c.c. of boiling water, and adding to the liquid 0·24 gram of neutral chromate of potash dissolved in a little water. A slight turbidity is thus produced at first, but it disappears on stirring the liquid with a glass rod and heating it to the boiling point, and after standing for twelve hours to cool nearly all the quinine will be separated from the solution in the state of crystallized quinine chromate, which is to be collected on a filter, then washed with distilled water, dried in the air and weighed. This salt has, according to Dr. de Vrij, the composition $2(C_{20}H_{24}N_2O_2)H_2CrO_4 = 766{\cdot}5$. At the temperature of 12° C. it requires for solution 2733 parts of water, and at 16° C. it requires 2000 parts of water for solution. Only a small portion of the salt will therefore be retained in solution by the mother liquor when operating as above described, and within that range of temperature. Dr. de Vrij proposes to allow for this by adding to the observed

weight of the quinine chromate 0·05 gram for each 100 c.c. of mother liquor before calculating the quantity of quinine sulphate in the sample operated upon. Cinchonidine chromate (as well as the chromates of the other alkaloids), being very much more soluble than the quinine salt, would also remain in solution if the sample contained cinchonidine; but if it were pure the mother liquor mixed with caustic soda and evaporated to one half its bulk should remain quite clear and not deposit anything upon cooling. In order to determine the amount of cinchonidine and other alkaloids besides quinine at least 5 grams should be operated upon as already described. On adding caustic soda to the mother liquor mixed with the washings no turbidity is produced at the ordinary temperature when there is no more than 5 per cent. of cinchonidine present; but when the amount is greater than that the liquid becomes turbid. On evaporating it to three-fifths of its original volume all the cinchonidine separates in a crystalline state after cooling, and it may be collected on a filter and weighed. The recommendation of this method of testing appears to convey an admission that the optical method, hitherto so highly praised by Dr. de Vrij, is not to be relied upon as a safe and convenient means of determination, as has been pointed out by M. Jungfleisch and others; but there does not appear to be much reason for giving the new method a preference over the very simple and readily applicable method based upon the different degrees of solubility of the neutral sulphates of the cinchona alkaloids. Incidentally it may be mentioned that Dr. de Vrij's application of the principle that a medicine should have the "greatest practically possible purity" in the case of quinine sulphate, is not in accordance with the proposals he has made to employ the mixed alkaloids of Indian red bark in place of quinine, as being in many cases more useful, and to use by preference for pharmaceutical purposes the succirubra bark in which the amount of cinchonidine often predominates very largely over that of quinine. There appears to be a practical inconsistency here which is difficult to understand, especially when it is remembered that, even according to Dr. de Vrij's estimate, the amount of cinchonidine in sulphate of quinine is very small, as compared with the large proportion it bears to quinine in the mixed alkaloid of succirubra bark, and that the complete separation of that small amount would considerably enhance the cost of quinine sulphate. Moreover, since it is now known that the quinine sulphate of Pelletier's time must have contained cinchonidine in considerable and probably varying amount there seems from a therapeutical point of view to be the less reason for insisting upon the absolute purity of the salt at the present time. Though the utmost possible purity of drugs and medicines is to be sought for, a certain degree of common sense must be exercised as to the standards to be adopted, and in this respect there does not appear to be sufficient reason for demanding a degree of purity in quinine sulphate that is so far in excess of the requirements of all existing Pharmacopœias.

Asimine.

The "North American papaw," or "custard apple" (*Asimina triloba*, Dunal), is an anonaceous shrub that occurs on the banks of streams in the middle, southern and western states of North America, and probably received one of its names on account of its edible fruit, from negroes who were acquainted with the papaw of the tropics (*Carica Papaya*). The plant is not at present used in medicine, but as the bark and leaves have a disagreeable smell and bitter taste different parts of it have been submitted to examination by Messrs. Lloyd (*Pharm. Runds.*, Dec., p. 269). Only the ordinary constituents were found in all the parts except the seeds, from which an alkaloid was isolated that has been named "asimine." The pure alkaloid is described as being colourless, odourless and tasteless, insoluble in water, readily soluble in alcohol and ether, and less soluble in chloroform or benzol. It could not be obtained in the crystalline form, but the hydrochlorate and some other salts were easily crystallizable. In some of its reactions asimine closely resembles morphine, and it will probably be made the subject of physiological experiment.

Drumine: a New Anæsthetic.

Under the name "drumine," Dr. John Reid has described an alkaloidal compound, which he says he has separated from an Australian Euphorbiaceous plant (*Euphorbia Drummondii* (Boiss.), and has found to possess anæsthetic properties resembling closely those of cocaine (*Austral. Med. Gaz.*, Oct. 15, p. 1). This plant is reputed in South Australia to be fatal to sheep and cattle feeding upon it, death following in from twenty-four hours to seven days, marked by paralysis of the extremities, the action being most energetic when the greatest quantity of juice is present in the plant. The compound was obtained by exhausting the plant with alcohol, distilling off the spirit, adding ammonia in excess, filtering, dissolving the residue in dilute hydrochloric acid, filtering the solution through animal charcoal and concentrating, when the hydrochlorate was deposited in concentrically marked discs with radiating fissures. It was almost insoluble in ether and freely soluble in chloroform and in water. A 4 per cent. solution applied to the tongue, nostril and hand is described as having produced very marked anæsthesia in each case, the sense of taste, even to quinine, having been abolished on the side of the tongue to which it was applied. Injected subcutaneously in a case of chronic sciatica and in cases of severe sprains it is said to have given immediate relief. "Drumine" is in Dr. Reid's opinion "almost a pure sensory paralyser without preliminary excitement," and can be given with comparatively slight, if any, risk.

Cocaine.

According to M. Bignon (*Archives de Pharmacie*, Dec. 5, p. 522), whose position as Professor of Chemistry in the University of Lima gives him opportunities favourable for the investigation of the subject, fresh coca leaves treated immediately after having been collected do not yield much more cocaine than leaves that have been carefully preserved. He says that the amount of cocaine does not vary much in coca leaves from different sources, but only according to the method of preservation, and that in well-preserved leaves it amounts to from 9 to 11 grams per kilogram. Although, however, different kinds of leaves contain the same amount of cocaine, it is asserted that the alkaloid does not always present the same physical properties. According to Professor Bignon there exist in the coca plants two kinds of anæsthetic matter, possessing the same chemical and physiological properties; but while one of them is crystalline and inodorous, the other is uncrystallizable and has a strong smell. It is admitted, however, that this amorphous form,

which is said to occur in variable quantities in the coca leaves of Peru and Bolivia, is inferior in anæsthetic power to crystalline cocaine, but on the other hand it is claimed that it is less toxic. Before accepting Professor Bignon's conclusions, however, it would be interesting to determine indisputably how far the non-crystallizability, as well as the weaker physiological action, of the amorphous variety, is dependent upon the influence of an admixture of some persistently adhering, possibly odorous, decomposition or other product. At any rate, the chemistry of cocaine would appear to be at present very imperfectly understood by the manufacturers of the alkaloid, if Professor Bignon's statement be correct that samples obtained from different European houses differed absolutely in their composition. For internal administration, Professor Bignon prefers the alkaloid to its salts, as it is soluble in the acids of the stomach. He also recommends that it be administered in a succession of small doses, rather than in one large one, and for this purpose he makes it up with an inert excipient into pills each containing one centigram, one of which he says may be given every quarter of an hour, up to the maximum total dose in twenty-four hours of 40 to 50 centigrams. Some time since (see vol. xvi., p. 1007) a word of caution was uttered in these columns respecting a statement by Professor Bignon that cocaine might be safely used in much larger doses than had hitherto been supposed, and as he is now widely quoted as an authority on all that pertains to cocaine, another warning may not be superfluous. The maximum dose here mentioned would be an enormous one if the alkaloid were anything like pure. Fifty centigrams of the alkaloid would be equal to 56 centigrams, or 8·6 grains of the hydrochlorate, and the effects that may follow the ingestion of little more than half that quantity will be found recorded in the next paragraph.

Cocaine Poisoning.

At a recent meeting of the Sheffield Medico-Chirurgical Society, a case was mentioned in which a patient swallowed in mistake two drachms of a 4 per cent. solution of cocaine hydrochlorate. Twenty minutes afterwards he was seized with cramp in the stomach, nausea, throbbing in the head, loss of sight and of the use of his legs, and incoherence of speech, but he remained conscious. These symptoms were followed by severe sweating and prostration, vomiting and intermittent pulse, accompanied by cyanosis and sense of suffocation. The treatment adopted was emetics, sinapisms over the heart and stomach, warmth and stimulants, under which the patient gradually recovered; but on the sixth day after taking the cocaine he was still unable to feel a pen with his fingers.

Cocaine from a new Source.

The genus *Erythroxylon* is largely represented in Brazil, there being more than eighty species besides *E. Coca*, from which cocaine is ordinarily prepared. Thinking, therefore, it would be of interest that some of them should be examined to see if they contain the alkaloid, Dr. T. Peckolt has commenced the work, but it has been rendered troublesome by the difficulty in obtaining from the interior supplies of plants through the natives. The first examined was the bark and leaves of *Erythroxylon pulchrum*, St. Hil. (*E. utile*, Sald.), which grows tolerably abundantly near Rio, and is known popularly as "subrasil," or "arco de pipa." It is a tree thirty to forty feet high, with large ovate leaves, abruptly tapering at the base, shining dark green above, and dull green below. The bark gave only negative results. From the leaves cocaine was separated, but as the yield was only equal to 0·005 per cent., this species will hardly prove a profitable material for the manufacture of that alkaloid.

Ecgonine.

It will be recollected that some time since Herr Merck effected the partial synthesis of cocoaine, by introducing successively a benzoyl and a methyl group into ecgonine that had been found as a bye-product in the manufacture of cocaine. A comparison of the formulæ attributed to ecgonine and that of tropine, the basic product of decomposition of the belladonna group of alkaloids, suggests that a product analogous to the latter might be obtained from the former by the substitution of an atom of hydrogen for a carboxyl group :—

$C_8H_{15}NO$. Tropine. $C_8H_{14}NOCO_2H$. Ecgonine.

According to Messrs. Calmels and Gossin (*Compt. Rend.*, c. 1143) this replacement of the carboxyl group has been effected by distillation of ecgonine with caustic baryta, barium carbonate being formed and an oily liquid, the platinum salt of which had attributed to it the formula $(C_8H_{15}NOHCl)_2PtCl_4$, and which upon further distillation with caustic baryta was decomposed into a non-nitrogenous oil and methylamine. In repeating this experiment, however, Herr Merck has failed to obtain an isomer of atropine as an intermediate product of the reaction, but he confirms the occurrence of methylamine as one of the final products, which is so far interesting that methylamine is known to be a product of a similar decomposition of tropine.

Chinoline.

Some doubts have been suggested as to the identity of synthetically prepared chinoline with chinoline obtained by the decomposition of cinchonine, upon the ground that the former does not yield a tribromide as it had been supposed that the latter did. This has now been cleared up by Dr. Ljubawin (*Chem. Zeit.*, Dec. 12, p. 1548), who has found that the bromine compound was not formed with chinoline, but with other bases contaminating the decomposition product.

Urine Testing.

In presence of the fact that chloral hydrate is sometimes added to a specimen of urine to prevent decomposition, a note by Dr. Sherwin is worth bearing in mind (*Bost. Med. Journ.*, Nov. 18, p. 487). Having observed that a sample of urine, of which the specific gravity was only 1·015, reduced alkaline copper solution like a diabetic urine, he made inquiry and found that a few grains of chloral hydrate had been added to preserve it. On further trial he found that very weak solutions of chloral hydrate in water always reduced Fehling's solution. The urine from two patients after the administration of medicinal doses of chloral hydrate also gave a similar reaction, which, however, was absent from urine from the same patients two days afterwards.

Preparation of Salol.

At the last meeting of the British Pharmaceutical Conference, it was stated that information could not be obtained as to the method of preparing salol, the phenyl ether of salicylic acid that had recently been introduced as an antiseptic. This information has since been supplied by Dr. C. Kolbe (*Pharm. Zeit.*, No. 72, p. 544), who says it is prepared by heating together equivalent quantities of sodium salicylate

and sodium carbolate in the presence of phosphorus pentachloride, the end products being sodium chloride, phosphoric anhydride and salol. In a subsequent communication (*Archiv*, Nov., p. 928) Dr. Eckenroth announced that phosgene gas (carbon oxychloride) could be substituted for the more expensive phosphorus pentachloride. He also described a crystalline monobrom derivative of salol.

Decomposition of Hypodermic Solutions.

It is known that considerable local irritation sometimes follows the introduction of a medicine hypodermically, and this result has been attributed to the influence of micro-organisms contained in the solution used. The conditions under which this influence is exerted have been the subject of an investigation by Dr. Engelmann, whose attention was directed specially to solutions of ergotine. He reports (*Med. Wochenschr.*, No. 39) that by cultivation on gelatine plates he has demonstrated the constant occurrence of microbes in solutions of ergotine of various origin, but that the organisms differed widely in their number and nature. On the whole he is nevertheless of opinion that ergotine is not particularly favourable to their development, since after a time the organisms seem to perish, either through exhaustion of nutriment or other causes. Moreover, the ergotine itself does not appear to undergo any alteration. Speculating as to the origin of the organisms he was led to suspect that they might be derived from the water used in dispensing, and upon testing several samples of distilled water obtained from high class pharmacies he was astonished at the number of organisms present in them. This state of things Dr. Engelmann considers is attributable to the fact that the vessels used for storing distilled water are not thoroughly cleansed sufficiently often, and thus become a breeding place for microbes. The influence of certain antiseptics—such as carbolic and salicylic acids, glycerine and mercuric chloride—in preventing the development of organisms in such solutions was tried, but it was found that when used in any admissible proportions they only exercise a limited influence. Dr. Engelmann therefore prefers the use, where practicable, of solutions freshly prepared with previously sterilized distilled water.

Chemical Action of Plant Life.

An interesting botanical lecture experiment, illustrating the chemical functions performed by plants, has been described by Professor Klebs (*Nature*, Dec. 9, p. 126). He states that the capability of algæ to render the water in which they live alkaline during the fixation of carbon by them under the influence of light may be easily demonstrated by the addition of a little phenolphthalein solution. As the fixation proceeds the water gradually assumes a deep red tinge, which as gradually disappears again when light is excluded. The explanation offered is that the algæ not only take up any free carbonic acid that may be present absorbed in the water, but decompose any acid carbonates that may be within reach. In darkness the reverse process takes place.

Formation of Chalk.

It is generally supposed that chalk can only be formed in a deep sea. It has been shown, however, by Mr. J. Walther, that the seaweeds belonging to the Lithothamnieæ, which are not uncommon close to the shore in the Gulf of Naples and elsewhere, contain only 5 or 6 per cent. of organic matter, nearly the entire dry substance consisting of mineral matter, chiefly carbonate of lime. On decay, these plants do not change their form, but are gradually transformed into a structureless substance altogether resembling chalk (*Science*, 1886, p. 575). On some of the beaches in this country, as at Falmouth, the shore is almost entirely composed of chalky nodules and *débris* resulting from dead plants of this group of seaweeds.

Japanese Cod Liver Oil.

The Japanese do not appear to be lacking in commercial enterprise. According to a note in *Nature* (Dec. 16, p. 158), the Japanese Government has dispatched an official of the Ministry of Commerce to Norway in order to study the cod fisheries, and the preparation of cod liver oil in that country. In the north of Japan large numbers of cod-fish appear at certain seasons of the year, and it is intended to develop this industry. Japanese cod liver oil is already not unknown in the London market, but, doubtless, the inquiry now being made will lead to the preparation of a superior article in Japan.

Japanese Exports.

In the list of exports and imports of drugs into Japan during May, June and July, 1886 (*Sei-i-kwai*, p. 260), it is noteworthy that *Cubeba officinalis*, or "goshuyu," occurs among the former. "Goshuyu" is the Japanese name for the fruits of *Euodia rutæcarpa*, which are about the size of cubebs, although easily distinguishable by being 5-parted and by their different flavour. It would be interesting to know whether these are likely to be used for adulterating cubebs, or as a substitute for it, as the Japanese star anise is for that of China. It seems to be a remarkable coincidence that some cubebs have recently come into the market mixed with small fruits evidently belonging to some rutaceous plant and having, like so many of the Xanthoxylum fruits, a lemon flavour. They are easily recognized by traces of an inferior calyx and the absence of a fruit stalk. It is noticeable that menthol crystals form a large article of export, as much as 4,082,60 yen in May, while the oil of peppermint is exported to nearly as large an extent, 3,411,00 yen. Camphor, however, forms by far the largest article of export, amounting in July to 118,592,32 yen. Ginseng, China root, peony bark, aloes wood and worm seed are exported to a sufficient extent to be given separately in the list.

Lewinin.

Some additional personal experiments with kava resin, or lewinin, are reported by Lewin. He finds that the injection of 6 or 7 minims of a solution produces a complete loss of sensibility in the surrounding area, which does not pass off for five days. The anæsthesia thus obtained is so extreme, that even strong induced currents fail to produce more than a slight pricking sensation. When a small quantity of the resin is placed on the tip of the tongue, the bitterest medicine cannot be tasted (*Brit. Journ. Dental Sc.*, Dec. 15, p. 1138).

Capsicum.

Capsicum has hitherto formed a sort of sheet anchor in the medical practice of herbalists in the United States and to a less extent in this country. It now is recommended strongly in an editorial article in the *Medical Bulletin* (Nov., p. 359) as one of the most important remedies in the materia medica. Among the diseases and complaints, common at this time of year, for which it is recommended, are bronchitis and chilblains. For the former it is added to expectorant mixtures and for the latter it is used as an application when they are still unbroken.

A remarkable case is given in the Japanese *Sei-i-kwai* of the resuscitation of a woman apparently dead, and who had been pronounced so by one physician, through the subcutaneous injection of ten drops of a hypodermic solution of nitro-glycerine. It is suggested that in all cases of collapse or shock this remedy should be tried.

Nitro-glycerine.

Dr. Tweedy, in giving his opinion of the value of hyoscine hydrobromate in ophthalmic therapeutics (*Lancet*, Dec. 4, p. 1065), says that it will be chiefly of use in cases of iritis, and where it is desirable to produce as much dilatation of the pupil as possible, and for as long a time as possible. The fact that it does not seem to cause the unpleasant taste and feeling in the throat, which often follows the use of atropine, is also in its favour.

Hyoscine Hydro-bromate.

It certainly seems strange that the exact origin of the rind of so common a fruit as the orange should not be clearly understood, since so many opportunities for watching its growth exist. The view at present adopted is that it is an extraordinary development of the disc at the base of the ovary, which grows up from below and eventually covers the carpels. A very singular specimen observed by Mr. H. de Vilmorin, near Antibes, and figured in the *Gardener's Chronicle* (Dec. 18, p. 780), has the rind provided with projecting scales, terminating in a point and arranged in regular spirals. In the axil of one of the scales a rudimentary bud marked with two small tubercles, apparently abortive leaves, was noticed. From this structure, it appears, according to Mr. Naudin, that the disc is really a condensed portion of the true leafy axis, with which the carpels when young are surrounded at the base. In the pomegranates and apple, this fleshy development of the axis takes place outside the entire flower, but in the orange it is formed between the stamens and ovary.

Orange Rind.

The cause of the fertility produced in fruit trees by bending the twigs at an acute-angle has been investigated by Professor Sorauer. He finds that the bark on the lower surface of the twig below the bend is thrown into transverse folds, here and there detached from the wood. In these cavities new woody tissue is formed, filled with starch grains and afterwards new woody tissue of a normal character, but always thicker there than elsewhere, and especially on the convex upper surface. The mass of woody tissue checks the flow of water towards the tip of the branch to the great advantage of the bud immediately beneath, which is thus more likely to develop as a fruit bud. Professor Sorauer does not appear (*Gard. Chron.*, Dec. 18, p. 785) to have taken into consideration the obstruction to circulation of the sap caused by the partially broken or compressed wood cells at the bent portion. In bending poppy head stems to ripen the heads, this is probably the chief factor in the case, by arresting more or less the upward flow of the sap.

Fruit Development.

In a list of flowers of which bees are especially fond (*Gard. Chron.*, Dec. 11, p. 756), the following are mentioned as being among the best:—Borage, mignonette, *Nemophila insignis*, *Limnanthes Douglasii*, *Œnothera bistorta*, *Veitchii*, *Centaurea Cyanus minor*, *Erysimum Peroffskianum* and *Clarkia pulchella*. The Irish heath and *Impatiens glandulifera* are also mentioned by Messrs. Veitch and Co. as being much visited by bees. There appear, however, two things necessary to be considered in growing plants for bees, viz., those which will produce the greatest quantity, and those which will produce the finest flavoured honey. In the Canadian section at the late Colonial Exhibition there were two distinct varieties of honey sold, one known as clover and the other as linden honey. It would probably not be difficult in this country, by placing bee-hives at the edge of clover fields, or in rose gardens, to obtain in like manner honey of a characteristic flavour.

Bee Flowers.

For preserving the colour of plants which usually turn brown when placed in alcohol, Dr. H. de Vries, of Amsterdam University, recommends the use of 2 per cent. of strong hydrochloric acid added to ordinary rectified spirit. By this means, if the alcohol is sufficiently often renewed, colourless specimens may be made of such plants as *Orobanche* and *Monotropa*. Old specimens of a brown colour cannot be thus decolorized, but these may often be rendered white by adding to the alcohol a small quantity of chlorate of potassium and sulphuric acid. Some plants with coriaceous leaves are not bleached by the acid alcohol, but require treatment with boiling alcohol.

Colour of Parasitic Plants.

According to a writer in the *Garden* (Dec. 18, p. 500), the berries of the holly seem to possess an intoxicating property, since the birds that eat them seem to become more hungry and excited the more they eat of them, and consequently waste a great many of the berries. To a large extent they seem to lose their sense of fear, and to become blind to danger, dashing against one another in their short, swift, straight flights for the berries. If this be true the berries might be worthy of a chemical investigation. The recent discovery of ulexine in the furze shows that there is still much to be learned concerning some of our commoner plants.

Holly Berries.

It is a singular fact that while mistletoe is largely imported into London from Boulogne, Havre, Bordeaux and other French towns, several tons of the plant, gathered on the Welsh borders of Monmouthshire, have been shipped from London to New York by speculators to supply English settlers in the United States (*Gard. Chron.*, Dec. 18, p. 786).

Mistletoe.

In an interesting article in *Nature* (Dec. 16, p. 151) on the dispersion of plants by birds, Mr. D. Morris points out that the pimento industry in Jamaica depends entirely for its existence on the offices of frugivorous birds. It is thought by the planters in the island that the seeds in passing through the birds undergo some fermentation which fits them better for vegetation than those gathered immediately from the tree, and that no other plan is likely to produce good pimento walks, although it has been shown in the Botanical Garden there that young plants can be raised otherwise if carefully treated.

Dispersion of Plants by Birds.

The different species of *Pinus* are so difficult to determine from the leaves alone that botanists will be glad to learn that a synopsis of the North American species of the genus, founded on the microscopical anatomy of the leaves, has been published in the November number of the *Botanical Gazette*.

Genus Pinus.

The Pharmaceutical Journal.

SATURDAY, DECEMBER 25, 1886.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE PATENT MEDICINE STAMP ACT.

WE publish this week reports of two cases of prosecution by the Inland Revenue authorities for infringement of the law relating to stamp duty on proprietary medicines, and it appears desirable to direct attention to these cases, because the views put forward by one of the defendants in answer to the charge against him are not unfrequently entertained by chemists, notwithstanding the numerous occasions on which we have endeavoured to impress upon the vendors of such preparations as those in question the propriety of protecting themselves from legal proceedings by compliance with the provisions of the existing law. As to the question whether the articles sold with the maker's name were proprietary articles within the meaning of the Act, the magistrate who heard the case very justly pointed out that they must, at all events, be taken to be articles which had been prepared and sold by the defendant, and the money obtained from the sale of them had gone into his pocket. Hence, with those elements of proprietorship, it was very difficult to see how it could be maintained that these preparations did not come within the purview of the Act. The terms in which the Act defines preparations that are liable to stamp duty on the ground of being proprietary are very precise. If the person making, preparing, uttering, vending, or exposing for sale any of the articles mentioned at the end of the schedule has, or claims to have, any exclusive right or title to the making or preparing the same, then they are liable to stamp duty. Really, from a common sense point of view, there seems to be no other meaning in putting the name of the maker and vendor of such preparations upon the labels than that he claims to be the proprietor. If a neighbour of Mr. WHALES had made use of his name upon similar preparations of his own, perhaps the sense of a proprietary right and claim would have become more apparent to Mr. WHALES. A preparation identical with Mr. WHALES's might be sold by his neighbour without interference with the rights of Mr. WHALES, but so soon as his name was put upon the label those rights would be invaded, and precisely because the use of his name in that way would convey the impression that the preparation was made by him. It cannot, therefore, be too plainly borne in mind, that by putting upon labels the name of the maker and vendor of such preparations as the Act applies to, the condition of proprietorship within the meaning of the Act is established, and the preparations are rendered liable to stamp duty by that act alone, independently of any secret method of preparation, and also of any recommendation of the articles for the prevention, cure or relief of disease.

As regards the other condition which was held in this case to constitute liability to the payment of stamp duty, namely the recommendation of the articles, the modes of holding out or recommending medicinal preparations as nostrums or proprietary articles, or as specifics, or as beneficial for the prevention, cure, or relief of any distemper, malady, ailment, disorder or complaint incident to or in anywise affecting the human body are clearly defined to be either by public notice or advertisement, or by any written or printed papers or handbills, or by any label or words written or printed, affixed to or delivered with the preparations. Such handbills as are here referred to were used by Mr. WHALES, and although the general recommendatory memorandum at the head of these handbills referred to a number of preparations named in them other than those for which he had been summoned, it was held by the magistrate that the statement at the head of the handbills was to be taken as if and as though it was repeated before or against every one of the preparations mentioned in them. If some of those preparations were of such a nature as not to be in themselves, or by reason of any recommendation of them, liable to stamp duty, that circumstance would be of no avail in regard to others of them which were of a nature to become liable to stamp duty when recommended. But as the magistrate pointed out, the general recommendatory heading of the handbills would have been sufficient to go upon for bringing the articles under the Act, inasmuch as it stated that the defendant guaranteed them. For what purpose can a preparation be designated "gout and rheumatism mixture" except as being intended for the prevention, cure or relief of those ailments, and when it is also recommended for its speedy and beneficial results, there seems no possibility of maintaining that this does not precisely fulfil the condition which in this respect the terms of the Act specify, as making a preparation liable to stamp duty. If it were not for such evidence as that furnished by the arguments of the defendant in answer to the charge brought against him, it would be scarcely possible to conceive that anyone dealing in articles of the kind now referred to could allow himself to be misled by such flimsy disguises of the real facts of the case as are there apparent. Thus, for instance, it was assumed to be an absurdity that a mixture might be lawfully sold for the cure of gout and rheumatism without any label, but that when sold with

the label it should be an infringement of the law, unless a stamp were affixed to it. There is really no absurdity in this at all, beyond that of failing to perceive that in the one case the sale would be one with which the Act has absolutely nothing to do, while in the latter case the mere fact of the label being put upon the bottle of mixture would be alone sufficient to bring the sale of the article within the provisions of the Act.

We have dealt with this subject at somewhat greater length than its intrinsic merits probably warrant, but it is one of practical importance to a great many in the trade, and one in regard to which we believe there is a vast amount of erroneous opinion and misapprehension. Chemists are very commonly under the impression that if they are prosecuted for infringement of the Patent Medicine Stamp Act they are the victims of persecution and unfairly dealt with, but we think that an unbiassed consideration of the matter must dispel any such ideas. The real question to be taken into account is what are the provisions of the Act. It is futile to enter into disquisitions as to whether such a law should exist, for so long as it does it must be complied with. And we doubt very much whether its repeal would be conducive to the interests of those who are especially affected by its provisions. Moreover, the payment of stamp duty is not a tax upon the vendor of proprietary preparations, but one that falls upon the purchasing public. It is therefore no hardship to the vendor to be compelled to put a stamp upon his medicinal preparations which he desires to recommend in such a manner as to induce the public to purchase them. We think it right to point this out clearly, because we have reason for believing that there is considerable activity being exercised by the Inland Revenue authorities in regard to the observance of the law in this respect. We understand that in a considerable number of cases steps of a preliminary nature have already been taken, and it may be inferred that the intention is to issue summonses if the law is not complied with. As illustrative of the action being taken in this direction, we may refer to the correspondence that has taken place between the department and Messrs. Towle, of Manchester, in regard to their "chlorodyne lozenges and jujubes." These were held to be liable to stamp duty for two reasons: first, the claim of proprietorship put forward by the use of the maker's name upon the label, and secondly, the recommendations contained in the handbills and advertisements issued in reference to the articles. Messrs. Towle have—we think wisely—acquiesced in the view taken by the Inland Revenue department, and in reply to the request for an explanation they have stated they had no desire to evade the law, and had not been aware they were infringing it. The Commissioner of Inland Revenue has therefore consented to mitigate the penalty incurred, and while pointing out that the boxes of chlorodyne lozenges or jujubes sent out must bear the medicine duty stamp proportionate to their price, he allows that these articles may be sold by retailers without further payment of duty, provided they are merely wrapped in paper. Messrs. Towle add a note, in which they point to a circumstance which they think deserves special attention, and it is probable that this has been the foundation of their belief that they had not infringed the law. They consider that their recommendation of the lozenges and jujubes only implied that they were "for the prevention, cure or relief of any complaint, etc.;" but it is perhaps, from a practical point of view, of more importance to bear in mind the fact that even with that possibly correct limitation, the Inland Revenue authorities have held that the recommendation was sufficient to bring the articles under the operation of the Patent Medicine Stamp Act, and as the Commissioners have absolute power to decide such points, the attention of those concerned with similar preparations may be usefully directed to the result arrived at.

LINIMENTUM TEREBINTHINÆ.

Considerable difficulty seems to be still experienced in making this preparation, and in different operations very different results are obtained, varying from a translucent liquid to an opaque white solid. Sometimes, also, there is a separation of the ingredients on standing, and sometimes a perfect emulsion is obtained which keeps without any appearance of separation. As will be seen from a letter that appears in the Journal this week the precise mode of manipulation adopted in making the liniment has something to do with these differences. A short time since, Mr. W. Baxter, Jun., published some observations on the subject which appeared to show that an increase of the proportion of water would insure a satisfactory preparation. Since then he has continued his experiments with materials from different sources and has obtained widely differing results. He therefore writes now to suggest that it is most desirable to have an authoritative statement as to what the appearance of the liniment should be. We agree with him in this opinion, as we are aware that the preparation has been unaccountably a source of considerable inconvenience to pharmacists, and therefore willingly call attention to the matter as he desires.

The death is announced of Don Franciscos Loscos y Bernal, pharmacist, of Castelseràs, a botanist of considerable repute. Don Loscos was devoted to his favourite science and spent upon it all the income he made by his profession He kept up relations with many of the most distinguished botanists in Europe, and is supposed to have known more about the interesting flora of Arragon than anyone else.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

December 9, 10, 15, 16 and 17, 1886.

Present on each day—Mr. Carteighe, President; Mr. Gostling, Vice-President; Messrs. Barnes, Blunt, Bowen, Corder, Fletcher, Gale, Gerrard, Greenish, Linford, Ransom, Symons, Tanner, Taylor and Thresh.

Dr. Greenhow was present on the 17th, on behalf of the Privy Council.

MAJOR EXAMINATION.

9*th.*—*Five* candidates were examined. *All* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Dickson, James Currie .....Dumfries.
Fleetcroft, John Frederick.... .Chester.
Gilson, Charles Boulter ....London.
Mussellwhite, William .....Basingstoke.
Oram, Frank .....Totnes.

15*th.*—*Six* candidates were examined. *Three* failed. The undermentioned *three* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Reade, Leonard James .....Wolverhampton.
Southall, Wilfred Francis .....Birmingham.
Turney, John Davy.....Plymouth.

MINOR EXAMINATION.

9*th.*—*Twenty-six* candidates were examined. *Eighteen* failed. The undermentioned *eight* passed. and were declared qualified to be registered as Chemists and Druggists:—

Barratt, George Frederick .....Penzance.
Blankley, George William .....Arnold.
Booth, John .....Keith.
Burrell, William Holmes.....Holt.
Catterall, Cuthbert George.....Pontefract.
Clark, Roger Clapham.....Kennington.
Cole, John Frederick .....Worcester.
Cooke, Charles Fowler.....Sileby.

10*th.*—*Twenty-eight* candidates were examined. *Nineteen* failed. The undermentioned *nine* passed, and were declared qualified to be registered as Chemists and Druggists:—

Day, Henry William ... .Margate.
Doble, Henry Tregellas .....London.
Evans, Edgar Michael.....Cardiff.
Everett, Walter Edes .....Colchester.
Fields, Tom William .....Beverley.
Hickinbottom, John William...Sleaford.
Hindle, Joseph.....York.
Hoare, Walter .....Christchurch.
Holyoake, William Wringrose .Leicester.

15*th.*—*Twenty-seven* candidates were examined. *Twenty* failed. The undermentioned *seven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Hunter, George Ackland.....London.
Idenden, Richard Frederic.....Dartford.
Kingzett, John Frank... .....Weston-sub-Edge.
Makepeace, Alfred Joseph.....Nuneaton.
Mitchell, James Vernon.....Aberdeen.
Moss, Abraham .....Wrexham.
Moyle, Simon Chellew .....London.

16*th.*—*Thirty* candidates were examined. *Thirteen* failed. The undermentioned *seventeen* passed, and were declared qualified to be registered as Chemists and Druggists:—

Evans, John Thomas .....Bala.
Fitton, Robert .....Huddersfield.
Hunter, John .....Penrith.
Johnson, Charles Ernest.....London.
Jones, William.....Coventry.
Neal, William .....Chatham.
Northey, Edward John .....Truro.
Osmond, Henry Lincoln.....Totnes.
Palmer, Charles Joseph .....Wingham.
Park, John .....Aberdeen.
Pentelow, Harry .....Polebrooke Lodge.
Philp, Wm. John Ignatius.....London.
Poll, William George .....Great Yarmouth.
Thomas, Joshua James ... .Neath.
Turner, John William James...Sheffield.
Wheeler, Joseph King-ton.....Bristol.
Wilson, John Anderton .....Chorley.

17*th.*—*Thirty* candidates were examined. *Nineteen* failed. The undermentioned *eleven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Jones, John Lewis ..... St. Asaph.
Stanton, Leonard William.....Wolverhampton.
Start, George Edward.....Nottingham.
Tonking, Wm. Oliver Hosking.Camborne.
Wain, Charles Oliver .....Bolton.
Wakeham, Horace Norton.....Helston.
Watson, Frederick Percy .....Lincoln.
Webber, James Wilkey .....Taunton.
Willcock, Frederick Albert ...Wolverhampton.
Williams, John Llewellyn .....Llantrissant.
Woolley, Samuel Walter.....Stamford.

PRELIMINARY EXAMINATION.

17*th.*—The undermentioned certificates were received in lieu of the Society's examination:—

Certificates of the College of Preceptors.

Goulding, Ernest .....Holloway.
Hewes, Edward Thomas.....Woodbridge.

Certificate of the Society of Apothecaries.

Hosford, William Joseph .....Forest Gate.

Certificates of the University of Cambridge.

Daily, Dionysius Lees.....London.
Moorhouse, Joseph William ...Barnsley.

Certificates of the University of Oxford.

Blake, Ernest Charles .....Stroud.
Taylor, Thomas Morley .....Bath.
Williams, Richard Watson .....Hanley.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The fourth general meeting of the thirty-eighth session was held at the Royal Institution on Thursday evening, December 9, the President, Mr. A. C. Abraham, F.C.S. in the chair.

The minutes of the previous meeting were read and confirmed, and the following donations to the library announced, viz.:—Current numbers of the *Pharmaceutical Journal*, from the Society; *Pharmaceutical Record of New York*, from the publisher; *British and Colonial Druggist*, from the publisher; and 'The Proceedings of the Pharmaceutical Congress held at Brussels, 1885,' from the President.

There being no miscellaneous communications, the President called upon Mr. Conroy to take the chair, whilst he read the following—

Note on Aromatic Spirit of Ammonia.

BY A. C. ABRAHAM, F.C.S.

The past history of the aromatic spirit of ammonia has been so thoroughly detailed by Thresh and others that it is, I am sure, quite unnecessary for me to say anything respecting it this evening.

The process suggested by Dr. Thresh (*Pharm. Journ.*, vol. xiii., p. 661), and introduced into the British Pharmacopœia of 1885, has been regarded by most practical pharmacists, and certainly by myself, as a great improve-

ment upon the old one, and I propose this evening to lay before you the results of such experiments as I have made with the object of finding to what extent our anticipations have been realized, or at least how far the article met with is actually improved.

First, however, let me allude to the tests given in the Pharmacopœia.

Neutralizing Power.—The Pharmacopœia says that 1 fluid ounce requires for neutralization 558 grain measures of volumetric solution of oxalic acid, and the question at once arises, to what is it to be neutral, and under what conditions?

Chemical neutrality to litmus is arrived at in a good sample in the cold, when only about 360 fluid grains are employed, and by carefully heating to drive off carbonic acid, considerably more may be used, but still although I would not like to say that it was impossible to get 558 fluid grains used up when operating in this manner, it is certainly difficult and troublesome.

There can, I think, be no doubt that what is meant by the Pharmacopœia is that the ammonia present both as caustic and carbonate should be capable of being neutralized and *decomposed* by the quantity of oxalic acid solution named.

There are three methods of finding the point indicated, viz :—

1st. Neutralizing the caustic ammonia present, and then heating carefully to drive off carbonic acid, keeping the solution always slightly acid.

2nd. Employing an indicator which is not affected by carbonic acid.

3rd. Rendering acid with an excess of volumetric solution of oxalic acid, boiling, and titrating back with volumetric solution of soda.

The first point, as I have said before, is troublesome, and I believe inaccurate, for although I have not gone sufficiently into the subject to speak very confidently I suspect that there is a loss of neutral carbonate of ammonia with the carbonic acid.

The second method, notwithstanding the claims made for some of the many new indicators, has so far proved a failure in my hands. I may say that my few experiments have not included any with phenolphthalein, simply because Thompson, after his very elaborate trials, condemns it absolutely for all ammoniacal solutions.

The third method, however, is so exceedingly rapid and accurate that there can, I think, be no question as to adopting it in preference to any other, especially because the loss of a volatile base is at once prevented by the addition of the acid. I should explain that I use only 1 fluid drachm of the sample to be tested because that quantity can be readily and accurately measured with a pipette, which cannot be done with 1 fluid ounce, which is besides an extremely clumsy quantity to employ.* I also always use the volumetric solution of oxalic acid of half strength on account of the very troublesome quality which that of full strength has of crystallizing out in cold weather.

My *modus operandi* is as follows :—To 150 fluid grains of volumetric solution of oxalic acid (half strength) contained in a beaker add 1 fluid drachm of the sample, shake and boil two minutes and titrate back with volumetric solution of soda. The number of fluid grains of the latter employed, multiplied by two and deducted from 150, gives the quantity of total ammonia present in terms of half strength volumetric solution oxalic acid

With regard to the amount of carbonate present I have been somewhat forestalled by Mr. Gravill, at least so far as the process is concerned, but he has saved me the trouble of examining that process (which I had proposed to employ) as to its accuracy.

My table merely gives the number of c.c. found, with the addition of the correction of 3·5 c.c. which Mr. Gravill has calculated and for the accuracy of which I cannot therefore vouch. I have not made any correction for either temperature or pressure (usually unimportant).

I therefore only give the figures as *comparatively* accurate, but I have reasons, which I shall give later on, for regarding 32 c.c. as a more accurate number than the 36 c.c., which Mr. Gravill regards as such, *i.e.*, as what should be produced (with correction) from 5 c.c. of spirit of sal volatile.

With regard to the much debated question of the specific gravity, I cannot say that I have done much. In the first place I regard it as an unimportant point, *i.e.*, to say between ·896 and ·900, and in the second place there are but few of my samples which are sufficiently correct in other respects to make an average of much value.

Specific gravity of sample A 1 was not taken on account of deficiency of total ammonia ; samples B 3–6 as only of interest on account of total ammonia and carbonate in old preparations as compared with new ones. A 10 was too deficient in carbonate to be of any value. D 11 and 12 (from first-class London houses) were not accurate enough to afford valuable information, and the reputation of the houses rendered the probability of water having been added out of the question. E 13 was taken with a view to detection of water.

Now before reviewing the samples generally, permit me to say a few words respecting the volume of the product if the directions of the Pharmacopœia are followed.

Operating upon eight times the quantities of the Pharmacopœia, I find in two cases carefully noted (C 7 and 8), that the quantity of water required to produce 1 gallon, was 3 fluid ounces, and in both cases that amount was added ; then again, I find that after straining through absorbent cotton (in a conical percolator to avoid loss of ammonia), that about 4 fluid ounces more water has to be added to again produce 1 gallon. The total product when the distillate is mixed with the solution is about 10 ounces short of the eight gallons which it is supposed to produce. C 7 was made up to eight gallons. In the case of C 1 the same procedure was followed except that the sample actually estimated for ammonia was taken before making up.

Source.			Total ammonia.*	Carb. of am.†	Specific gravity.
Wholesale houses	A	1	115¼	31	not taken
		2	128¾	30½	8945
		10	131	5⅞	8945
Own make Old Pharm.	B	3	133¼	30	8945
		4	135½	21	8945
		5	152½	38½	8945
		6	140	28	8945
Own make New Pharm.	C	7	126½	29	·900 [up ·8974).
		8	133¼	32	·8984 (before making
		9	70	14	·8948 at 64°
Retail houses	D	11	83	12½	not taken
		12	167¼	22	,,
General dealer	E	13	124¼	47	·9408 at 64°
B.P. standard . .			139½	say 32	·896

Now, to take the samples seriatim.

First, the wholesale samples :—

A 1 is slightly low in total NH_3, practically right in carbonate.

A 2 is fairly accurate, and probably not made up with water to the quantity named in the Pharmacopœia.

* Of course 10 c.c. or 100 fluid grains would be still better.

* In terms of half-strength, vol. ac. oxal. requires for 1 fluid drachm.

† Number c.c. of CO_2 from 5 c.c. of sample, with 3½ added for solubility in liquid. No corrections for temperature or pressure.

A 10 surprised me much, as it was from a house second to none, and was labelled B.P., 1885. Probably, the small quantity of carbonate is due to the incautious application of heat in dissolving that substance; it can hardly be due to a mistake in supplying the old preparation, as my table shows a much larger quantity for the sample of such, poorest in that respect.

Samples B 3–6 do not show such an amount of discrepancy with respect to carbonate and total NH_3 as has been found by others; but, of course, they are all my own manufacture, and, with the exception of a slight modification, all made in the same apparatus, and with a proper regard to the complete condensation of the product.

C 7 I have alluded to before, but I may say that I regard it as a fair sample only, as I remember that the cork of the bottle containing the caustic and carbonate of ammonia was blown out once, and that a trifling leakage occurred through the cork, which would account for some slight loss.

C 8 I regard as a perfect sample, so far as carbonate is concerned, because the solution was effected with but little heat, and a sample of the carbonate used required 1450 fluid ounces vol. sol. acid. oxalic., when the theoretical amount required by the Pharmacopœia was 1453, which is as close an approximation as is possible. The free NH_3 is, however, slightly too low, as, to my knowledge, the solution used had the correct specific gravity at 62½ instead of 60°. I therefore take C 8 as a minimum standard for total NH_3, and as a perfect one for carbonate.

D 9 was the sample which induced me to undertake this inquiry. It was brought to me to test as being "very weak," which I found it to be. The specific gravity shows that it has been made in good faith. and not watered by a servant. How it has come to be so weak I cannot explain.

E 13 is a very bad sample, and was bought from a general dealer, not a druggist, and considering this, is quite as good as could be expected. Whether the large amount of carbonic acid is due to the use of powdered carbonate in ignorance, or whether it is intentional, to make its taste milder, I do not know.

And now, gentlemen, I have only one further remark to make, and that is one with which I think you will agree, viz., that these samples are very disappointing, as showing that although we now have a process capable of giving very constant results, the results are not attained by first-class houses, from which, with only two exceptions, my samples have been obtained.

A discussion followed, and a vote of thanks, proposed by Mr. Conroy and seconded by Mr. J. S. Ward, was heartily accorded to the President for his paper, and the meeting then terminated.

TORQUAY CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting of this Association was held on December 14; there was a good attendance, including the Vice-President, Mr. W. Bathe, in the chair.

The Chairman having made a few remarks, the Secretary present, Mr. W. Smith, read the minutes of the last meeting, which having been confirmed, it was announced that several principals had given their support to the Association since the last meeting. The conditions of the prize essays were also given.

Mr. Smith then read a paper on "Cinchona Barks," the historic part of which treated of their introduction into this country, and their cultivation in Java, India and Ceylon. In comparing the kinds official in the B.P. 1867 and 1885 it was stated that owing to the more reliable and abundant supply of red bark it had superseded the yellow and pale varieties for use in galenical preparations, while the manufacturers of alkaloids were at liberty to use any barks so long as their products answered the proper tests. Respecting the modes of collection, that of renewing or mossing was specially spoken of as being an ingenious and profitable system. The chief distinctive characters, such as fractures, cracks, lichens, colour, etc., were then pointed out, the reader remarking that students must not always expect to find all the characters in every instance, though there would generally be some clue present to the practised eye. Some of the tests for the presence of quinine and of its purity were practically shown.

Specimens from the Pharmaceutical Society's museum of the following species were exhibited:—*Cinchona succirubra*, flat and quill; *Cinchona officinalis*, *Cinchona Calisaya*, flat and quill; *Cinchona lancifolia*, *Cinchona cordifolia*, *Cinchona micrantha*, *Cinchona nitida*, and *Remijia pedunculata*; also sections of stems illustrating the renewing process.

A discussion then took place, in which Messrs. Curtis, Fooks, Milne, Morris, Ness, Riches and the Vice-President joined.

Votes of thanks to Mr. Holmes for providing the specimens, and to Mr. Smith for his paper, were passed, Mr. Morris remarking that those present had had an opportunity of examining the cinchonas such as rarely fell to the lot of assistants in provincial towns; and pointing out the importance of the subject.

Mr. Smith, in reply, said that he was pleased if those present had profited in any way by the paper he had read; and urged on all those who were preparing for the examinations, the necessity of taking every opportunity of examining specimens of materia medica, as it was only by becoming familiar with various specimens that a thorough knowledge of their distinctive characters was to be acquired.

The next meeting will be held on December 29.

MIDLAND COUNTIES CHEMISTS' ASSOCIATION.

A meeting of the Midland County Chemists' Association was held at the Grand Hotel, Colmore Row, Birmingham, on Wednesday evening, December 15. Mr. Councillor Barclay occupied the chair, and there was a very fair attendance. A paper was read entitled—

Sir John Lubbock's Shop Hours Regulation Bill.

BY MARTIN MAGOR.

At the opening meeting of this session, a discussion was raised concerning our classes, and the reason why they failed to attract students as they did in the heyday of their opening glory some three years ago.

I think the figures given, were, for the first year, sixteen students; for the second, nine; and for this, the third, only three. Much was then said about the lack of practical chemistry and a paucity of apparatus, slackness of trade, etc., etc.; but I noticed that beyond all else that was said, the few "unaccustomed-to-public-speaking" remarks that I rushed out on the matter of too long shop-hours being more than anything else the cause of failure, etc., etc., met with the most ready acceptance and acquiescence. This feeling was authenticated and confirmed by the resolution which was afterwards carried *nem. con.*, I say *nem. con.* advisedly, for I think there was a something present, whether in the body or out of the body, I wot not, who—or must I say which?—did not see its way to a step which though undoubtedly good for health, might somewhat perhaps affect pocket.

Personally I was a great deal gratified to find this deep-rooted sympathy with the attempt which has been made to relieve shopkeepers somewhat of the drudgery which gives all day long, and frequently a good part of the night. to a thoughtless and unsympathetic public; and which robs them almost entirely of social intercourse with their families and fellows. I had been for many years out of England and out of our trade, engaged in tea planting in Assam, and had lost touch of what had been doing at home, and from what I had seen and heard

since my return and re-engagement in the drug trade, I had come to the conclusion that not only had the chemist and druggist business deteriorated, but that the chemist and druggist had deteriorated with it, and had become a spiritless grumbler with scarcely a kick of genuine life left in him. Yes, I was glad to find how mistaken I had been, and to see that we were not only alive to our grievances, but ready to quit them as soon as the way was opened up; and I trust that the vote which to-night we shall get on Sir John Lubbock's Bill will be the commencement of that unanimity in our craft, which by constant agitation, shoulder to shoulder, and hand in hand, shall compel the Government to give to us alone the right to supply medicines to the public.

All true government in legislating must have for its chief aim the health and happiness of the people governed.

Especially during this, the nineteenth century, has our Government recognized its duty in this direction by legislation affecting drainage, sewage, waterworks, the method of building houses and streets, the laying out of roads, parks, etc. Many of the laws in these matters have seemed to be very arbitrary to some individuals who have held the selfish doctrine that they have a right to do what they like with their own; many such a one has been compelled to bend his will and even sacrifice his much-vaunted liberty so that the health and happiness of the public should be secured. "Can't I build my house as I like?" said one in a city I know well; "I will so build it!" He did so build it! And there it stood year after year, a monument of this man's idea of liberty. Yes, stood! and rotted empty, for the authorities of that city would not certify the house as fit for habitation, and the libertine, shall I call him, could not live in the house himself nor let it to another because of the penalty attached to such an action. Years of waiting, of decaying property and sunk capital have brought this man to his senses; he has altered his house as required by the sanitary authority and has received the necessary certificate of habitation. In addition to legislation, affecting the housing of the people, there have been enacted laws limiting the hours of employment of women and children in factories, and also of men in certain noxious trades; much more would undoubtedly have been done for the latter in this direction had he, the British workman, not being found, in the power of his trades-unionism, well able to dictate such hours as to prevent his labour becoming so burdensome as to injure his health. A careful look around and consideration will show that there has been year by year a greater care on the part of Government and of the British workman himself for health and recreation tending thereto. But, although this process has been going on and perfecting itself for a long time in connection with what are known as the working classes, it has only taken any definite shape amongst shopkeepers during this year, the form being an Act which has ordered that no shopkeeper shall employ any person under eighteen years of age for more than seventy-four hours, meals included, in a week, under a penalty of £1 fine.

This Act came into force on November 1, 1886. In the course of a speech by Sir John Lubbock, delivered at Glasgow, on Tuesday, October 5, 1886, he said:—"They did not propose more because they knew they had no chance of carrying more." But what happened? The Bill was referred to a Select Committee. It attracted a good deal of attention, and their opponents, believing that the shopkeepers generally would pronounce against it, induced the Lord Mayor to summon a great representative meeting of trades at the Mansion House. They (that is, Sir John Lubbock and friends) had nothing to do with the invitations. They were issued, as he had said, by opponents of their Bill, who, however, courteously invited him to attend. Some 700 or 800 traders were present, not assistants, remember! He believed there was not a single assistant present; they were all themselves shopkeepers. It was a thoroughly representative meeting. The gentlemen who called the meeting proposed a resolution condemning our Bill; but the meeting, to their great surprise, was overwhelmingly in its favour. Eventually, the hostile resolution, in deference to "the strong feeling" of the meeting was withdrawn, and one, prepared by Mr. Stapley, and seconded by Mr. Crisp, was adopted by more than ten to one, as follows:—"That while heartily accepting Sir John Lubbock's Bill (now become law), which would undoubtedly confer a great benefit on young persons engaged in shops, this meeting earnestly prays Parliament to go further, and to add a clause enacting a compulsory closing at eight o'clock on five days of the week and ten on Saturdays, a measure which would confer an inestimable benefit on the whole shopkeeping community, and relieve them from the intolerably long hours from which they now suffer." This resolution ran like wildfire round London. Meetings were held at once in Holloway, Paddington, Shoreditch, Kensington, Camden Town, and elsewhere, in fact all round London, at which the same resolution was enthusiastically adopted.

Sir John Lubbock goes on to show how enthusiastically the matter has been taken up in Liverpool, Edinburgh, Dublin, Manchester, Newcastle, etc., etc., pointing out how thoroughly the shopkeepers themselves are in favour of shorter hours as proposed and of asking Parliament to enact such regulations. Of course there are some of the same class I spoke of previously, who shout out against the restriction of their own particular and peculiar liberty. One such is said to have written that he would prefer "to be a toad, and live upon the noisome vapours of a dungeon than let infamous knaves or crafty friends trample on (his) precious liberty." That the lunacy laws have not been sufficient to meet such a case as this, proves the necessity for further legislation.

Enough has been said to show that the vast majority of shopkeepers throughout the length and breadth of the land is strongly in favour of Government legislation regarding shop hours. But some would say, How will our customers take the matter, what do the greater bulk of these, the working classes, say on it? Surely these will not contend that working men, having obtained the boon of shorter hours themselves, would grudge the same to the slaves of the counter; and would, by any action on their part, compel the continuance of the present state of fourteen to sixteen hours' daily servitude. Never has it been shown that from any act of the public that a voluntary agreement amongst shopkeepers for shortening the hours has been broken; no, the breach has always come about by the sneaking action of some crawling creature who has mistaken his vocation—and taken to living by shopkeeping instead of on the "noxious vapours of the dungeon" aforesaid.

But, gentlemen, there is something more than mere neutrality on the part of the working classes—we have their leaders—Broadhurst, Thomas Burt, and others—giving Sir John Lubbock their cordial support, and backing his Bill.

Enough has been said from the general shopkeeper's standpoint, and now, for a very brief space, I must ask your kind attention to those points in the Bill which particularly affect that branch of shopkeepers—the chemists and druggist. Speaking roundly, we are always crying out for a more thorough enforcement of those laws, which, in some slight measure, segregate our craft (I refer particularly to the Poison Clauses of the Pharmacy Acts), and for some further legislation which shall lift us from the position of mere poison-mongers, and give us our rightful position as the only dispensers of medicines to the public.

It goes without saying that as soon as legislation is initiated in any degree regulating the action of shopkeepers at large, for health's sake, the anomalous state of affairs which allows any huckster to dispense all medicines (except a few scheduled poisons), frequently

to the hurt of the buyer, must begin to cease; or else the several laws which from time to time have been enacted for the bettering of the public health have been wrongly conceived, and are in themselves uncalled for. I leave this proposition to the consideration of the "precious liberty maniacs," and pass on to show how this comes out in Sir John Lubbock's bill.

Clause 11, reads "a pharmaceutical chemist or chemist and druggist shall not be liable to any fine under this Act for supplying medicines, drugs, or medical appliances, after the hours appointed by this Act, or by any order made thereunder for the closing of shops; but this section shall not be deemed to authorize a pharmaceutical chemist, or chemist and druggist, to keep open shop after the said hour."

Here by a side issue and through the side door we are segregated from other shoopkeepers, and the sole supplying of medicines, etc., is placed in our hands for, say, twelve hours out of twenty-four. True it is the twelve hours of night; but if the Act passes, and I expect it will, it will be the first law which recognizes that the sale of medicines should be solely in the hands of a class of men whose education fits them, as no one else is fitted, for the purpose, and will be another step in that process which indicates on the part of Government an increased care for the health and happiness of the public governed. And to us chemists and druggists it supplies a stepping stone which we may logically use for the obtaining legislation which shall give us the same position during shop hours as Sir John Lubbock's Bill gives us after them; that is, the right to the sole supply of medicines. Towards this end no stone must be left unturned by us; no man should be elected to the Pharmaceutical Council who will not promise to work his hardest for this object; and every pharmaceutical chemist and chemist and druggist throughout Great Britain should work directly and indirectly, and agitate, and agitate, and everlastingly agitate until we have secured this, our right.

Mr. Perry (Vice-President) said that he was opposed entirely to the inclusion of pharmacists in the scope of this measure. Not that he objected to an earlier closing of pharmacies,—on the contrary, he thought it a very desirable thing,—but he did object to compulsion, or to any interference whatever with pharmacists as to the manner in which they found, or might find, it necessary to conduct their business, not only in their own interests, but for the convenience of the various districts where they might be located. Pharmacists, in common with the other branches of the medical profession, had to submit to compulsion at the very outset of their career; they had to undergo a compulsory examination before they were allowed to prosecute their calling. And as some sort of return for this certain privileges were accorded to them which were not granted to what may be termed pure traders. And therefore just as strongly as he should object to any inspection of their pharmacies, such as obtains in other countries, as an insult to professional men, so did he protest against any interference with their privileges such as this measure contemplated. He quite believed that there was growing up amongst pharmacists a better feeling, and especially among the younger members, a feeling which had in it less of the spirit of self, more of the spirit of mutual goodwill, and it was to this, he thought, they must look for an improvement in the direction which he (Mr. Perry) no less than Mr. Magor was desirous of moving. But whatever they did let them not put their necks into a noose; let them not allow their privileges and liberties to be in any way tampered with; let them not suffer themselves to be at the mercy of every magistrate on the bench, and every policeman on his beat! They had well earned the privileges they possessed let them not sell their "birthright for a mess of pottage." He concluded by moving the following amendment:—'That in the opinion of this meeting it is not desirable that pharmacists should be included in the scope of Sir John Lubbock's Bill, seeing that they are an integral part of the medical profession."

Mr. Ferriday formally seconded the amendment.

Mr. Thompson said Mr. Perry had spoken of the privileges of pharmacists, and would he like to know what they were. He had great pleasure in seconding Mr. Magor's motion, for it was worthy of their support.

Mr. Thonger approved of the principle of the motion, but suggested that it should read as follows:—"Resolved that this meeting is strongly of opinion that Sir J. Lubbock's Bill as it now stands meets the requirements of shopkeepers, and sees no reason why pharmaceutical chemists and chemists and druggists should not accept the position given by clause 11, and heartily expresses its hope that it may become law during the next session of parliament." He supposed that they were *in camera*, and then said that the medical profession did not act towards the pharmacist as it should now be expected to do.

Mr. Spencer did not see why they should have shorter hours, for our grandfathers used to get up at six o'clock in the morning to mix paint, and were very frequently found at some such occupation at eleven o'clock at night. And did not they live long enough? Their calling was neither a trade nor a profession. He supported the amendment, because legislation in this direction did not seem to be any good.

Mr. Morley supported the resolution thoroughly, and even went so far as to say that if by legislation pharmacists were compelled to close at eight o'clock in the evening of each day, even without side-door attendance, they and their families would have no reason to grieve.

Mr. Lucas could not support the motion, for he feared that the next thing would be to close them up altogether. Each chemist should be allowed to use his own discretion with regard to the time of closing of his shop.

The President said that he heard from Mr. Haydon, who attended the London meeting, on behalf of the Trade Association, that he had brought away a different view of it than that given by the lecturer, as he was disappointed to find that it appeared to him to be a packed meeting of the Early Closing Association. He believed that early closing was desirable, but to be compelled to close was to him very much like grandmotherly legislation.

Mr. Magor, in his reply, said that Mr. Perry was very nearly of his opinion, and it should be noted that throughout the paper no allusion was made to trade or profession. He was glad to say that our grandfathers were dead and buried, and we did not wish to be. He could not but feel astonished at the President's remarks, for Sir J. Lubbock's description of the meeting was stated in this paper almost word for word. As for the peculiar legislation of which he spoke, he was surprised that a leading Liberal in Birmingham, who had shown himself foremost in legislation affecting the well-being of the inhabitants, should speak of this present movement in the way he did. He feared Mr. Barclay had the British working man more at heart than the poor shopkeeper.

Eventually Mr. Magor's resolution, as modified at the suggestion of Mr. Thonger and Mr. Charles Crooke, was carried by a majority of two to one.

A vote of thanks to Mr. Magor was unanimously passed, and the rest of the evening was devoted to a musical entertainment and a social conversation.

Proceedings of Societies in London.

CHEMICAL SOCIETY.

At a meeting of this Society, held on Thursday, December 16, Dr. Hugo Müller, F.R.S., President, in the chair, several certificates were read for the first time, and the following were duly elected Fellows of the Society:—

Messrs. H. E. Brothers, F. J. H. Coutts, Tamemasa Haga, H. J. Hardy, Michitada Kawakita, W. Leach, S. J. Pentecost, H. J. Phillips, P. Yeshwant Sheshadri, Tetsukichi Shimidzu, J. Stapleton, W. P. Thompson, Hikorokuro Yoshida.

The following papers were read :—

Researches on the Constitution of Azo- and Diazo-derivatives. I. Diazoamido-compounds. By R. MELDOLA, F.R.S., and F. W. STREATFEILD.

The Influence of Silicon on the Properties of Iron and Steel. Part I. By THOMAS TURNER, Assoc. R.S.M.—After referring to the work of previous observers in this direction, including Bessemer, Gautier, Mräzek, Pourcel, Riley, Snelus, and others, the author gives an account of experiments undertaken to determine the influence of silicon on the purest form of iron obtainable in considerable quantities. For these experiments metal was taken from the basic Bessemer vessel, at the end of the blow, and before any addition of manganese had been made. This metal had the following composition :—C = 0·03, Si = 0·0098, S = 0·039, Mn = 0·06, P = 0·04. It was mixed in a red-hot clay crucible with varying small quantities of silicon pig, containing 10·3 per cent. of silicon, the product being afterwards examined. The most important results are given in the following table :—

Si per cent. by analysis.	Limit of elasticity Tons per sq. in.	Breaking load. Tons p r sq. in.	Ratio limit to break.	Extension per cent. on 10 inches.	Reduc- of area per cent.	Relative hardness.
0·0098	13·01	21·80	0·597	27·7	77·0	18
0·02	13 08	19·95	0·656	17·6	40·3	16
0·035	15·69	23·07	0·680	16·3	31·8	17
0·039	16·42	23·28	0·704	18·2	37·7	17
0·08	16·72	23·77	0·704	24·2	44·9	20
0·117	18·00	28·05	0·642	15·6	26·8	21
0·13	18·37	25·68	0·751	18·8	41·9	20
0·027	17·75	21·75	0·861	26·0	67·4	15

Other specimens were prepared to which more silicon was added, but these broke in pieces in attempting to roll them. The last specimen in the above list is not comparable with the others, as in this case the silicon, existed in the *oxidized* condition, and the material more closely resembled the original metal in its behaviour. The author draws the following conclusions from his experiments. That the addition of silicon, in the form of silicon pig, to the purest iron obtainable in commerce tends to distinctly reduce its suitability for being rolled. With only a few hundredths per cent. of silicon, the metal remains quiet in the mould. Red shortness appears to increase with the amount of silicon, though the welding properties appear to be quite unaffected ; the metal was tough when cold, with all proportions of silicon. The limit of elasticity and tensile strength increase with addition of silicon, but the extension and the reduction of area are seriously diminished. The relative hardness is but slightly affected, and appears to be connected with the tenacity of the material. With 0·4 of silicon and 0·21 of carbon a steel was obtained which was difficult to work hot, but could be hardened, and was very tough when cold. The author points out that these results would be considerably modified by the presence of larger quantities of carbon and manganese, such as are met with in practice.

The Distribution of Nitrifying Organisms in the Soil. By R. WARINGTON, F.R.S.—The result of sixty-nine experiments with clay or loamy soil from various depths shows that the nitrifying agent is present almost without exception down to 3 feet from the surface ; samples from below this depth did not always exhibit the power of causing nitrification, and none of the samples of soil taken 8 feet from the surface produced nitrification. The nitrifying organism present in the subsoil is apparently in a feeble condition, nitrification starting much later in solutions seeded with subsoil than in those seeded with surface soil. Reasons are given for believing that in agriculture nitrification is practically confined to the surface soil. The nitrogenous matter present in the subsoil is, however, nitrifiable if exposed to favourable conditions.

Isomeric Change in the Phenol Series. The Action of Bromine on the Dibromonitrophenols. By A. R. LING.

Some Azines. By FRANCIS R. JAPP, F.R.S., and COSMO INNES BURTON, B.Sc.

CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting of this Association was held at 103, Great Russell Street, December 15, Mr. H. H. Millhouse, President, in the chair.

The minutes of the previous meeting were read and confirmed, and a new member proposed.

The Chairman then called on Mr. Ellwood, to read the following paper, entitled—

THE OFFICIAL LIQUID FIXED OILS.

BY T. A. ELLWOOD.

The title of my paper is rather more comprehensive than the substance of it. Instead of embracing the six oils that I ought really to take, I have confined my examinations and shall restrict my remarks to four only ; those being in most common use :—Almond oil, castor oil, olive oil and linseed oil.

Almond Oil obtained from the kernels of the fruit, which is a drupe, of *Prunus Amygdalus, vars dulcis et amara.*—The oil is obtained by submitting the kernels to hydraulic pressure ; the sweet yielding about 50 per cent. and the bitter 40 per cent. by this method. The oils from these two sources resemble each other in appearance and very nearly in their chemical composition and analytical characters.

The oil consists of almost pure olein, or as it is sometimes called, triolein.

Olive Oil is the fixed oil obtained by pressure from the fruit of *Olea Europæa*, an evergreen tree, abundantly cultivated in the south of Europe. The method adopted for the extraction of the oil varies slightly in different countries ; but it is chiefly obtained by submitting the crushed pulp to pressure in coarse bags; the oil which floats to the top being skimmed off and forming the so-called virgin oil of commerce. The pulp is now mixed with boiling water, and again pressed as before, and yields a second quality oil. More oil is yielded of a very inferior quality if the pulp is allowed to ferment, and the above treatment repeated.

Olive oil consists chiefly of triolein, with small quantities of palmitin and other fatty acids. The best oil does not contain stearin, though some of the commoner qualities undoubtedly do.

Castor Oil is obtained from the seeds of the *Ricinus communis*, a plant truly indigenous to India, though now widely distributed throughout warm regions of the globe, in some parts being a tree and in other parts an annual herb. The fruit, which is a three-celled capsule, contains a seed in each cell, which must be peeled before subjecting to pressure for the oil. They are either pressed in the cold state or in a warm room, and yield from 40 to 50 per cent. of oil.

The oil is composed of a peculiar kind of olein, called ricinoleic acid, which chemically contains one atom of oxygen more in its formula than that of the ordinary olein ; and this peculiarity makes it very different in its action with reagents. The oil also contains palmitin.

Linseed Oil, obtained by cold pressure from the seeds of the well-known common flax (*Linum usitatissimum*), is a drying oil composed nearly entirely of linolein, with traces of palmitin, myristicin and true olein. By exposure it absorbs oxygen very readily, increasing its

weight 10 or 12 per cent, and forming linoxyn, a kind of resin.

About 25 per cent, of oil is obtained from the seeds by pressure. If heat is employed the colour of the oil is darker.

Of these four oils we have three divisions, almond and olive oils being non-drying; linseed oil a drying; and castor oil a medium between the two, not drying readily, but doing so if exposed in very thin layers.

My work has been chiefly conducted upon the purest oils obtainable through the usual channel of retail chemists; in each instance they furnishing me with the name of the wholesale house from which they were procured.

I have thus restricted my examinations, as I wish to point out what a pure oil should be, rather than what a bad one is: and in order to make a few practical remarks useful to those engaged in our profession.

The figures I shall give are the means of results obtained from three samples of each oil. I will here mention that common oils did not give nearly the same results; but it would make my paper too lengthy, if I were to show comparisons between them. The differences, however, between the three I examined were so minute, that they would be scarcely worthy of mention.

The following are the chief observations made:—Specific gravity; actions of HNO_3, H_2SO_4, $HNO_3 + Hg$; Maumené's and Valenta's tests; saponification; amount of free acid, etc.

Maben, in *Pharmaceutical Journal* (March 20, 1886), recommends the use of $ZnCl_2$, made by saturating strong HCl with ZnO, as a test for almond oil. It is applied on a white slab, by allowing 5 drops of the prepared solution to run into the centre of 10 drops of oil, stirring and observing the colour. Almond oil only gives a milkiness, but if adulterated with the foreign, cheaper, so-called almond oil, but which, in reality, is usually apricot or peach kernel oil, it imparts a green colour.

I tried cohesion, as recommended by Tomlinson, in the *Pharmaceutical Journal*, 1864 (pp. 387 and 495), but did not get any satisfactory results; for, by adulterating the various oils, I could get them all to give nearly similar results, or so near that were anyone else to allow them to drop upon the water I could not have identified them.

Specific Gravity.—This I took at a temperature of 15° C. by means of a 50 gram specific gravity bottle, previously checked and found accurate.

Mr. A. H. Allen highly recommends the use of Westphal's hydrostatic balance, which is certainly of great service for taking specific gravity at high temperatures, for ascertaining the coefficients of expansion, which, in the ordinary way, I was unable to obtain. These coefficients Mr. Allen has pointed out to be tolerably constant, though not sufficiently different to be of service in the recognition of oils or detection of adulterations.

My specific gravity very closely resembles his:—

Olive.	Almond.	Castor.	Linseed.
918·2	919	965·6	935·6

Action of Acids.

Nitric Acid.—Specific gravity 1·38 used. Six drops of the oils were placed upon a white ointment slab, and then three drops of the acid were run down a glass rod into the centre, allowed to stand two or three minutes and then gently stirred.

Strong H_2SO_4.—The method was repeated as with the nitric acid, but using 10 drops of the oil and 1 drop of acid.

Amount of Free Acid.—This was estimated by shaking with about five times the volume of rectified spirit, which dissolves out the acid, and, except in the case of the castor oil, leaves the oil undissolved. At first I separated the alcoholic solution, but subsequently found exactly similar results were obtained without so doing.

The solution was titrated with a decinormal solution of NaHO, phenolphthalein being used as an indicator. The acid I calculated as oleic. Finding the oils all yielded a low percentage I tried some of the commoner oils previously mentioned, and found them to vary from 5 to 15 per cent., hence the amount of free acid may be put down as a guide in the choice of a pure oil.

Results:—

Olive.	Almond.	Castor.	Linseed.
HNO_3:—Dirty green coloration.	Turns pink in colour, increasing after some time.	Amber after stirring some time.	Olive green.
H_2SO_4:—Amber, then darkens with a green tinge.	Resembles olive, but does not darken so much.	Thickens and forms pasty mass without darkening	Chars forming black gelatinous mass.

Saponification of Oils.—This consists of ascertaining the amount of KHO to form a soap with the oil.

The following are the methods of manipulation I employed.

A weighed quantity of the oil was placed in a six-ounce round phial, fitted with a good india-rubber stopper; a known quantity of a freshly made solution of alcoholic KHO, taking care to add excess, was then mixed with it. It was then heated in a water-bath for about ten hours, with frequent agitation in order to entirely saponify the oil. The soap solution thus formed was then further diluted with water, and the excess of KHO estimated by titration with a standard volumetric solution of acid, phenolphthalein again being used as an indicator.

My figures are percentages of true KHO required.

Free acidity per cent.—

Olive.	Almond.	Castor.	Linseed.
1·88	1·6	1·5	3·1

Per cent. KHO for saponification:—

19·8	18·4	17·6	19·2

The figures by other observers in the case of olive and almond are 19·5 and 18·3, which are very close to my own.

The method above detailed will also approximately do for the estimation of amount of glycerine produced by the saponification.

Several well-known analysts, including Messrs. Allen (*Journal Society of Chemical Industry*, vol. v., p. 69), Wanklyn and Fox, have used this estimation and recommend it.

The method of saponification has, however, been modified, by using a methyl alcohol solution of KHO in place of an aqueous solution. The methyl alcohol, must, however, be quite pure, as ethyl yields oxalic acid upon oxidation.

After saponification the soap is diluted with hot water, the fatty acids are then liberated by means of HCl, and separated from the aqueous liquor containing the glycerine.

The latter solution is then rendered alkaline, and the glycerine in it oxidized to oxalic acid by means of alkaline permanganate of potash in excess according to the equation—

$$C_3H_8O_3 + 3\,O_2 = C_2H_2O_4 + CO_2 + 3\,H_2O.$$

The excess of $K_2Mn_2O_8$ is then destroyed by a sulphite; filtered from any deposit of black oxide of manganese, and acidulated with acetic acid. The oxalic acid present is then precipitated as calcium oxalate, which is collected and well washed. It is then added to dilute sulphuric acid, and titrated with a standard volumetric solution of $K_2Mn_2O_8$.

I have only done olive and almond oils, the other figures I take from Mr. Allen's paper previously alluded

to. The figures represent the percentage of glycerine produced.

Olive.	Almond.	Castor.	Linseed.
10	9·8	9·03-9·13	9·39

This process is not so tedious as it appears at first, the worst part being the saponification, having to boil it for so long a time.

The results are all a little below the calculated quantities, for, presuming the oils to be all glycerides, which are tribasic, it follows that for every three of KHO used one of glycerine should be produced.

Taking almond oil as an example, calculating from the already found amount of KHO to saponify, it should yield just 10 per cent. of glycerine, whereas 9·8 per cent. only was really obtained. The figures for linseed oil are particularly low:—Calculated 10·5; actually obtained 9·39. But then there is the allowance in each case of the KHO required to neutralize the free acid, and this being done the results are tolerably accurate.

To express the rule definitely, "the amount of glycerine produced is in direct proportion to the amount of KHO required to saponify, less the amount to neutralize free acid."

Fatty Acids.—Another useful observation, which may be made with the saponified oil, is the determination of fatty acids.

This is performed by decomposing with excess of HCl the soap produced, washing thoroughly with hot water, drying and weighing.

The composition of these fatty acids can be approximately fixed by means of their melting points in the case of the solids; and by the amount of alkali required for their neutralization in case of liquids.

Owing to want of time I have been unable to do this, and thus verify the figures of others. I think this might easily be done in connection with the process for glycerine, as there the fatty acids are not required; by so doing it would save the time required for saponification, which, as I have before said, is very tedious.

The Elaidin Test.—This well-known and valuable test was first used for detections of adulterations in olive oil by Poutet in 1819, his reagent being prepared by dissolving 6 parts of mercury in 7½ of HNO_3 specific gravity 1·35, and added to the oil in the proportion of 1 to 12 by weight, shaking occasionally for two hours, then standing aside in a cool place for twenty-four hours. Pure oil leaves a solid mass.

Boudet discovered in 1832 that the agent effecting this result was nitrous acid, and he proposed to use it mixed with nitric acid.

Several modifications of this original method have been devised and used, though all hinge upon the same fact.

The one I have used for my experiments, and from which I give my results, is that recommended by Mr. L. Archbutt in the *Journal of the Society of Chemical Industry*, vol. v., p. 303.

It is made by dissolving 6 grams of Hg in 5·2 c.c. of HNO_3, specific gravity 1·42, in a dry stoppered 1 ounce phial, adding the HNO_3 to the Hg and tightly stoppering the phial to prevent any gas escaping, and placing in water for ten minutes. A dark green solution with a white deposit is the result. The deposit is dissolved by carefully stirring, and if necessary a little heat.

This solution retains its potency a long time, or until it has lost its green colour.

It is added to the oil in the proportion of 1 to 12 by weight, and shaken occasionally until solidification ensues, or until it is evident none will take place, temperature and time required for solidifying being noted.

My experiments were conducted in 4 ounce glass stoppered bottles at a temperature of 13° C. After two hours they were stood in a cool place until next morning.

The elaidin test will detect adulterations in olive or almond oils of cotton, poppy, sesame, rape, colza and linseed oils. They all delay solidification or darken the colour of the resulting mass, or render it soft after about twenty-four hours' standing.

Olive.	Almond.	Castor.	Linseed.
Solid in an hour, clear yellow colour. Next morning quite hard.	Same as olive, but much whiter.	Very little effect.	Colour darkened considerably, but no solidification took place.

Valenta's Acetic Acid Test.—This test, as described in the *Journal of the Chemical Society* (vol. xlvii., p. 1078), consists of mixing equal parts of the oil under examination, and of glacial acetic acid, warming until solution takes place, or until the acid boils; then allowing to cool gradually, a thermometer being inserted, and the temperature noted when turbidity begins to take place.

The easiest way of allowing it to gradually cool is either in a water-bath, or an oil-bath; the latter being the better, as in the case of some oils turbidity begins at a temperature above that of a water-bath.

This test is but in its infancy, and hence must naturally be expected to have many little imperfections. Indeed, I find the same oil to become turbid at different temperatures during separate manipulations, and, therefore, do not think much reliance can be placed upon it at present, although with other tests it may be useful; it being in itself so simple and quickly applied. The following are the temperatures of turbidity:—

Olive.	Almond.	Linseed.
104° C	108° C	67° C

Castor oil entirely soluble at ordinary temperatures.

Bromine Absorption.—The power possessed by different oils to absorb bromine, forming bromo-additive compounds, was brought before the notice of analysts in 1857. It was not, however, put into practical use for the estimation of their composition until some time afterwards.

Mr. A. H. Allen has experimented upon numerous oils, to find out the extent to which they will absorb the halogens. He states that the acids of the acetic and stearic series do not combine with the halogens; the oleic and acrylic absorb two and the linoleic four atoms of bromine. Hence we must expect linseed oil to have large absorptive power; and so it has, as will be shown by the figures.

Mr. Allen first worked with solution of hypobromite; but Dr. E. J. Mills has devised another method, which supersedes the preceding, and hence is the one now used generally.

It consists of the use of free bromine in some good solvent without the presence of any water. Carbon disulphide was first tried and gave fairly good results; but subsequently carbon tetrachloride was employed, and found to be far superior in the results obtained: and from experiments with this later modification most of Dr. Mills's figures have been taken.

The following is, briefly, the method used.

The oil under examination is freed from all traces of moisture, by either warming, or filtering through broken up bibulous paper. A definite quantity is then dissolved in the solvent, and afterwards made up with more to about 50 c.c.

A decinormal solution of bromine in CCl_4 is made and run into the oil solution, gradually, with frequent agitation, until after standing a quarter of an hour there remains a permanent colour with bromine.

Excess of bromine is then estimated by retitration with a standard solution of beta naphthol; or by a colorimetric method which consists of taking carbon disulphide, equal volume to the oil solution, and titrating it with the bromine until the solutions are identical in colour; deduction, in each case, being made from amount added to the oil.

In the estimation direct sunlight is to be scrupulously avoided.

Am sorry I have not had time at my disposal for application of this test, so will quote the percentages obtained by Dr. Mills and Mr. Allen.

Olive.	Sweet almond.	B. almond.	Castor.	Linseed.
54·60	53·7	26·3	58·3	76

Maumené's Sulphuric Acid Test.—This test is described in the *Analyst*, 1881, page 102. It consists in mixing together the oil under examination and strong sulphuric acid, and noting the rise in temperature produced by the action.

Maumené's original paper was published in 1852. It recommended 50 grams of the oil to be put into an upright, narrow beaker, 10 c.c. of H_2SO_4 added, and the mixture then stirred with the bulb of a thermometer until temperature ceased to rise.

The subsequent improvements are only slight details in the method of manipulation, the chief being to bring the acid, of strength 1·84, and the oil both to the same temperature by immersing in water before mixture. The acid is then to be run in slowly from a pipette. The beaker to be put into a non-conducting medium, such as in cotton wool contained in a cardboard box. The stirring then to commence, and the original temperature deducted from the ultimate.

Mr. C. J. Ellis strongly recommends the oil to be mixed with some oil the rise of which is definitely known, and the figure of which is low ; always to mix in definite proportions, and thus prevent the temperature rising above 60° C. This, I find, is very useful in the case of linseed oil.

He also recommends this method as being useful in the estimation quantitatively of adulterations.

The test is a fairly reliable one, but still far from perfect.

The figures I obtained, the initiative temperature being 10° C., are—

Olive.	Almond.	Castor.	Linseed.
42	52	46	102

A further examination, which, in all probability, will become popular and useful, is the determination of viscosity of the various oils.

Mr. Boverton Redwood has brought it very prominently forward recently. I just compared the oils by means of an ordinary cylindrical pipette, filling it and noting the time it took to all run out ; the experiment was, however, too rudely performed to be worthy of figures, though satisfactorily conveying the impression of its future value.

I will now briefly refer to a few of the commoner adulterations, and the methods of detection.

The most useful observations to make in the case of olive and almond oils are the following :—

1. Specific gravity.
2. Amount of free acid present.
3. Amount of KHO required for complete saponification, less the amount to neutralize free acid.
4. Bromine absorption power.
5. Elaidin test.
6. Rise of temperature on adding 10 c.c. H_2SO_4, specific gravity 1·84 to 50 c.c. of the oil.

Adulterations in Olive Oil.—Those detected by the elaidin test I have already enumerated.

Sesame Oil, if present to the extent of 5 per cent.—Ten c.c. of the oil are to be shaken with 5 c.c. of HCl, containing ·1 gram of sugar in solution, when a rose colour is imparted, which separates on standing.

Cotton Oil.—Equal parts of the oil and strong nitric acid give, on shaking, a brown coloration.

Emulsion made of the oil with acetate of lead, on standing half an hour turns of a rose colour.

Castor Oil.—Shake with ten times its volume of rectified spirit and observe the solubility ; free acidity governs the amount of adulteration.

Linseed Oil.—Five c.c. of the oil with 2 c.c. of HNO_3 and a bright copper wire on shaking and standing tinge the copper red.

Blackened by HNO_3.

Boil with HNO_3 and allow the oily liquid to float ; gives a very dark colour.

Adulterations in Almond Oil.—The same tests are applied for the oils already mentioned in olive oil.

Peach Nut and Apricot Oil.—These are frequently sold as foreign almond oil.

I have mentioned the method of detection. Solution $ZnCl_2$ gives a green colour.

Fixed Oil from Bitter Almonds.—This oil constitutes a very large portion of almond oil of commerce ; it is peculiar in the absorption of bromine, the figures, as I have pointed out, being only about half those of oil of sweet almonds.

Adulterations in Castor Oil.—Castor oil is very different in quality according to the method of extraction ; it is, however, as sold by the retailer, seldom adulterated. Its high specific gravity, solubility in five times its volume of 90 per cent. alcohol and in glacial acetic acid, are the best characters on which to rely. If adulterated with "blown oil," which is a vegetable oil oxidized to about the same specific gravity, it can be detected by shaking with mineral oil, in which castor oil is insoluble, but blown oil is soluble.

Adulterations in Linseed Oil.—Cheap mineral oils.

These considerably influence the rise in temperature by mixing the oil with strong H_2SO_4.

They also require a larger amount of KHO for saponification.

They do not absorb so large a quantity of the halogens.

Before concluding I must express my thanks to Mr. J. Woodland, in whose laboratory many of these experiments have been conducted, and also to Mr. Burnett for valuable suggestions made during my operations.

The Chairman, in opening the discussion, congratulated Mr. Ellwood on the manner in which he had treated the subject, which he remarked was one entirely new to the Association, so far as he was aware.

Mr. Millard, after congratulating Mr. Ellwood on the paper, then criticised certain parts in detail, commencing by regretting that Mr. Ellwood had not pulled to pieces certain processes now in vogue for the examination of oils. He next referred to the sulphuric acid test for oils, and remarked that as the acid was generally taken from the laboratory bottle there was great chance that it might have absorbed some moisture, and from this cause the temperature might differ with the same oil using different acids. As to the elaidin test, as described by Mr. Ellwood, he preferred the modification proposed by Mr. Conroy about two years since, which consisted in heating nitric acid 1 part with 10 parts of the oil, which gave a similar result, and saved the trouble of making the reagent. He also considered that a standard temperature and time should be worked out and fixed for the application of this test. In his own experience Mr. Millard had found that the amount of free acid present had a considerable influence on the specific gravity of samples, and that the amount present varied from 1 to 25 per cent. He went on to advocate the insertion in the B.P. of nitric acid as a test for pure oil, as the reactions with it were so definite. In conclusion, he referred to plumbic acetate as a test for cotton seed oil in olive oil, and stated that in his hands it had afforded useful results.

Mr. MacEwan remarked that the examination of oils had not attracted much attention on the part of pharmacists, but was chiefly carried out by soap makers. The HCl and sugar test for sesame oil, he had understood previously, would detect as small an amount as 1 per cent., but Mr. Ellwood stated that it was not serviceable with less than from 3 to 5 per cent. Then it struck him as rather a weak point in the paper, that the application of the tests to mixtures of oils was not shown, as certain

of these might frequently cause the test to fail. His friend, Mr. Maben, who had made many experiments in application to practical purposes, used to say that many of these new tests were so much humbug, and that no one without much experience could detect slight admixtures in oils. He considered that Mr. Ellwood had rendered a service to pharmacy in reading his paper.

Mr. Farr said in reference to the free acid present in oils in his experience he had frequently found it consisted chiefly of the higher fatty acids, but then that it was a difficult matter to say in all cases.

The Chairman asked Mr. Ellwood if he could not give any practical tests which might be applied to oils when required for special purposes—emulsions, for instance, as he found oils differed very much in the results they afforded.

No other points being raised, Mr. Ellwood then replied. With regard to the H_2SO_4 test, that a standard acid must be used, and he had used an acid of specific gravity 1·84 invariably, and found it to give constant results. He had also tried an acid of specific gravity 1·76, but with this variable results were obtained. As to the elaidin test, he preferred the test as described in his paper to Mr. Conroy's modification mentioned by Mr. Millard, and said the reagent was not difficult to make, and kept fairly well. He agreed with Mr. Millard that the amount of free acid in an oil influenced its gravity, and stated that these two points formed a good criterion of the quality of a sample of oil. Also as regarding nitric acid as a test for oils, he would certainly advocate its introduction into the B.P. The lead acetate test for cotton seed oil he found would not detect much less than 5 to 10 per cent. of that adulterant. The rose colour produced by HCl and sugar would not, in his experience, appear if less than 2 per cent. of sesame oil were present, and above 10 per cent. the colour did not become much deeper as the proportion of adulterant increased. He was quite prepared to agree with Mr. Farr that the free acid was generally composed of the higher members, not only oleic, but seeing that the proportion of free acid was so small the difference in molecular weight would not appreciably affect the titration. As general tests, he would recommend the elaidin, nitric acid and free acid ones as being easy of application. Any oil containing much free acid would not be suitable for an emulsion. The sulphuric acid test of the rise in temperature was a fair one for quantitative purposes, but it was necessary to know what adulteration was present, then a calculation could be made.

The President next said that a new programme would shortly be issued for the next half of the session.

Parliamentary and Law Proceedings.

The Pharmaceutical Society of Great Britain *v.* Hull.

On the 16th inst. at the County Court, Sunderland, before his Honour, Judge Meynell, the Council of the Pharmaceutical Society of Great Britain sued Robert S. Hull, of 19, Church Street, Monkwearmouth to recover two penalties under Section 15 of the Pharmacy Act, 1868.

Mr. F. T. Greenwell appeared for the Council, and Mr. J. Robinson appeared for the defendant.

Mr. Greenwell said that the defendant kept a shop in Monkwearmouth, at which he sold poisons, and that in business he used the label of a registered person with the title "Pharmaceutical Chemist." He had consequently incurred a penalty of £5 for keeping open a shop for the sale of poison, and a further penalty of £5 for using or exhibiting the title of pharmaceutical chemist.

T. W. Stroud proved that on September 17 last, he purchased at defendant's shop some laudanum and opodeldoc, which was labelled "William Fowler, Pharmaceutical Chemist."

Mr. J. Pattinson, Public Analyst for Newcastle, proved that he had analysed the contents of the bottle handed to him by the last witness, and found it to contain laudanum.

Mr. William Fowler was called, and proved that he sold the business to defendant two years ago, and that he had no interest therein. He had himself warned defendant against selling poisons and using the title.

On the part of the defendant, it was contended that inasmuch as Mr. Fowler's name appeared on the labels, and that defendant had not, in conjunction with his own name, used the title pharmaceutical chemist, and in his business employed a qualified assistant, there was not sufficient ground to justify a prosecution.

His Honour thought the case proved, and found for the plaintiffs for £10 penalties, with costs on the higher scale.

Prosecutions under the Medicine Stamp Act.

On Tuesday last, at the Bow Street Police Court, Mr. T. Whales, chemist, of 41, London Road, S.E., appeared before Mr. Vaughan, in answer to three summonses taken out by the Commissioners of Inland Revenue for selling certain proprietary medicines without having the proper stamp on them.

Mr. Alpe, who appeared for the prosecution, said the information was laid under the 15th George III., c. 150, and the Commissioners of Inland Revenue claimed that the particular medicines now in question were rendered liable to duty by the general words which were found in the Schedule at the end of the Act. Mr. Whales was charged with having sold "gout and rheumatic mixture," "gout and rheumatic pills" and "neuralgia elixir," which were clearly specific names, and came within the words of the Act, and, consequently, liable to stamp duty.

Mr. William Frost Speers, an officer of the Inland Revenue, Somerset House, deposed that he called at the defendant's shop on November 17, and purchased a bottle of Whales's Gout and Rheumatic Mixture. A handbill was given to him, which he now produced, and there was a label on the bottle. The bottle was in the same condition now as when it was handed to him. He produced the handbill in which the bottle was wrapped. On the same day he bought a box of Whales's Sugar-Coated Gout and Rheumatic Pills. A hand billwas also given to him, which he produced.

Mr. Alpe said he contended that the words upon the label brought the article within the description of "specific or proprietary." Attention was also called to a handbill in which the words "the undermentioned proprietary articles" appeared above a list in which the names of the articles that were subjects of the summonses were included.

The witness said that on November 18 he purchased a bottle of neuralgia elixir, which was also wrapped in a handbill. He paid 9*d.* for the mixture, 6*d.* for the pills, and 6*d.* for the elixir.

Cross-examined by Mr. Whales: He purchased the articles upon his own instructions and bought them upon the chance of their being proprietary articles. He was not told to buy any particular articles. His impression was that the medicines were liable to the duty by the recommendation on the top of the handbill. He did not think that the same recommendation applied to all the other articles.

Mr. Alpe submitted that the question for decision was one of law, and that it was a waste of time to go into these questions.

Mr. Vaughan said questions with regard to facts might be put, but not with regard to the reason for purchasing the article.

The Defendant said he had no other questions to ask as to facts, but he thought that by pursuing the cross-examination it would save going over the ground again for the defence.

Mr. Vaughan said he had better hear what the defence was.

The Defendant said the defence was this, that the Act was written as plainly as it possibly could be. There could

be no mistake if a man followed out the injunctions of the Act contained at the end of the Schedule. The words were so plain that no inference, he contended, should be drawn from them ; they must be construed strictly. The liability depended upon the answers to the questions; first, Does the person making any of the articles claim any occult secret or art in preparing the same? To that he answered, "No," and no evidence had been given about it. Secondly, Is it a proprietary article?—that was to say, according to the definition of "proprietary." Not a tittle of evidence had been offered in support of that contention. The third question was, Had the medicine ever been patented? Of course there was no question as to that. The fourth question was, Had it ever by a written or printed document been recommended for the relief, cure or prevention of any disease? He contended that the articles had never been recommended for that purpose. The small handbills said, "popular preparations sold at popular prices," but underneath that there were the words, "the undermentioned proprietary articles are guaranteed to be equal, and in many cases superior to others at the same prices," and his contention was that the words, "undermentioned articles" would not refer to all the articles on the list, such for instance as the golden hair dye, nursery wash, etc. No stretch of imagination could bring those articles within the range of proprietary medicines ; the words merely referred to certain articles. The common sense view of the sentence proved that. If it did not apply to every article, what did it apply to? To certain articles undermentioned which were proprietary articles and stamped as such. It was straining the expression in its literal meaning to say that it applied to everything on the list. No evidence had been brought forward to prove that gout and rheumatic mixture was a proprietary or specific article ; it was not stated to be for the cure of any disease, or prepared only by himself. Neither did he pretend to any secret in making the same, so that he could not see that it was necessary for him to deal further with that case. With regard to the expression at the bottom of the large bill, to the effect that sugar-coated pills by the process which T. Whales had invented, enabled him to guarantee that the pills were not only rendered tasteless, but their freshness and efficiency were retained for any length of time, he might say that he claimed to have invented a certain process of coating pills with sugar, but there was no secret in it. The mere fact of announcing to the world that the pills were coated with sugar, proved that there was no secret in the process. The expression which the prosecution seemed to rely upon was, "Whales's sugar-coated pills," and the words that Whales's pills were better than others, admitted that other people did make that sort of thing. If a tinker claimed that Smith's tin pots were better than anyone else's, that would not be saying that Smith was the only maker of tin pots. He need hardly say that this was the first prosecution that had been instituted against him, although the Commissioners had once brought an action against him in the Queen's Bench Division, which they did not go on with. His opinion was that it was more persecution than an attempt to further the ends of justice. Unless the exact words in the Act were adhered to, chemists would be landed in all sorts of absurdities. The prosecution might say that gout and rheumatic mixture was for the cure of gout or rheumatism, but it would equally be so if he were to sell it without putting any label at all on the bottle, which he was quite entitled to.

Mr. Vaughan said he had paid considerable attention to what had been said by the defendant with regard to the Act, but he was perfectly unable to agree with his argument, and certainly not with his conclusions. Amongst other things he stated that these were not proprietary articles. At all events they must be taken to be articles which had been prepared and sold by the defendant, the money obtained from the sale of which had gone into his pocket. For the most part they were known as "Whales's medicines." It was very difficult to see with those elements of proprietorship how it could be contended that these preparations might belong to someone else, and were sold for someone else's benefit. It seemed perfectly clear, looking at the fact that they were purchased at the defendant's shop, that they bore his label, and the money was received by him for them, that he was the proprietor of the medicines. Another contention raised on the part of the defendant was that because the general memorandum at the top of the bill referred to other preparations than those for which he was summoned, therefore it could not be taken to be a recommendation of the article in question. But those words must be taken distributively. The statement or memorandum or information at the head of the paper was to be taken as though it were repeated before or against every one of the preparations. If he went on the general heading alone that would be quite sufficient, as the defendant guaranteed the articles. As to the gout and rheumatic mixture there was a statement, because it was said the mixture was recommended for its speedy and beneficial results. Looking at the language of the section it was impossible to contend that the articles in question did not bring the defendant, as the vendor, under the provisions and words of the Schedule. There could be no question about that, as directions were given upon the label on the mixture, and it was stated that it had speedy and beneficial results. The same remark applied to the neuralgia elixir. The penalty for selling any one of these medicines without complying with the provisions of the Act of Parliament was £10, but he was much inclined to think that the defendant had been deluding himself with the belief that he could evade the provisions of the Act by selling these things, and simply putting, as it were, a general statement at the head of the paper, which included other things besides medicine. The better course, he thought, would be to impose one penalty with regard to the mixture, and order the defendant to pay the costs of the other summonses. He did not know whether the defendant had sold the pills and medicines for any length of time.

Mr. Alpe said the defendant was a rather obstinate man, and had his own ideas about this question. The Commissioners did not impute any fraudulent intention, and if they could get some satisfactory undertaking from him they did not wish to press for heavy penalties.

The Defendant said he was willing to enter into communication with the Commissioners, and to let them make what arrangements they liked for the future.

Mr. Vaughan said it would make a difference with regard to the penalty if the defendent, instead of being obstinate and determined to sell the medicines, would promise not to sell them as he had heretofore done.

The Defendant said he would unreservedly promise to comply with the wish of the authorities.

Mr. Vaughan said, that being so, he imposed a penalty of £5 on one summons, and ordered the defendant to pay the costs of the others.

The Defendant asked that the penalty might be reduced to £1, which was the sum usually inflicted in an aggravated case.

Mr. Alpe did not know that the defendant was in a position to say what penalty was usually inflicted, as he had never been fined before.

Mr. Vaughan pointed out that he might impose a penalty of £10 in respect of each summons, but he thought the justice of the case would be met by imposing the penalty which he had already mentioned.

Mr. Henry Cooper, Chemist, of 24, Greek Street, Soho, and 29, Little Newport Street, was summoned for having sold eight bottles of medicine, unstamped, which were liable to duty.

Mr. Alpe appeared in support of the summonses, and Mr. Clare defended.

Mr. Alpe said the defendant was summoned for having

sold "pectoral cough mixture," which was described as a "truly efficacious medicine, as proved by many years' experience," an "anodyne mixture," which was held out as being "good for diarrhœa and cholera," and an "odontalgic essence" which "gives instantaneous relief." It appeared that Mr. Cooper stamped some of the anodyne mixture, the practice being to sell the mixture with a certain amount of discrimination, and he should prove that the assistant who sold one bottle of the mixture was at first going to sell it without a stamp, but changed his mind and sold a bottle which was properly stamped.

Wm. Frost Speers, examined by Mr. Alpe, deposed that on October 28 he went to the defendant's shop, at 29, Little Newport Street, and purchased a bottle of pectoral cough mixture. He noticed some bottles of medicine exhibited in the window which were unstamped, among others being the cough mixture. On the 29th he purchased a bottle of odontalgic essence which was advertised on the circular wrapped round the cough mixture. On this occasion he noticed some bottles of anodyne mixture stamped and unstamped. He asked for a bottle and the assistant was about to hand him an unstamped one when he withdrew it and handed a stamped one On October 30 witness purchased an unstamped bottle of anodyne mixture. On October 29 he purchased at 24, Greek Street, two bottles of odontalgic essence, one being wrapped in a circular relating to the cough mixture. On the 30th he purchased a bottle of pectoral cough mixture and a bottle of anodyne mixture, both being unstamped; 1*s.* was charged for the mixture and 3*d.* and 6*d.* for the odontalgic essence. On the cough mixture a red ticket was pasted over the bottom of the label; the ticket was put on before the bottle was handed over. He noticed bottles in the window without the red ticket. The red ticket covered the recommendation.

Cross-examined by Mr. Clare: His duty was not to act as spy on the chemists of London, but to get in the Inland Revenue. He received part of the penalty in the cases he proved.

Mr. Clare observed that the red ticket had been placed on the label at the suggestion of the Somerset House authorities with a view to avoid any question of liability, and how a bottle came to be sold without the ticket was a mystery to the defendant.

Mr. Alpe could not admit that the authorities had suggested that the ticket should be put over the directions.

Mr. Clare said he would read the letter. The defendant had instructed his assistants to cover up the words complained of with the red ticket.

Mr. Vaughan said there appeared to have been a double mode of carrying on business: sometimes the bottles were sold stamped and sometimes unstamped; sometimes the recommendation was covered over with red paper, and at other times it was not. At least that was the evidence.

Mr. Clare contended that if the recommendation was covered with a red label the defendant was in no way liable.

Mr. Vaughan could not see the use of having the words on the label at all, if a red ticket was to be pasted over them.

Mr. Clare replied that the labels having been printed they did not wish to waste them.

Mr. Vaughan thought that the cost would not be very great for printing fresh labels.

Mr. Clare could not resist the evidence that a bottle had been produced by the witness which did not bear a red ticket. With regard to the odontalgic essence, he pointed out that the words on the circular which were complained of were not on the circular now issued by the defendant, and he could only imagine that an old circular had been obtained by the witness.

Mr. Vaughan had not the least doubt that at the time the bottle was sold, the other circular was made use of.

Mr. Clare said he would call the person who sold the article to prove the contrary.

Witness stated that at the time he purchased the cough mixture the wrapper was wrapped round it.

Mr. Vaughan considered that so far as the anodyne mixture was concerned, he doubted whether there was a case against the defendant. It required some knowledge of Greek to understand the meaning of the word "anodyne."

Mr. Alpe said he attached importance to the use of the word "anodyne," and he hoped the magistrate would hear him before deciding the point. The same remark might apply to the word "odontalgic."

Mr. Vaughan thought it would be better to deal with the other two articles.

Mr. Clare admitted that if the words complained of were upon all the bottles the defendant would be liable; but this was not so, and Mr. Cooper was astonished to find that a bottle bearing the words had been sold. Placing a cover over the recommendation was a compliance with the Act of Parliament. Mr. Cooper had been anxious to comply with the provisions of the statute, and in 1885 he wrote to the Commissioners asking what would secure him, and they replied that "Cooper's cough pills, and Cooper's cough mixture are rendered liable to stamp duty by the hand bills which hold them out as proprietary medicines. If you describe an article as cough pills, for example, prepared by Cooper and Co., the Commissioners do not insist on the payment of duty, although, in strictness, such an article might be considered liable; but any addition to the description, or any further recommendation of the articles in any way whatever, would deprive you of the benefit of this liberal interpretation of the law."

Mr. Vaughan considered that if the defendant had followed this advice, he would have been perfectly safe. Persons were not content with putting their name on the article; they put on words puffing it, and thus rendered themselves liable.

Mr. Vaughan said he should impose a penalty of £5 in respect of the cough mixture, and 20*s.* for the odontalgic essence, and order the defendant to pay the cost of the other summonses.

Mr. Alpe contended that the anodyne mixture was clearly within the words of the section.

Mr. Vaughan replied that he did not dismiss the summons as to the anodyne mixture, but imposed the costs upon the defendant, believing that it would be a caution to him.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

The Medicine Stamp Act.

Sir,—We enclose you copies of correspondence which have passed between ourselves and the Inland Revenue.

"75, Back Piccadilly, Manchester,
"*November* 23.

"To the Solicitor of Inland Revenue.

"Sir,—We beg to acknowledge the receipt of your notice, dated November 19, 1886, in reference to our 'Towle's chlorodyne lozenges and jujubes,' in which you state that we are liable to two penalties of £10 each for selling a sixpenny box of each without first affixing a stamp thereon; also asking for an explanation, if any, with the view to induce the Commissioner of Inland Revenue either to forego the proceedings or mitigate the penalties.

"In reply, we beg to state that we had no desire to evade what is legal or right towards the Inland Revenue, but believed we had always, so far as we were aware, kept strictly within the law as to the sale and recommendation of these by any advertisements, handbills, etc.

"We take this opportunity of stating that our principal sale of them is in bulk, and herewith enclose samples of the labels affixed to the 1 lb., 2 lb. and 4 lb. bottles before sending out. The said Towle's chlorodyne lozenges and jujubes are sold by the ounce retail by chemists, etc., without label or printed matter.

"We should feel obliged if you would kindly point out—

"1. What constitutes the liability of our boxes of lozenges and jujubes.

"2. If the lozenges be so, would the liability apply to those sold in bulk by us to the trade?

"3. Will the retailer be rendered liable for selling these over the counter by the ounce without label or printed matter?

"We trust you will take a liberal view of this matter, as no offence was intended.

"As your reply will affect a large number of tradesmen throughout the country, who adopt the same course as ourselves in the stamping and sending out of lozenges, etc., their own and others, we should be glad of a reply which would help the trade on this point, to be published in the trade journals if any change is necessary.

"Should your objection be to the word 'Towle's,' would it make any difference to put Chlorodyne lozenges, Towle or Towle's? The registered name of our preparation is 'Towle's Chlorodyne.'

"Thanking you for the courtesy of your notice, and trusting to receive a favourable reply,

"We remain, Yours faithfully,

"A. P. TOWLE AND SON."

Reply from

"Solicitor's Department, Somerset House,

"*November* 26, 1886.

"Gentlemen,—The Commissioner of Inland Revenue has considered your statement herein, and has been pleased to mitigate the penalties incurred by you to the sum of £3.

"The boxes of 'Towle's Chlorodyne Lozenges' and 'Towle's Chlorodyne Jujubes' that you send out to retailers should bear the proper medicine duty stamp according to price, and the lozenges and jujubes may then be sold by the retailers without payment of further duty, providing they are merely wrapped in paper, and not enclosed in a box, bottle or packet.

"The liability to duty of the medicines is caused by the claim of proprietorship and by the recommendations contained in your handbills and advertisements.

"Your obedient servant,

"W. H. MELVILL,

"*Solicitor of Inland Revenue.*"

It is a point worth drawing special attention to, that our recommendation was not contrary to the wording of the "Act," viz., "for the prevention, cure or relief of any complaint, disorder," etc., but only an implied recommendation, viz:—"Clergymen, Public Speakers and Singers will find the Lozenges and Jujubes invaluable; also for night use, Damp and Foggy Weather." In compliance with the above, all our Chlorodyne Lozenges and Jujubes—retail sizes and in bulk—will in future bear Government Stamp with the Proprietor's signature on it.

A. P. TOWLE AND SON.

TINCTURE OF STROPHANTHUS.

Sir,—Mr. Martindale has done wisely to recommend that tincture of strophanthus should be made of less potency than the 1 in 8 preparation referred to Dr. Fraser, whose formula, as originally published by Messrs. Burroughs, Wellcome and Co., he follows in all other respects.

To my mind it is doubtful whether Mr. Martindale would not have been wiser had he gone farther still in the same direction, and recommended an even weaker tincture than 1 in 20. Except in perhaps a very few instances, highly concentrated preparations with a very small dose are disadvantageous to prescriber, to patient, and especially to pharmacist. I shall not propose a weaker tincture of strophanthus, but perhaps the British Pharmaceutical Conference Committee will allow due weight to this consideration when constructing a formula.

With regard to the removal of some of the activity of strophanthus seeds by preliminary percolation with ether, I may say that, in October last, I made an experiment bearing on this point. The ethereal extract from 20 ozs. of strophanthus was agitated with acidulated water until the washings ceased to give alkaloidal indications with Mayer's reagent. The washings, agitated with excess of ammonia and ether, gave on the evaporation of the ethereal solution a residue weighing 0·988 of a grain—no very great loss from 20 ounces. The residue was a pale lavender colour, and curiously enough became green on addition of a dilute acid. Even the small quantity obtained was contaminated, therefore, with the colouring matter of the oil, which, by the way, is not chlorophyll, at least not all of it.

JOHN MOSS.

15, *Laurence Pountney Lane, London, E.C.*

UNG. HYDRARG. OX. RUBRI, P.L.

Sir,—Anent the non-keeping properties of this ointment as P.L., which I noted at a recent sessional meeting of the Liverpool Chemists' Association, it is quite refreshing to find so able and prominent a member of our trade—or rather, as now understood, profession—as Mr. Groves, of Weymouth, not only taking notice of my little inquiry, but also pointing out (*Pharm. Journ.*, December 11) most clearly and satisfactorily a complete remedy; and for which I personally feel much obliged, and hereby beg to thank him. Although a continuous "retailer" now for something like forty years, I freely admit that the two little wrinkles which Mr. Groves points out, viz., the essential oil and degree of fineness in powder of the HgO, seemed quite new to me. His paper on the "Rancidity of Fats," which was read at the first meeting of the British Pharmaceutical Conference, Bath 1864 (*Pharm. Journ.*, 2nd series, vol. vi.), I should peruse at the time, but memories are often porous, and I had quite lost sight of the matter. I have now, however, gone carefully through it, and must say it has given me considerable pleasure and satisfaction. The allusion to "Old Wife's" tale, about the necessity of lard "coming to the boil" to make it keep, amused me very much; as only last week my venerable housekeeper was "rendering" some for domestic use, and she reminded me that "it is essential to boil it a little." In regard to the HgO, my rule all along the line has been to have it as fine as possible; but seeing that a consideruble portion of the ointment is wanted for the eyes, I shall now be inclined to adopt Mr. Groves's plan, and also aromatise the lard when used.

RICHARD PARKINSON.

LINIMENTUM TEREBINTHINÆ.

Sir,—I should like to ask through your columns whether such an alteration in lin. terebinthæ as Mr. Conroy suggests would be justifiable in dispensing. I have found the addition of two ounces more water make a very satisfactory emulsion. But should we stick to B.P. formula for the sake of uniformity, from which I can make nothing but a soft gelatinous mass?

INQUIRER.

Sir,—There has been a large amount of correspondence respecting lin. terebinth., but I should be glad to know whether the authorities intend a solid or a liquid, as we find it is sometimes sent out in one form, sometimes in another.

W. F. G.

Sir,—Seeing Mr. Conroy's note on linimentum terebinthinæ, B.P., in a recent Journal, I send you my experiences of the preparation; perhaps they will be of use to some in the same position as myself. About a month ago I had occasion to make some, and following the B.P. directions and quantities, continuing the rubbing throughout the entire addition of the camphorated turpentine, I obtained the jelly-like emulsion. Having, however, been accustomed to see the liniment dispensed as a liquid emulsion, I tried another quantity, still adhering to the B.P. proportions, but instead of adding the last two ounces of turpentine to the liniment in the mortar I transferred the contents of the mortar to a wide-mouthed bottle, added the remaining turpentine and thoroughly incorporated by shaking. By this means I obtained a splendid liquid emulsion and, having kept same as a sample, I find it remains in a perfectly good condition and with no appearance of separation.

Preston, Brighton. A. A.

K.—See a paper by Professor Redwood on "The Preparation of Lard," in the *Pharmaceutical Journal* for November 10, 1883.

T. Stokoe.—We are unable to supply you with the name and address asked for.

G. F. Stephens.—The prospect of inducing Parliament to pass a Bill containing such a clause as that suggested by you is so remote as to be at present outside the range of practical politics.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Brown, Major, Chaney, Smith, Elborne, Bell, Stephens, Thonger, Assistant, Metabolism, K.

THE CHEMISTRY OF THE ANCIENT EGYPTIANS.

The chemistry of the ancients is known to us principally through some articles upon materia medica, mineralogy and metallurgy by Theophrastus, Dioscorides, Vitruvius and Pliny the elder. The only amplification of this information hitherto afforded has been yielded by the analysis of trinkets, pigments, enamels and vitrified and ceramic products found in the débris of ancient civilizations. Egypt, in particular, though associated by tradition with the origin of alchemy, and reputed also to have been the source of much of the learning of the later alchemists, had not until recently contributed any genuinely ancient hieroglyphic writing relative to the mysterious operations by which it was pretended that the transmutation of matter was effected. The publication therefore, at Leyden, of the text of some authentic papyrus documents, dating back to the third and fourth centuries of the Christian era, and containing, among other information, a number of chemical, alchemical, and metallurgical receipts, is an event of considerable interest. Not only has the text of these documents been published, but the portion specially interesting to modern chemists has been made the subject of an exhaustive commentary, from the competent pen of M. Berthelot, which appeared in the September number of the *Annales de Chimie et de Physique.*

The documents referred to are three in number, and are distinguished as Papyrus V., Papyrus W., and Papyrus X. They appear to have been preserved at Thebes, probably in a tomb, or more exactly in a mummy, and in the opinion of M. Berthelot they constituted the notes of a dishonest metal worker and charlatan magician. Papyrus X. is devoted to receipts more or less connected with chemistry and alchemy, of which there are 101, followed by 10 articles extracted from Dioscorides. The papyrus is believed to have been written as far back as the latter part of the third century, and is probably similar to those old Egyptian alchemical books upon gold and silver, which were burnt by Diocletian about the year 290, in order that the Alexandrians should not profit by this art and draw from it the wealth that would enable them to revolt against the Romans. The systematic destruction of such documents is attested by Procopius and other Byzantine historians, and was in conformity with the practice under the Roman law in respect to books on magic, which led to the loss of many scientific works.

The information contained in the escaped papyruses closely resembles that given by Dioscorides and Pliny upon the mineralogy and metallurgy of the ancients, so that many of the receipts probably reach back at least to the commencement of the Christian era, and as technical processes are frequently transmitted from one generation to another, it may be that some are much older. What is equally interesting is that M. Berthelot believes these ancient documents furnish evidence that the hopes and doctrines of the alchemist relative to the transmutation of metals were born of the practices of Egyptian goldsmiths in imitating and debasing the precious metals. Commencing with fraudulent practices with the intent to deceive others they appear to have succeeded so well as eventually to have fallen under the illusion that with the aid of some mysterious rite their debased alloys actually were converted into the metals which at first they were only intended to simulate. However this may be, it is pretty clear that the artisan who compiled these receipts was under no such delusion, and that in attaining his ends he in many cases followed processes that had more than a passing resemblance to those still adopted for similar purposes several centuries later. The receipts and the detailed commentary upon them by M. Berthelot are far too lengthy for quotation in their entirety, but the instances mentioned in the following paragraphs will give some idea as to their nature.

Papyrus V.—This papyrus is devoted principally to magic formulæ, but among them is one for a writing ink. It consists of "misy" (basic sulphate of iron mixed with sulphate of copper), 4 drachms; green copperas, 2 drachms; gall nuts, 2 drachms; gum, 3 drachms. To these is to be added 4 drachms of a "mystic ink," manufactured in an unspecified way from "the seven perfumes and the seven flowers" that appear to have been specially associated with magic formulæ. From Papyrus W. it appears that the "seven perfumes" were styrax, consecrated to Saturn; "malabathrum," to Jupiter; costus to Mars; olibanum, to the Sun; Indian nard (rhizome of *Nardostachys Jatamansi*), to Venus; cassia to Hermes; and myrrh to the Moon. The "seven flowers," according to Manetho, quoted in the same papyrus, were the common marjorum, lily, lotus, "eriphyllium," narcissus, white violet and rose. These were to be brayed together in a white mortar twenty-one days before the ceremony in which they were to be used and then dried in the shade.

In this papyrus there is also a receipt for the refining of gold, which was a process of cementation, and consisted essentially in roasting the gold with salt and ferruginous sulphate of copper. Pliny* gives a similar receipt, but adds that the ash was used as a medicinal remedy. This ash would apparently have consisted mainly of chlorides and oxychlorides of the foreign metals, and M. Berthelot thinks it may possibly have contained a minute quantity of a gold salt in the form of a double chloride.

Papyrus W. contains exclusively formulæ relating to magic, but it presents one point of interest in the use of words that may be rendered "tetragonal nitre," as the designation of a material used for writing on with the magic ink before referred to. Neither saltpetre nor sodium carbonate would answer to this requirement, and M. Berthelot is of opinion that the designation was applied to some moderately hard insoluble substance, such as calcspar or felspar.

Papyrus X. is more specially chemical and metallurgical. It bears witness to a very advanced and subtle knowledge of alloys and metallic colourings, which found its application not only in legitimate ways, but also in the fraudulent debasement of gold and silver. Many of the practices described in this papyrus are identical with those of the older alchemists, though free from the mystic trappings of the latter, a fact which has an important bearing on the origin of alchemy. The papyrus consists of ten large leaves, about 12 inches by 14, folded in two; there are sixteen pages

* 'Hist. Nat.,' l. xxxiii., 25.

of writing, varying from twenty-eight to forty-seven lines, written in the Greek capitals of the latter part of the third century. It contains altogether 111 receipts of different dates, many of them being more or less repetitions, huddled together without any attempt at arrangement, and frequently disfigured by stupidities and orthographical and other grammatical faults. It bears the stamp of great genuineness, being without a shadow of charlatanism, notwithstanding the professional dishonesty of many of the receipts, and appears to have been the working note-book of an artisan in the precious metals, who also perhaps practised a little dyeing of the more valuable stuffs.

In the first place there are no less than fifteen receipts for inks for writing in gold, showing that there was a close connection between the calling of the worker in precious metals and that of the hierogrammate, or sacred scribe, whose business it was to trace characters in gold or silver on monuments of marble or other stone as well as in books of papyrus or parchment. In fact the receipts given in this papyrus for the gilding of metal work are many of them the same as those for writing in gold. They show that in the third century, as now, the name "gold" was loosely applied not only to the pure metal, but to alloys of all degrees and even to mixtures that had nothing in common with gold but the colour. Thus the "gold" inks include gold leaf triturated with honey and gum ; gold amalgam with and without gum ; alloy of gold and lead variously treated ; yellow oxide of lead mixed with alum and suspended in dove's dung and vinegar ; mixtures having orpiment for their basis ; copper made to resemble gold by washing with an infusion of "cumin ;" and carthamus florets and tortoise or calf's gall. Even an ink of "asem," an alloy of silver and gold, had its imitation in one of copperas, sulphur and vinegar, from which both the precious metals were therefore absent.

Closely allied to the foregoing are receipts for gilding, silvering, tinting and colouring metals superficially. Two of these describe a treatment of steeping that would appear to have had for its object the removal of base metal from the surface of an article made from an alloy, so that the exposed parts might consist only of gold, and there are others designed to effect the same object by a process of cementation. Then there are some processes of actual gilding, one of which is remarkable for the absence of mercury, a circumstance that, in M. Berthelot's opinion, may indicate that it had its origin before mercury was known, although a knowledge of that metal reaches back to at least five centuries before the Christian era. The process consists in coating the article, such as a ring, with a paste made by incorporating with gum a mixture of gold and lead, submitting the article to heat and repeating the operation until the result is satisfactory. The treatment is then, the receipt goes on to say, difficult of detection, as the heat consumes the lead, but not the gold. In fact it is to be feared that deception was the order of that day in the metal craft, the reader being assured in another case of silver gilded by means of gold leaf and mercury that the article will stand the ordinary test for gold. Other receipts are avowedly only intended to give the appearance of gold, among which may be mentioned one containing realgar, cinnabar and "misy" (basic sulphate of copper and iron). A gold varnish for application to metal objects after they had been passed through the fire consisted of lamellous arsenic, copperas, a sulphide of arsenic, mercury, tragacanth and arum pith in equal parts suspended in goat's gall. The agents for "silvering" copper that are mentioned include mercury, an amalgam of tin, and a process in which the whitening of the metal was effected by means of arsenic.

One name that appears repeatedly in the receipts is "asem," which has been identified as having been originally a synonym of "electrum," a designation applied to an alloy of gold and silver that occurs in nature. This alloy was long regarded as a distinct metal, comparable to gold or silver, and it is referred to side by side with them upon the Egyptian monuments. It was consecrated to Jupiter, but this place was afterwards filled by tin, probably when the true nature of asem became better understood. Meanwhile its apparent behaviour evidently gave rise to a deal of mystification. It differed considerably in the proportion of gold and silver it contained, and seemed therefore to vary in its properties ; but probably what brought it most reverence was the fact that according as it was treated it seemed to be convertible into gold or silver. It is easy to see how this favoured the belief in the possibility of the transmutation of metals. In fact, native asem, and afterwards an artificially produced alloy of gold and silver, evidently played an important part in the "diplosis" of gold, which was the euphonious term applied to the increasing of its bulk by the introduction of less valuable metal. It may be that at first this process was hardly open to the charge of being wilfully fraudulent ; for M. Berthelot thinks he can detect evidence that "asem" was looked upon as a kind of metallic ferment, and it is curious to note that nearly all the receipts for the artificial manufacture of asem provide for the introduction of a piece from a previous making, just as a piece of "sour dough" is used to start a fresh fermentation in bread making. But however this may be, the "diplosing" material was, at the time these receipts were collected, evidently not only itself subjected to "diplosis," but to the worse fate of entire substitution. By that time the name covered a large variety of compounds, and among the receipts for asem given are some for alloys of silver and tin, silver and lead, silver, tin and copper, and other alloys and amalgams into which neither gold nor silver enter as an ingredient. There is one consisting of silver, tin and copper, that is recommended as yielding an asem preferable to the real article. There are also receipts for making black asem, which seems to have been comparable to what is known as oxidized silver.

One more article that is the subject of a receipt is worthy of mention, and that is ὕδωρ θεῖον, sulphur water or *eau divine*. This preparation was credited with very wonderful properties by the alchemists, who played continually upon the double meaning of the name. It was also called by them "serpents' gall." In this papyrus it is ordered to be prepared by heating a handful of lime and a handful of sulphur, in fine powder, together with strong vinegar or the urine of a child, until the supernatant liquor appears like blood, and then decanting the liquor from the sediment. In this way a solution of polysulphide of calcium would be obtained that could be turned to many purposes by the metal worker and chemist.

THE USE OF MAGNESIA IN MAKING SOLUTIONS OF ESSENTIAL OILS.*

BY E. B. SHUTTLEWORTH.

Whatever doubt there may be as to the propriety of the practice, the fact remains that the use of certain absorbent powders, for promoting the solubility of essential oils and kindred substances, is very general with pharmacists and others engaged in like manipulations. This expedient has received the sanction of numerous authorities, including some of the pharmacopœias, and though the use of magnesium carbonate for the preparation of medicated waters has been discarded by the U.S.P. on the ground of the solubility of the salt in an aqueous menstruum, recourse is now had to cotton wool, which produces results very similar in character.

The manufacture of soluble essences, as that of ginger, gave a fresh stimulus to solution by intervention, and also brought closer the conclusion to which it is the object of the writer to direct attention. The experiments of Thresh, Sheppard, Creuse and others, clearly show that though by the use of absorbent substances it is possible to produce a clear and miscible essence, it is always at the expense of some of the flavouring or odorous principle.

The substances which have been employed for the purpose indicated are magnesium carbonate and oxide; calcium phosphate, hydrate and sulphate; talc, fullers' earth, pumice, charcoal, paper pulp, and cotton wool. Solutions of potassium hydrate and carbonate, the latter in the form of oil of tartar, have also been recommended, more especially for the preparation of soluble essences.

The action of the alkaline compounds is not to be attributed to the same causes as that of chemically inert substances, while magnesium carbonate partakes of the character of both classes. Its formula,

$$(MgCO_3)_3Mg(HO)_24H_2O,$$

indicates the presence of 20·4 per cent. of hydrate, which plays the part of an alkali, and like other substances of the same character forms saponifiable compounds with the resins which are associated with many volatile oils.

This cannot be said of such substances as calcium phosphate, pumice, cotton wool, charcoal, etc. These agents act mechanically by surface attraction, which is of course a form of adhesion. If any of these be agitated with a solution of colouring matter the whole or part of the latter will disappear, not because it is rendered soluble in a colourless condition, but that it has been simply withdrawn from the solution and attached to the solid substance. In other words, the force of adhesion between the colouring matter and the solid is stronger than that between the colouring matter and the liquid, and the latter has to give way. In the case of essential oils and alcoholic or hydro-alcoholic menstrua the case is precisely similar. If an attempt be made to dissolve a quantity, say 8 ounces, of a volatile oil, as that of lemon, in a mixture of half a gallon each of alcohol and water, a milky mixture will result, and a quantity of oil will in time separate, but if the oil is previously triturated with magnesium carbonate and then mixed with the solvent and filtered, a clear essence will be produced. The reason is simply that the carbonate has absorbed and retained about half the original quantity of oil. This will not be any news to those who ask the why and wherefore of results, but there are doubtless many to whom the fact is not known. That the oil really adheres to the carbonate may be readily shown by mixing the pasty mass with cold water, when the bond of adhesion will be broken by the force of gravity, and the lighter oil will be forced to the surface; or, better still, if the attraction be overcome by heat and the oil separated by distillation. Another, and perhaps the simplest and most effectual means of separation is to match the force of chemical attraction against that of adhesion. A little dilute sulphuric acid may be added to the contents of the filter, previously mixed with a little water, when the union between magnesia and acid will be complete, and the whole of the displaced oil may be recovered and estimated. In most cases it will be found that in physica properties at least it is precisely similar to the oil originally used.

That much ignorance or thoughtlessness exists on this point is evident from the wide extent of the practice. The amount of money annually lost, directly, from this cause must be very considerable, and the trouble incurred in trituration and filtration makes the loss even greater. In the case of cologne, lavender water, and other perfumes, it is always considered good form to reduce the quantity of spirit to a minimum, as a more permanent and less costly product is thought to be thus secured. If this is sought by the use of magnesium carbonate, or other intervening substance, the object will always be purchased at the expense of the preparation. Even filtration through simple paper is attended with some loss of oil, and the only safe plan to pursue where aqueous dilution is desirable, and the precise solubility of the oils is unknown, is to make a clear solution with strong spirit, adding water gradually, and with much agitation, until opalescence is produced, and then after the lapse of a little time adding a quantity of spirit sufficient to restore transparency.

In some cases certain oils contain resinous constituents which may be removed by alkaline substances, as magnesium carbonate; or a soluble essence may be desired, no matter at what expense. It will be worth while for those engaged in manipulation with such compounds to experiment with ordinary milk, as in the defuselization of spirit.

* From the *Canadian Pharmaceutical Journal*, Nov.

NOTES ON A FEW CHEMICAL SUBSTANCES RECENTLY INTRODUCED INTO THE FIELD OF CHEMICAL INDUSTRY.*

BY IVAN LEVINSTEIN.

One of the principal objects of our Society is that of keeping its members posted up in the progress which is being made, not only in scientific, but more especially in industrial chemistry. With this object in view I desire to direct your attention to the following chemical compounds—viz., salol, lanolin, and antifebrin, which have lately become of industrial and also of medicinal importance.

Commencing with salol—the new antirheumatic *par excellence*—I may just state that I am aware that attention has already been called to it by Mr. Moss, in a paper read before the British Pharmaceutical Conference, held on September 1; that gentleman was, however, under the erroneous impression that the process of its manufacture was a secret, and was not aware that it was the subject of a patent; and this fact will serve as a justification for further referring to this very interesting and valuable substance.

Salol was produced about three years ago by Professor Nencki, who also investigated its physiological properties. To Dr. H. Sahli, however, is due the credit of having first practically applied it to medicinal purposes; and the results which he obtained were made public by him in the early part of the present year, in a communication to the Société de Médicine et de Pharmacie, at Berne. Nencki and von Heyden's successors patented the process of the industrial manufacture of salol in Germany, England, and other countries about three or four months ago, and transferred the right of manufacture to three continental firms—viz., Messrs. Durand and Huguenin, of Basel; Dr. von Heyden's successors, of Dresden; and E. Schering, of Berlin. The complete specification of the British patent, No. 8018, 1886, has not been filed, and no copy of it is obtainable, while the German specifi-

* Read before the Manchester Section of the Society of Chemical Industry.

cation has not yet been printed. According to the inventors, there are within their knowledge three modes of practically effecting the industrial production of salol—viz.,

1. Heating salicylic acid and phenol or naphthol with phosphorus pentachloride or phosphorus oxychloride.

2. Melting the sodium or other metallic compounds of the salicylic acid and phenol or naphthol together, with phosphorus pentachloride or phosphorus oxychloride.

3. Treating with phosphorus pentachloride or phosphorus oxychloride the crude product of the reaction obtained in the manufacture of salicylic acid.

This last mode is probably the most likely to produce the most economical results. The general reaction may be stated to be as follows :—

When fatty or aromatic acids are heated with phenol or naphthol in presence of a dehydrating agent, such for instance as phosphorus oxychloride, acid ethers are formed. Thus, if molecular quantities of salicylic acid and phenol are melted together, and this mass heated with phosphorus oxychloride, at from 120° to 130° C., the salicylic phenol ether or phenol salicylate, "salol," $HO.C_6H_4CO.OC_6H_5$, is obtained.

$$2(HO.C_6H_4CO.OH) + 2(C_6H_5.OH) + POCl_3 = 2(HO.C_6H_4CO.OC_6H_5) + HPO_3 + 3HCl.$$

Salicylphenylether (salol).

Under the same conditions the resorcinol salicylic ether may be obtained, if the phenol is replaced by resorcinol.

The reaction is effected in a simpler manner, and gives a better yield if in place of free salicylic acid and phenol their sodium or other metallic salts are used, as the following equation will explain :—

$$2(HO.C_6H_4CO.ONa) + 2(C_6H_5.OH) + POCl_3 =$$
$$2(HO.C_6H_4CO.OC_6H_5) + NaPO_3 + NaCl + 2HCl, \text{ or}$$
$$2(HO.C_6H_4CO.ONa) + 2(C_6H_5.ONa) + POCl_3 =$$
$$2(HO.C_6H_4CO.ONa) + NaPO_3 + 3(NaCl).$$

Instead of phosphorus oxychloride, phosphorus pentachloride may be substituted.

In place, however, of commencing with free salicylic acid, the salicylphenolether (salol) may be produced by taking the crude product of reaction, as obtained in the process of manufacturing salicylic acid according to the following formula :—

$$2(C_6H_5.ONa) + CO_2 = NaO.C_6H_4CO.ONa + C_6H_5OH.$$

This mixture, after being allowed to cool, is treated either with phosphorus oxychloride or phosphorus pentachloride, when the process may be explained by the following equation :—

$$4(C_6H_5.ONa) + 2(CO_2) + POCl_3 = 2(HO.C_6H_4CO.OC_6H_5) + NaPO_3 + 3(NaCl).$$

Finally, the process may be effected by first heating for some time in closed vessels a mixture of phenol carbonate, sodium hydrate, and phenol at 180° to 200°, allowing it to cool a little, and then treating the mass as above described with phosphorus oxychloride or phosphorus pentachloride.

The information available with regard to salol is naturally scanty, as the article itself is comparatively of recent origin, and its manufacture was only commenced within the last few months. All that has been published is more or less an abstract of the communication of Dr. Sahli, who, however, chiefly confined himself to its therapeutic properties. Dr. Sahli's experiments thus far go to prove that salol is a valuable antiseptic, antipyretic and antirheumatic. He especially remarks on its great efficacy in rheumatism, and on this point I can confirm his far greater experience by a single instance which happened to fall under my personal observation. A friend had been suffering for a lengthened period, extending over several years, from chronic rheumatism of the joints; and after having spent more than three months of the present year at the best anti-rheumatic watering places on the Continent, returned without having derived the benefit desired. On the contrary, the pains increased, and also the swelling of the knee and finger joints. Having read Dr. Sahli's paper, I induced my friend to try salol, and its beneficial effect on him has certainly been most striking. In the course of a few days the pains were relieved, and the swellings subsided immediately. My friend then discontinued the use of the salol, but was again inconvenienced by the damp and wet weather of the early portion of last month; he again took the salol with equally satisfactory results, and though it has not yet entirely removed his chronic rheumatism of old standing, he is at least in the fortunate position of possessing a remedy which will afford almost immediate relief from pain, and at once reduce the swelling of the joints. The possession of such a remedy is undoubtedly a great boon in this damp climate, so unfavourable for the cure of rheumatism. I may add that my friend had repeatedly tried salicylic acid, but had in every case been compelled to discontinue its use owing to the disturbance of the digestive functions which this remedy unfortunately produces with most persons. Now salol is practically free from this very great disadvantage, and under ordinary circumstances may be taken for weeks twice or thrice daily in doses of thirty grains, without producing any perceptible effect on the digestive organs. As Professor Nencki has shown, salol, being insoluble, passes unaltered through the stomach, and is only decomposed into salicylic acid and phenol in the duodendum by the ferments of the pancreas. Its action on the human system is, therefore, like that of salicylic acid and phenol combined, with this remarkable difference, that the latter may be taken in the form of salol without ill effects in larger doses than would be possible if taken alone. Salol is also said to be very effective in neuralgic and other similar complaints. After taking salol, the urine has a similar dark or even black colour to that of carbol urine, but it is singular that this dark colour is not present in all cases, even though comparatively large doses of salol are taken. Sahli attributes the valuable antipyretic properties of salol to some extent to the phenol which it contains, and thinks that this fact also accounts for its action as an antirheumatic being more powerful than that of salicylic acid. Salol is further recommended as an immediate and very efficient antiseptic, and for surgical operations it may be found of the highest value, as it is neither caustic nor irritating, like phenol and salicylic acid. Dr. Sahli also employs salol as a dentifrice, and considers it to be, perhaps, the only one that will effectually prevent the spread of caries in the teeth. He dissolves salol in alcohol, and adding a small quantity of this solution to water, uses the milky emulsion for rinsing the mouth. His theory is that small particles of the insoluble salol in this finely divided state become lodged in the small crevices of the teeth, and thus act for a certain length of time as an antiseptic. Chemically as well as physically, salol behaves in a similar manner to fats; it is soluble in ether, alcohol and petroleum spirit; crystallizes in large and well-developed crystals, and possesses a not disagreeable aromatic smell. Its melting-point is 43° C. The fact of its possessing similar properties to fats, and its solubility in petroleum and other solvents, renders it very suitable for impregnating bandages or preparing salol-wool, as it adheres far more readily than salicylic acid.

I think enough has been said to show that this interesting substance may be destined to play an important part in medicine, in hygiene, and probably in the arts and manufactures. I have to thank Messrs. Durand and Huguenin for the specimen of salol which you have seen this evening, and which represents their commercial and absolutely chemically pure product.

We will now turn our attention to the next chemical substance which will occupy a portion of these fragmentary notes—viz., lanolin.

Cholesterin or Lanolin.

Cholesterin, $C_{26}H_{44}O + H_2O$, although in a strict sense chemically differing from fats, possesses very similar physical properties. It is present not only in the animal organism but also in the vegetable kingdom. Liebreich has recently demonstrated its presence in the human epidermis, in hair, whalebone, tortoiseshell, hornshavings, feathers of geese, fowls, turkeys and pigeons, bristles of the hedgehog, hoofs and warty excrescences on the leg of the horse, horny substance of the sheep's foot, etc. Until a short time ago, however, the usual material for obtaining cholesterin for scientific purposes was furnished by gall-stones, which consist principally of cholesterin, although many years ago F. Hartmann and E. Schulze had already found that the fat of greasy wool (wool-grease) contained cholesterin. Indeed, as far back as 1872, Schulze described a method of obtaining cholesterin from wool-grease. He heated the latter for about twenty hours in a closed vessel with alcoholic potash lye at 100° C., and on drawing off and evaporating the clear hot solution, mixing the residue with water and treating it with ether, he obtained two separate layers, —the watery layer, containing the fatty acids of the wool-grease as potash soaps, and the ethereal layer, holding in solution cholesterin, which, after evaporation was obtained pure by repeated crystallization of an ether-alcohol solution.

Cholesterin crystallizes in thin monoclinic tablets; it has a neutral reaction, being neither alkaline nor acid; it is free from smell and tasteless, insoluble in water, sparingly soluble in cold, but easily soluble in hot alcohol, ether, and chloroform; dissolves also readily in fatty acids; its melting-point is 145° C., and its specific gravity 1·067.

Professor Liebreich observed that cholesterin fat possesses the peculiar property of being able to absorb more than one hundred per cent. of water, and this singular property was denominated by the great pharmacologist lanosation, while the cholesterin mixed with water was termed by him lanolin. He also first called attention to the great therapeutic value of lanolin, and shortly afterwards the industrial production of pure lanolin was commenced by a Berlin firm,* and its manufacture has been of late steadily increasing, which is not surprising when we consider the valuable properties possessed by this substance. Indeed, it is impossible to foresee the manifold applications which it may yet find in medicine, arts and manufactures. Lanolin is already taking the place of vaselin, paraffin and lard, and there is every probability that before long it will exclusively replace these substances for medical purposes. Its efficiency in the composition of plasters, salves and ointments has already been established beyond doubt, and its superiority is due to the extraordinary readiness with which it is absorbed by the skin. While vaselin, for instance, directly hinders the passage of medicaments into the skin,—so that even some poisonous substances mixed with vaselin and rubbed into the skin produce neither local nor general symptoms of poisoning,—on the other hand, lanolin is absorbed by the skin with the greatest ease, and this ready absorption is not known to belong in a similar degree to any other fatty substance. So marked is the power of penetrating the epidermis possessed by lanolin that, according to Dr. W. G. Smith, when mixed with poisonous drugs, such as the toxic alkaloids, only about half the usual proportions should be prescribed in ointments. In attempting to account for the ready passage of the lanolin into the skin, Liebreich thought this property might probably be due to the fact of its originating from keratinous tissue. Lanolin may also be advantageously used in place of vaselin in *massage*. It is not so smooth as vaselin, but it possesses this advantage, that the skin, after being rubbed dry with a cloth, still remains soft and pliant; it is further recommended in cases where the epidermis is broken, as, for instance, in chapped hands, and is said to be very serviceable in the treatment of dandriff or scurf. Liebreich, however, warns us against many substances sold under the name of pure wool-oil or wool-grease, which have found their way into trade both before and since the introduction of lanolin. He considers these injurious, as they contain free acids and various other irritating substances.

Besides the medical uses which have been found for lanolin during the short period of its existence, it has also been already introduced into various branches of industry, such as perfumery, soaps, creams, and pomades, also for greasing leather-belting and for improving the pliability of leather, while quite recently a German officer—Von Kleist—was induced by Liebreich's discovery that cholesterin is present in the hoof of the horse, as well as in the skin of various animals, to employ it with very successful results as a lubricant for horses' hoofs.

The process employed in the industrial manufacture of lanolin is based on Schulze's method. The crude wool-grease or wool-oil is obtained in the usual way by treating the natural greasy wool with soap liquors, and then decomposing these by mineral acids. According to Jaffé and Darmstädter, the crude wool-oil contains about 70 per cent. (principally cholesterin), and 30 per cent. of fatty acids. The main object of the industrial chemist is to obtain from this mixture the lanolin in a pure state, and this difficulty has been successfully overcome by the two Berlin chemists just referred to, who (according to Liebreich) have succeeded in producing a lanolin of great purity, and to their kindness I am indebted for this collection of samples, showing the different stages of manufacture.

The first operation consists in saponifying the fatty acids of the crude wool-grease by means of caustic soda. An emulsion is thus obtained, which, on dilution with water, gives the so-called wool-milk. When this milk is subjected to centrifugal action, it separates, like cow's milk, into so-called cream and skim-milk. The cream contains the lanolin, and on precipitation by a lime-salt, we obtain the crude lanolin. This is heated, when water separates from it, and the lanolin is then further purified from its waxy impurities—higher-melting cholesterin—which are always present in the crude form, by a process which has been patented quite recently. The lanolin is much improved by the removal of these waxy substances, and the product thus obtained is the *Lanolinum anhydricum*, and this pure anhydrous lanolin is finally converted by being kneaded, with 30 per cent. of water, into *Lanolinum purissimum*.

In conclusion, I may add that Liebreich, in his investigations, in order to ascertain the presence of lanolin or cholesterin in other fats, made use of the method first described by Liebermann for proving the presence of cholestol, a substance closely allied to cholesterin, which test consists (*Berichte*, 1885, p. 1803) in dissolving the substance to be tested for cholestol or cholesterin in as much acetic acid anhydride as will allow it to remain in solution on cooling, and then adding, drop by drop (cooling at the same time), concentrated sulphuric acid. If cholesterin is present, the solution first turns pink, but soon changes to a fairly permanent blue colour.

The following tests are recommended for ascertaining the purity of commercial lanolin:—

1. If 2–3 grms. of lanolin be put into a small flask with 10 c.c. of a 30 per cent. solution of caustic soda, and the mixture be heated, red litmus paper placed at the top of the flask must not turn blue—disengagement of ammonia.

2. If 10 parts of lanolin be heated with 50 parts of distilled water in a water-bath, the lanolin must separate as a clear oil. Impure lanolin becomes frothy and turbid.

3. If oily, lanolin thus separated must be free from glycerin.

* Messrs. Jaffé and Darmstädter.

4. If mixed or well rubbed with water on a ground-glass plate with an iron spatula, the result must be a product containing over 100 per cent. of water; and if the lanolin employed is pure, the kneaded mass will be sticky and paste-like; but if impure, the mass will possess a soap-like smoothness, and will not adhere to the spatula.

The last chemical substance, formerly, and till quite recently, a preparation or specimen only figuring in the museum or laboratory of the organic chemist, now an article of chemical industry, is one called "Antifebrin."

Antifebrin or Acetanilide, C_8H_9NO.—It may interest some of our members to inspect the specimen which I have here of the above-named very latest febrifuge. It has been known to chemists for a considerable number of years. Acetanilide is said to be far more effective than quinine in the reduction of fever, and even four times more powerful in its action than antipyrin. As its method of preparation is extremely simple, and the raw material from which it is made not costly, its price is, of course, very much lower than that of antipyrin. I need scarcely add that antifebrin is made by simply heating for some time aniline and glacial acetic acid, and afterwards distilling the acetanilide.

$$NH_2C_6H_5 + HO.CO.CH_3 = N(CO.CH_3)C_6H_5.H + H_2O.$$

SOPHORA SPECIOSA, BENTHAM.*

BY MORITZ KALTEYER, PH.G., AND WILLIAM E. NEIL, PH.G.

This evergreen shrub is a native of Texas and New Mexico, flourishing on rough rocky hill sides, and avoiding the rich black soil of the prairie. Near Matagorda Bay it is a small tree about thirty feet in height; near San Antonio it attains the height of six or eight feet, and grows in patches, intermingled with the mezquite, often clinging to the edge of a ledge of rock with large portions of the roots bare and exposed to the heat and cold of many summers and winters, and by its long tap root enabled to withstand the frequent droughts. The trunk is tough, crooked and rough, with a grey-brown thin bark, and with hard and heavy yellow wood, which in some localities is called *lignum vitæ*. The leaves are imparipinnate; the leaflets in three to five pairs, about one and a half inch long, obovate or oblanceolate, obtuse or emarginate, entire, reticulate, dark-green and glossy above, and paler beneath. The showy flowers appear in February and March, grow in racemes, and have a blue-purple papilionaceous corolla, ten distinct stamens and a strong fragrant odour. The fruit is indehiscent, more or less moniliform, often curved, greyish-pubescent, and contains from one to eight seeds. The seeds are roundish-ovate, about half an inch long and three-eighths of an inch thick; the testa is hard, brittle, somewhat granular, dark-red or sometimes yellowish, and marked from the slightly flattened hilum by a longitudinal ridge. It contains a thin layer of firm whitish albumen, and an embryo of the shape of the seed, with two white, rather concavo-convex, cotyledons and a short radicle bent at a right angle. The average weight of the seed is twenty grains, that of the kernel about twelve grains, and of the integuments eight grains. The seed is inodorous, and the taste bean-like and somewhat bitter. Though known to be poisonous, and hence called *poison-bean*, it is largely used by boys in place of marbles.

Mr. Bellinger, of Texas, states that the Indians in the neighbourhood of San Antonio used the seed as an intoxicant, half a bean producing exhilaration, followed by sleep lasting two or three days, and it is asserted that a whole bean would kill a man.

Some years ago (see *Am. Journ. Pharm.*, 1878, pp. 33 and 283), the seeds attracted attention through the investigation of Dr. H. C. Wood, who isolated a poisonous alkaloid, *sophorine*. Both Mr. Kalteyer and Mr. Neil found the alkaloid in the testa and in the kernel.

* From the *American Journal of Pharmacy*.

Mr. Neil obtained 3·2 per cent. of ash from the whole seed; Mr. Kalteyer 3·1 per cent. from the kernel, and 7·6 per cent. from the integuments; the former contained chloride, phosphate and a trace of sulphate of potassium, calcium and magnesium, while in the latter phosphate and chloride of potassium and calcium, with a trace of manganese were found.

For proximate analysis the integuments and kernel were used separately; from the description given it seems that the layer of albumen was added to the embryo by Mr. Neil, and to the testa by Mr. Kalteyer.

Mr. Neil's results were as follows:

	Testa. Per cent.	Kernel. Per cent.
Extracted by petroleum benzin.	5·60	18·200
,, ,, ether	lost	·153
,, ,, absolute alcohol .	1·26	1·860
,, ,, distilled water .	12·00	26·500

The alkaloid was found in the alcoholic extracts; slight traces of it were also observed in the other extracts from the kernel. The specific gravity of the yellowish-red fixed oil, obtained by benzin from the kernel, was determined to be ·889; it was insoluble in alcohol, but freely soluble in ether, chloroform and carbon bisulphide. The presence of sugar was determined by Fehling's solution in the water extracts. As far as examined the other constituents agree with those determined in the following analysis.

Mr. Kalteyer's results are tabulated as follows:—

	Percentage from Testa.	Kernel
By *petroleum spirit*: Saponifiable fixed oil, sp. gr., ·912 .	1·300	21·050
By *ether* (resin or wax) . . .	·100	trace
By *alcohol*: Phlobaphene . .	1·000	2·610
Alkaloid, organic acids (tannin in testa) and other organic substances . .	2·350	7·540
By *water*: Inorganic salts .	1 000	2·300
Mucilage	4·150	1·500
Albumen	—	1·750
Dextrin	1·900	2·200
Organic acid and colouring matter	6·900	6·000
Soluble arabic acid? . .	1·050	6·573
By *caustic soda*: Mucilage and albuminoids	1·200	9·070
Not precipitated by acetic acid and alcohol . . .	3·700	4·250
By *hydrochloric acid*: Parabin	3·750	6·450
Lignin	6·876	4·380
Insoluble residue	55·084	14·945
Moisture	9·575	7·500

The colouring matter of the testa was not taken up by petroleum spirit or ether, but was freely soluble in alcohol and in alkali; it is precipitated by lead acetate, and, using alum as a mordant, gave a light pink-coloured dye.

The alcoholic extract was treated with water, the solution precipitated with lead acetate, treated with sulphuretted hydrogen, and both acid and alkaline, agitated with solvents; the alkaloid was taken up by chloroform from the alkaline liquid, and seems to be present in larger proportion in the testa than in the kernel. An aqueous solution gave with potassio-mercuric iodide a bulky white, and with gold chloride a crystalline yellow precipitate. Sulphuric acid and potassium chromate produced at once a muddy-brown colour, rapidly changing to light green, which slowly faded. Sulphuric acid gave a light flesh-coloured solution; ferric chloride only a perceptible darkening.

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1886.

ANOTHER year having come to an end the task devolves upon us of putting on record, according to the practice in this Journal now for several years, a summary of the events during the past twelve months which seem to be of special interest to the pharmacists of this country. It can hardly be claimed that the year 1886 has been a remarkable one in the annals of pharmacy, except that in one respect its leaders who have been long working for an advance in a definite direction, and had hoped that they were near the attainment of their object, have suffered a temporary reverse. But before proceeding to discuss this subject more in detail it will be well to refer to the body from which most efforts of this kind emanate, and which is the legally recognized representative of the chemists and druggists of Great Britain. The constitution of the Council of the Pharmaceutical Society shows a slight alteration as compared with the previous year. Mr. CHURCHILL, who has for several years past occupied a seat on the Council, declined to allow himself to be again nominated on the ground of ill-health. Although only one vacancy was thus created, there were twenty-one candidates for the fourteen seats to be filled, the result being that Mr. YOUNG and Mr. P. W. SQUIRE were displaced, and Mr. A. SOUTHALL, Mr. CROSS and Mr. BAILDON joined the Council as new members. At the first meeting of the Council, in June, Mr. MICHAEL CARTEIGHE was again re-elected to the office of President, which he has now occupied since June, 1882, and Mr. JOHN ROBBINS to the office of Treasurer, which he has occupied since June, 1880. Mr. T. P. GOSTLING was also elected to succeed Mr. S. R. ATKINS as Vice-President.

At the opening of the past year there appeared to be reason for anticipating that pharmaceutical education would be placed in a more satisfactory position in this country. The Council of the Society had long been engaged in elaborating the details of a systematic curriculum of study by which this might be effected, and amendments of the Bye-laws embodying the result of this work were then under consideration by the Privy Council. Unfortunately they did not meet with the expected approval of that department, and the consequent failure of the Council's efforts constitutes one of the most marked features in the history of the year. The first communication received from the Privy Council in reference to this subject was considered to leave some uncertainty whether the objects which the Council had in view might not have been realized by means of regulations made by the Board of Examiners. The result of further correspondence, however, showed that such was not the case, and the letter from the Privy Council read at the meeting of Council held last July left no doubt that the changes in the training and examination of candidates hoped to be effected by the proposed bye-laws must for the time be abandoned. On that occasion Mr. SCHACHT gave expression to the pain he felt at having thus to relinquish the project which the Council had been so long engaged with. Though he had clung to the hope of receiving assistance from the Government to accomplish what many had very earnestly desired for promoting the progress of the younger section of the body, he felt bound to recognize that the Council was in fact beaten all along the line. At the Council meeting held last November Mr. SCHACHT again took up this subject, by bringing forward a motion, of which he had given notice, that the Law and Parliamentary Committee be requested to draft a bill having for its object the amendment of the clauses in the Pharmacy Act which bear upon the Society's examinations, the amendments to be so framed as to admit of the changes that have received the approval of the Council. In bringing this motion forward Mr. SCHACHT reviewed the circumstances under which the existence of a deficiency in the training of those who presented themselves as candidates for the examinations had become evident, and the need for an improved system had been ascertained by experience. Referring, also, to the fact that the Council was thoroughly convinced that a certain course of training was highly desirable, he argued that the Council should seek to obtain the power required for the purpose by Act of Parliament. Taking the view that the provision for this was an affair of internal organization, he was of opinion that it should be obtained in the simplest form possible, and that it should stand by itself. By this means the opposition that might be offered to a bill in which other interests were affected would be avoided, and a short bill having for its object only the modification of those clauses of the Pharmacy Act which bore upon the subject of the examination and training of candidates for pharmaceutical qualification would not be likely to excite the opposition of anyone. The only object of such a bill would be to make those who practised pharmacy a more highly qualified body. With every respect for the arguments that had been put forward as to the desirability of better education for those entering the business of pharmacy, he held that there was only one means of removing the difficulty now experienced in organizing

educational institutions, and that was making education compulsory. Until that was done nothing could be hoped for but a continuance of the failures that had been experienced with the older institutions as well as the most recent ones. Having gone so far in this matter and obtained a large amount of endorsement from its constituents generally, the Council would be stultifying the work of the last four years if it stopped short without taking the next step forward, which he then proposed. The general tendency of the discussion which followed Mr. SCHACHT'S motion was in favour of its adoption, and notwithstanding some questions that were raised on grounds of expediency, it was eventually carried by a considerable majority.

Very shortly after this subject had been discussed by the Council it was specially dealt with by Mr. BARCLAY in an inaugural address to the Midland Counties Chemists' Association. The picture he gave of pharmaceutical education in the provinces, as the result of extended inquiries he had made, showed the utter absence of any adequate provision for the purpose, though considerable efforts have been made in various towns to establish classes and to induce apprentices and assistants to take advantage of the facilities for study offered by public institutions. Whatever success has attended those efforts, has been, for the most part, fluctuating and uncertain. The main conclusion to be drawn is, that in the absence of compulsion there can be no hope of education being sought for or of endeavours to provide it being appreciated and made due use of. Hence Mr. BARCLAY'S picture of the state of pharmaceutical education in the provinces constitutes a strong argument in favour of the course advocated by Mr. SCHACHT, and though he did not extend his consideration of this subject to the schools in London it was evident that he did not regard them as equal to satisfying the wants of the provinces. By stress of circumstances students are now driven, whether they like it or not, to the schools in London, not altogether for education in the proper sense, but "to be posted up in such a way as will enable them to get through their examinations." This is the greatest of all the evils resulting from the absence of a compulsory system of education. Consideration of the subject from a trade point of view also led Mr. BARCLAY to the conclusion that the best thing to be done for improving the position of the chemist is to promote this higher education, and he takes it as acknowledged on all hands that for this purpose the present system must be changed. For those who might thus be prevented from coming into the business Mr. BARCLAY does not appear to share the mistaken sentimentality that is sometimes made a ground for objecting to improved education. On the contrary, he expresses the very sensible opinion that it is in fact to the interest of the assistants and apprentices now in the trade to keep others out, and that while it would certainly be to the interest of the public that chemists and druggists should be better educated, it could be no hardship on those who were excluded because they have not been sufficiently educated.

But while thus supporting a compulsory system of education Mr. BARCLAY does not altogether approve of the curriculum proposed by the Council, and the chief point to which he objects is that from the time the apprentice enters the business until the three years' term has expired he would have no necessity laid upon him to study. Hence he fears that when the time came for the second or intermediate examination to be passed, the apprentice would go to some cram school to enable him to get through his first technical examination. Mr. BARCLAY would therefore substitute in place of the ordinary mechanical routine of work, which the apprentice is now ordinarily put to, a curriculum by which in his first year he would pass from his school work to the science class, and thus continue his studies without a break. Such a system would entail very material alterations in the conditions of apprenticeship, but there can be little doubt that it would be advantageous to the apprentice, and so far eminently desirable. Mr. BARCLAY'S views as to the means by which such an educational system might be carried out in the provinces are in favour of the establishment of tutorial classes, and he suggests a modification of the plan adopted by the Science and Art Department, by which it is necessary for a teacher to have a local committee of five to superintend his work. He thinks that in almost any town where there were a sufficient number of students to form a class, a qualified teacher could get five chemists to constitute a committee, and that he might then obtain permission to commence from the Council of the Pharmaceutical Society. Under this scheme it is proposed that one of the Society's local secretaries should be *ex-officio* a member of such committee. It is also proposed that the fees should be small, and supplemented by capitation grants from the Pharmaceutical Society. The fact that the Society could afford such an expenditure is, however, a poor argument in favour of it. On the contrary, it would appear more fitting that if the education is valued it should be proportionately paid for, and anything like an eleemosynary promotion of study carefully avoided.

This scheme presents a general resemblance to that which had been previously sketched out by Mr. GREENISH in his Presidential address to the British Pharmaceutical Conference at Birmingham last August, and is in some details identical with it; but instead of the tutorial classes to which Mr. BARCLAY gives a preference, the idea was to utilize as far as possible existing university or college teaching, and to focus, as far as possible, the demand for it. Many of the provincial districts marked out by Mr.

Greenish contain within their limits important educational institutions, which would no doubt be ready to include in their curriculum the teaching required of them, were there any evidence of an adequate demand for it. One of the difficulties recognized in this case, was the very loose manner of receiving and employing apprentices, and it is really of primary importance to bear in mind that a youth destined for pharmacy should, before leaving school, have been taught at least the elementary branches of a good English education, in order that he may be able to master the principles of those sciences which directly or indirectly govern the practice of pharmacy. The passing of the Preliminary examination should therefore be invariably insisted upon before a youth is taken as an apprentice, and he should enter upon the duties of that capacity with a distinct view of the course of study that he will be required to follow out in the future, for the purpose of acquiring a qualification to carry on business for himself. That there is in this respect a grievous deficiency in many instances is but too plainly shown by the records of failure in the examinations that have so often been referred to. Pending the elaboration of a more satisfactory mode of dealing with this question, the Council, it may be added, is following up its practice of assisting local effort, and during last year it made grants of £25 each to local committees in Sheffield, Leeds and Leicester.

Among other evidences of appreciation of the want of an educational system for pharmacists, the paper read by Mr. Dymond before the Chemists' Assistants' Association last October may be mentioned as one of the most encouraging indications for the future. After pointing out that while under a purely voluntary system examination may be relied upon as a test of education, because only those who desire education present themselves for examination, he urged that it cannot be trusted to for ensuring education when the examination—the means by which qualification is to be obtained—is compulsory, and it was shown that this great difference had a very important effect. Passing the examination is now the one thing sought for, and, consequently, teachers cannot educate because students do not care to be educated, and examiners are often at a loss to tell whether candidates really understand the subjects they are questioned upon, or have only got up by heart enough to enable them to answer the questions put to them. Hence, it was argued, that for the welfare of the pharmaceutical body, as well as the credit of the Society, it was desirable to establish a compulsory system of education, and, to elicit the sense of the meeting on this point, Mr. Dymond proposed the motion "that the meeting was of opinion that examination connected with a compulsory course of education was a trustworthy test of qualification." This was carried by a large majority of those present at the meeting, and it was unanimously resolved that a copy of the resolution should be forwarded to the Council of the Society. An equally high tone marked the address delivered by the President of the Edinburgh Chemists' Assistants and Apprentices' Association, Mr. W. Duncan, at the commencement of the winter session. The School of Pharmacy Students' Association was also fortunate in receiving valuable counsel in the same direction in an eloquent address from Mr. S. R. Atkins.

Most valuable light is always thrown upon this educational difficulty by an analysis of the results of the examinations. During the year 1886 the Board of Examiners for England and Wales met six times, and that for Scotland four times, and four Preliminary examinations were conducted by the College of Preceptors. The total number of candidates that entered for examination was no less than 2476, so that the progressive increase which has been observable for several years past was maintained, until last year the number reached was only a little below that of 1874, which was abnormally high in consequence of the inrush of candidates anxious to forestall the more stringent regulations that came into force in the following year. The candidates for the Preliminary examination numbered 1305, of whom 632, or 48·4 per cent. passed, being a lower average than in the preceding year, when 690 out of 1274 passed, or 54 per cent. In addition, 67 certificates of other examining bodies were accepted in lieu of examination, so that, altogether, 699 persons advanced last year the first stage in the pharmaceutical career. For the Minor or qualifying examination there were 1070 candidates, against 955 in 1885, of whom 398, or 37 per cent., passed, the average of passes having been practically the same as in the previous year. For the Major examination there were 98 entries, and 56 passes, which is the highest number and best result in this examination for several years past. So far, however, as the foregoing figures indicate the measure of success—or rather of the want of success—of candidates coming up for examination, none of them can be regarded as satisfactory, except so far as to show that the examiners have not flinched in the performance of a very unpleasant, though necessary, duty. An illustration of the incompetency which is too frequently met with in the examination room was furnished in an interesting note appended to the report of the College of Preceptors on the October Preliminary examination, from which it appears that failures in this examination are still far more numerous in the subject of arithmetic than in either of the other two, and that out of 73 candidates who were then unsuccessful in it, only 8 gave a correct answer to the first question, which was a comparatively easy one in compound subtraction and multiplication.

Another subject that has been under the consideration of the Council is the Poison Schedule. In February the Law and Parliamentary Committee, after consideration of a communication from the

Privy Council on the subject of nitroglycerine, reported in favour of this compound being included in the first part of the Poison Schedule, and that additions should be made to both the first and second parts of sundry other substances that had been so included in the Government Poison Bill of the previous year; also that the opportunity should be taken to direct the attention of the Privy Council to the large number of cases of poisoning by carbolic acid. The report having been adopted, a communication to that effect was made to the Privy Council; but in the reply it was intimated that while their lordships would be prepared to approve a resolution relating to nitroglycerine, the suggestions in relation to the other substances would be considered when preparing a Bill that it was proposed to introduce shortly into Parliament. The session ended, however, without any such Bill being introduced. In May the Council passed the desired resolution declaring nitroglycerine and its medicinal preparations to be poisons within the meaning of the Pharmacy Act, and that they should be included within the first part of the schedule, but up to the present time the promised approval by the Privy Council has not been forthcoming.

A Bill for the Amendment of the Medical Acts having been introduced into Parliament it became necessary to decide whether an attempt should be made to amend it so as to provide for the legal representation of pharmacists on the Pharmacopœia Committee. After ample consideration it was resolved that it was not expedient to take any action that would endanger the passing of the Bill. Since that time the Medical Council has resolved that it is desirable its Pharmacopœia Committee should be assisted by annual reports on published researches and opinions of therapeutists, pharmacologists, pharmaceutical chemists and chemists and druggists, and has appointed Professor ATTFIELD as the first Reporter.

At the Annual General Meeting held last May, the President was able to congratulate the members on the prosperous financial position of the Society, both as regards the General Fund and the Benevolent Fund, though the support rendered to the latter has not been so widely extended as might be desired. The inability of the Privy Council to approve the amended Bye-laws as they then stood was briefly referred to, and the expressed intention of the Government to introduce a Bill on the subject of poisons was mentioned as a matter requiring the attention of the Council. In referring to the refusal of the Privy Council to adopt the recommendation that other articles besides nitroglycerine should be added to Part I. of the schedule, or to consider that part of the subject until the new Bill was being drafted, the disposition of the Privy Council to absorb the power now vested in the Council of the Pharmaceutical Society was pointed to as being apparently still operative, the President remarking that if the advisers of the Privy Council thought articles put in its own Bill of the previous year were then fit substances to be considered as poisons, there could be no valid reason why they should not be placed in the schedule at once, as the Council of the Society had recommended. The proposed extension of the Society's premises was described as a measure of necessity for the proper conduct of business, and for carrying out the work of the research laboratory. The position of the Society's affairs in Scotland was at that period such as would not admit of being dealt with further than by the expression of a hope that the scheme contemplated by the Council would meet with acceptation from the members generally, and even that of Scottish members.

It is satisfactory to be able to point to the fact that there has since been a settlement of the differences between the Council and Scottish members of the Society, to which reference was made in the review of the previous year. Those differences had been a source of much regret to many who did not take a very decided view on either side, but were influenced chiefly by the feeling that internal dissensions could only be injurious to the Society, and it is therefore matter for congratulation that in a spirit of mutual concession a satisfactory and amicable arrangement has been arrived at. This is of all the more importance since the North British Branch of the Society has established a precedent for local organizations in other parts of the kingdom and the good work that has been done in the past under its influence would well justify the flattery of imitation. Probably there never was a time when unity and organization were more necessary for pharmacists than at the present, both in regard to trade matters and the means of advancing the interests of the body by improved education. If the suggestions offered by Mr. GREENISH for the formation of local centres of organization among members of the Society could be carried out, it is probable that much good might be effected in the way of increased provincial activity in the promotion of the great objects of the Society and furnishing a practical answer to the somewhat unreasonable grumbling that is too often heard. Such local organizations among members of the Society need in no way supersede or interfere with other local associations, since their objects would be more special than those of the latter. Wherever there are now local secretaries those officers of the Society might form the nucleus for local organization, and in some instances, when combined action was desirable, they might be of great practical service by their more direct connection with the central institution.

The Society has held the usual number of Evening Meetings during the past year; most of them were fairly well attended, and one or two exceptionally so. The October meeting, for instance, seldom lacks an enthusiastic audience, but, probably, never had one fuller or more enthusiastic than that which

listened to the scholarly and graceful address to the students by the President of the Medical Council. Other meetings specially worthy of mention, are that in November, at which the drug exhibits at the Colonial and Indian Exhibition were described, which was attended by a number of influential colonial representatives, and that last month, at which Dr. AITCHISON made so important a contribution to the history of the umbelliferous gum resins. The papers read during the year were: "Tumbeki," by Mr. E. M. HOLMES; "Analysis of Tumbeki," by Messrs. E. J. EASTES and W. H. INCE; "Modified Extraction Apparatus," Mr. W. H. INCE; "The Alcoholic Extract of the Root of Atropa Belladonna," by Messrs. W. DUNSTAN and F. RANSOM; "The Presence of Potassium Nitrite in the Potassium Hydrate of Commerce," by Professor W. DUNSTAN; "Note on the Species of Strophanthus used in Medicine," by Mr. E. M. HOLMES; "Note on a Sample of Hopeine," by Dr. B. H. PAUL; "Note on a New Variety of Rhatany," by Mr. E. M. HOLMES; "Some of the Drug Exhibits at the Colonial and Indian Exhibition," by Mr. E. M. HOLMES; "Note on Tincture of Strophanthus," by Mr. W. MARTINDALE; "Some Plants of Afghanistan and their Medicinal Products," by Dr. J. E. T. AITCHISON; and "Notes on a Sample of Galbanum from Ferula Galbaniflua," by Mr. E. G. BAKER. In addition, it may also be recalled here that an interesting series of six lectures on Galenic Pharmacy has been delivered by Emeritus Professor REDWOOD.

The Museum of the Society has been greatly enriched during the past year by many large and valuable donations. Some of these have been received from well-known wholesale firms, or from private individuals, but the most extensive additions have been made through the liberality of the Commissioners of the Colonial and Indian Exhibition, and of several of the exhibitors, some of the latter having handed over their entire exhibits to the Society. Among the last-named are the valuable exhibits of Dr. HO KAI and Messrs. A. S. WATSON and Co. in the Hong Kong Court, the former including over four hundred specimens of Chinese drugs, and the latter, several valuable models. Not less important are the exhibits of Dr. BROOKS, including vanilla and valuable specimens of essential oil, from the Seychelles, and that of Mr. FRESSON, of Demerara. The India Court contributed a most useful series of sections of the trunks of the cinchona trees cultivated in that country, which show the mode of renewing the bark. The whole of the collection of Ceylon drugs (three hundred and fifty specimens) has been acquired by the Society, as well as the collection of Chinese drugs in the Straits Settlements Court, the latter having been presented by the Executive Commissioner. Valuable contributions to the Museum have also been received from the Executive Commissioners of the British Guiana, West Indian, Victoria and Fiji Courts. The materia medica of the Cape of Good Hope is now represented in the Museum by an entire series of the drugs exhibited in that Court, presented by Mr. SIDNEY COWPER. In addition to these, a very extensive and valuable collection of essential oils, many of them of great rarity, has been presented by Messrs. SCHIMMEL and Co., of Leipzig. Dr. AITCHISON has handed to the Society a collection of the drugs obtained by him in Afghanistan, and specimens of considerable interest have been received from the Director of the Kew Gardens, from Dr. DYMOCK, of Bombay, Dr. ONDAATJE, of Ceylon, Mr. MURAI, of Japan, and many others. The large contributions to the Museum during the last few years have raised it to the first rank as a Museum of Materia Medica; so that it has lately been classed in a well-known periodical (*Nineteenth Century*) with the National Museum of Natural History at Kew and the British Museum.

The Herbarium has been enlarged by the addition of about one hundred and fifty of the medicinal plants of the Mauritius, presented by the Director of the Department of Woods and Forests in that island, the last-named donation having been rendered all the more valuable by the previous gift of a number of the drugs themselves from Mrs. JOHNS, of Brentford. Some excellently preserved specimens of the more valuable native remedies of South Africa have been presented by Dr. ANDREW SMITH, of the Lovedale Mission, and three of the Afghanistan plants collected by Dr. AITCHISON, one of them being *Ferula galbaniflua*, have been presented by that well-known botanist. A second addition of about one hundred and fifty specimens has been made to the Herbarium of British plants through the liberality of Mr. J. W. WHITE, and several rare species have been presented by other gentlemen.

The principal donations to the Society's Museum in Edinburgh have been a collection of new remedies, presented by Messrs. T. CHRISTY and Co., and a series of the commercial varieties of carbolic acid and of the sulphocarbolates of various metals, by Messrs. CRACE-CALVERT and Co.

The Library during the past year has been enriched by the addition of 289 volumes and pamphlets. It is to be regretted that notwithstanding the high state of efficiency in which this department is maintained under the supervision of the Committee, there should be any indication of falling off in the extent to which it is utilized. Nevertheless we have to report that the attendances at the Library have shown a decrease both in the morning and in the evening, the number of signatures in the book having been only 6351 against 7294 in the previous year. Moreover, the loans of books have shown again a slight decrease, which has been continuous since 1881.

The operation of the Benevolent Fund has been fully maintained, no less than £1597 10*s.* having been paid in annuities, and £631 14*s.* 5*d.* in casual grants, both sums being in excess of the amounts

expended for similar purposes in the previous year. The total amount of relief granted during the year amounted therefore to £2229 4*s.* 5*d.* Unfortunately the income during the same time has shown a considerable decrease, the subscriptions having fallen off from £1529 4*s.* 5*d.* to £1451 16*s.* 11*d.*, the donations from £378 to £34 13*s.*, and the legacies from £300 to £140. In fact the income of the Fund from all sources has been very slightly in excess of the expenditure, although six more annuitants were elected only last month, so that under present conditions the Council will hardly be warranted in further extending the obligations of the Fund. In the coming year, however, the usual decennial dinner in aid of the Fund is to be held, and it may be hoped that the occasion may not only evoke a large number of donations, which is the form frequently adopted by firms of contributing to the Fund, but may also be the means of ingathering a large number of subscribers from the ten thousand registered persons who, though entitled to participate in case of need in the benefits of the Fund, have never yet contributed to it.

The British Pharmaceutical Conference commenced its annual meeting at Birmingham at the end of August; the attendance was good, and the gathering a very successful one. The President, Mr. GREENISH, in his address, made somewhat of an innovation by bringing two subjects definitely before his audience with an implication that they should be made the subjects of resolutions by the Conference. The first was the disadvantages attending the multiplication of proprietary preparations that are prescribed by medical men, the suggestion being that a committee should be appointed to compile a formulary of unofficial preparations that should be issued under the auspices of the Conference for the guidance of prescribers and dispensers. The other subject was the more thorough local organization of chemists and druggists for united action throughout the country, especially in respect to the provision of facilities for the acquirement of a suitable scientific training by young pharmacists in the provinces. This it was proposed to effect by dividing the county into districts, and entrusting the work to representative committees, and in consideration of the fact that the Pharmaceutical Society might be called upon to contribute from its funds to the necessary expenses, it was proposed that the local secretaries of a district might constitute the committee. The latter proposition failed to obtain any support from the meeting; but in compliance with the former an influential Unofficial Formulary Committee was appointed, which, under the chairmanship of Mr. W. MARTINDALE, is now engaged in compiling a report to be submitted to the Executive Committee of the Conference.

The Chemists and Druggists' Trade Association held its annual meeting in London in May. The report then presented by the Executive was a very dispiriting one in respect to the future, there having been again a large decrease in the membership. From financial reasons principally a course which it had been intended the Association should take in respect to the registration of trade marks has had to be abandoned; but nevertheless proceedings have been carried to a successful issue in several cases for offences under the seventeenth section of the Pharmacy Act. A meeting of chemists and druggists resident in London was also called under the auspices of the Association to consider what course, if any, should be taken in respect to prosecutions under the Medicine Stamp Act, but it cannot be said that it yielded any very tangible result. Of the other societies in which pharmacists may be supposed to be interested it may be mentioned that the British Medical Association met at Brighton in August; the British Association at Birmingham in September; the Society of Chemical Industry at Liverpool in July; the American Pharmaceutical Association at Providence in September; and the German Apotheker-Verein at Düsseldorff in August. There was also an Inter-Colonial Pharmaceutical Conference for the discussion of topics common to Australasian pharmacists held in Melbourne, in October.

In Ireland the Council of the Pharmaceutical Society has been occupied largely in the consideration of the conditions of the examinations and the Government Visitor's Reports upon them. The Annual Meeting was held at Dublin in October, when the retiring President (Mr. J. E. BRUNKER) defined the position of the Society by saying that it had not "much to boast of, but it had made some little progress during the year." There had only been an increase of one in the paying members since the previous year. Mr. BRUNKER, having filled the office of President for three years, a limit previously fixed by a resolution of the Council, declined re-election, and Mr. ALLEN was unanimously chosen to succeed him, Mr. H. N. DRAPER being elected Vice-President. It only remains to be said that an attempt to enlist the interest of the Government in Bill for the amendment of the Irish Pharmacy Act has been unsuccessful.

The year has not passed without a few—probably not very important—additions having been made to the materia medica, though these have come in the form of products from the laboratory of the chemist rather than as unworked material from the stores of Nature. Further contributions have also been made to the history of several of the vegetable medicines already in use. Of the former class one of the most interesting has been introduced under the significant name of "antifebrin," which, should the properties attributed to it on the basis of preliminary clinical experiments be confirmed, will take a position in the first rank of antipyretics. It is a compound having the constitution of an acetanilide, or an aniline in which one atom of hydrogen in the NH_2 group has been re-

placed by an acetyl residue. The compound is not a new one, having been prepared by GERHARDT more than thirty years ago by the reaction of glacial acetic acid upon aniline, but its alleged medicinal properties appear to have remained unsuspected. In fact, no other member of the same chemical group was known to possess antipyretic properties; consequently the results reported to have been obtained with acetanilide have directed attention to other anilides as well as acetyl compounds.

Methylal is also a compound that has been taken down from an inglorious resting place on the laboratory shelf and brought into use as an anæsthetic and hypnotic. It is a product of the oxidation of methyl alcohol, probably having the constitution indicated by the formula $CH_2(OCH_3)_2$, and standing in the same relation to formaldehyd as acetal to acetaldehyd. Tribromide of allyl is still another compound to which the remark as to deferred usefulness may be applied; after thirty years it has been administered successfully in the relief of hysteria, asthma, and angina pectoris.

Under the name of "salol," a compound which is represented as being the phenyl ether of salicylic acid has been introduced as a powerful antiseptic and antipyretic. The peculiar advantage claimed for it is that, while it passes through the stomach unaltered, it is broken up in the duodenum into carbolic acid and salicylic acid, both of which are then free to exercise their characteristic antiseptic properties without harm or inconvenience, no toxic symptoms resulting from the presence of the carbolic acid. The urine becomes blackish during the administration of salol, which is said to be excreted as urate of salicyl and sulphophenol. The decomposition of the compound was attributed by Professor von NENCKI to contact with the pancreatic ferment; but that this is not essential has been ascertained by Mr. JOHN MOSS, who, in a paper read before the British Pharmaceutical Conference, stated it was due to the alkalinity of the pancreatic juice, and that even the salivary secretion was sufficiently alkaline to effect it. Some secrecy was maintained for a time as to the method of manufacturing salol; but it has been recently stated by Dr. C. KOLBE that it is prepared by the ordinary method of preparing similar ethers, by heating molecular proportions of sodium salicylate and sodium carbolate together with phosphorus pentachloride, the end products of the reaction being salol, sodium chloride and phosphoric anhydride. More recently Dr. ECKENROTH has stated that the phosphorus pentachloride may be replaced by carbonyl chloride (phosgene) gas.

Urethan is another compound which although not, strictly speaking, an introduction during the past twelvemonths, has proved worthy of more than the brief reference accorded to it in the last annual summary. Moreover, it has a special interest as being a compound of which the properties were deduced by theoretical considerations before being put to a clinical test. Briefly it may be stated that pharmacological experience having led to the expectation that ethereal salts of carbamic acid would partake of the physiological properties both of the hydrocarbon group and of the NH_2 portion of the acid, experiments were made with ethyl carbamate, better known as "urethan," and it was found to produce profound narcosis, whilst at the same time the respiratory movements were increased in frequency and depth, the latter action being attributed to the influence of the NH_2 group. Urethan appears to have a promise of usefulness as a narcotic in cases where the administration of chloral hydrate is contraindicated. It may be added that whilst some of the carbamic ethers are unavailable on account of their insolubility, others, such as the methyl and ethylidene compounds, have not been found to present any special advantages. Urethan is also reputed to be an effective antidote to strychnine. "Hypnone," or acetophenone another compound that was mentioned in the last annual review conjointly with urethan, as having just been introduced as a hypnotic, does not seem to have made much progress in medical favour, at least in this country.

Besides the experiments that have been made as to the effect of substituting one radical for another in these synthetically produced compounds, similar trials have been made with some of the natural compounds. In one case, where an atom of oxygen in the caffeine molecule has been replaced by the ethoxyl group OC_2H_5, the resulting compound ethoxycaffeine, is reported to manifest physiological and therapeutic properties decidedly different from those of the caffeine from which it has been derived, as it exercises a marked sedative action upon the cerebro-spinal system and possesses incontestably narcotic powers. On the other hand, the introduction into cocaine of an ethyl group in the place of a methyl group does not appear to effect any remarkable change, since ethylcocaine has been found to resemble cocaine qualitatively in its physiological action, but to be less powerful. The great instability of cocaine is now well known, simple contact of the free alkaloid with water being sufficient to decompose it, as first pointed out by Dr. PAUL and confirmed by Professor FLÜCKIGER. It may be remarked parenthetically that Professor FLÜCKIGER has found atropine to be similarly decomposed, though not so readily. The important consequences that may attend this instability of cocaine were illustrated in an article that was put forward to meet a demand for benzoate of cocaine, consequent upon a recommendation of it as an advantageous salt; upon examination by Dr. PAUL, this product proved to be simply benzoylecgonine, which had probably been formed by decomposition of the alkaloid in the attempt to prepare the benzoate salt. This benzoylecgonine, which may be described as cocaine minus the methyl group, appears, according to Mr. STOCKMAN'S experiments, to be devoid of anæsthetic proper-

ties, the effect it manifests being rather that of a tetanizing poison. It appears quite possible therefore that the occurrence of this and other comparatively inert contaminations—at least in the earlier samples of cocaine compounds—may explain the administration of enormous doses in some instances, faith in the reports of which led only recently to the sacrifice of a patient's life, as well as that of the operator, who committed suicide in consequence. In view, therefore, of the importance of purity in this alkaloid, the applications of which appear to be multiplying indefinitely, Herr Beckurts has recommended that the hydrochlorate, which is the salt most used, shall be required to be absolutely neutral, volatilize completely, dissolve clear and colourless in water, give a colourless solution with strong sulphuric acid, not reduce potassium permanganate immediately, and when heated with an excess give off no odour of bitter almonds. In a chemical direction ecgonine, a still lower decomposition product of cocaine, has been experimented on by Herr Merck with a view to confirm or otherwise a suggested relationship with tropine, the common nucleus of the belladonna group of alkaloids, but the results obtained were not decisive. Whilst upon this topic it may be mentioned that the leaves of a species allied to the coca plant, *Erythroxylon pulchrum*, have been examined for cocaine by Dr. Peckolt, who reports that he found them to contain a minute quantity of the alkaloid. The fruit of *Erythroxylon Coca*, similarly examined by Mr. Millard, yielded only negative results. The wonderful success that has attended the introduction of cocaine has led to many suggestions as to the possibility of using other bodies as local anæsthetics, but hitherto cocaine has remained practically without a rival. Within the last few days, however, information has been received from the antipodes of the isolation from an euphorbiaceous plant, *Euphorbia Drummondii*, of an alkaloid which it is claimed produces local sensory paralysis, without any disturbance of the general system.

Another compound formed synthetically, which if it do not prove an addition to the materia medica is at least a most interesting product, is that which has been named "saccharine" on account of its intensely sweet taste. Systematically, its constitution is that of a benzoyl-sulphonic-imide, and as the starting-point of its production is toluene, it has not unfairly been classed among the ever-increasing army of coal-tar products. Considering the important commercial future that has been prognosticated for saccharine, its manufacture on an industrial scale appears to have been somewhat retarded, so that up to the present it has hardly been fully tested as to its capabilities. It would seem probable, however, that its sweetening properties will find practical application, and it may be that its physiological inactivity will allow of it being used for sweetening the food of diabetic patients; but the fact that a sample of a solution recently exhibited by Mr. Howie had after being kept a time developed an odour of bitter almonds and a slightly bitter taste proves that more experience is required in this direction.

The recommendation by Dr. Morrell of terebene as a remedy for winter cough created for it some considerable demand in the early part of the year. A misleading disclaimer in the original paper respecting the article intended gave rise to some uncertainty, which was further increased by certain suggestions from another quarter as to patent rights; but this was soon cleared away, and it is now pretty well understood that the terebene to be used is the optically inactive product of the action of strong sulphuric acid upon turpentine, and that any person is free to make or sell it who may choose. That the liquid supplied as terebene does not, however, always correspond to the foregoing definition was shown in a paper by Mr. J. Hodgkin, read before the Pharmaceutical Conference, which gave the results of an attempt to estimate the amount of unaltered turpentine in samples of terebene by the indications of the polarimeter. In another paper Mr. Lascelles-Scott reported that he had met with several samples containing oxidized products. It was a curious commentary on this striving after purity to hear Dr. Tidy assert that he had never found terebene to exercise any physiological action except when it was impure. It may be mentioned here that by oxidation by means of chromic acid of a solution of oil of turpentine in strong acetic acid, M. Bouchardat obtained a modification, closely resembling in its properties oil of lemon.

Strophanthus seeds, from which Professor Frazer extracted an active principle to which he has attributed useful properties in the treatment of some forms of heart disease, have been the subject of considerable attention during the year. The material originally experimented with was supposed to have been derived from *Strophanthus hispidus*, but this afterwards appeared doubtful, and samples of seeds subsequently received were probably derived from more than one species. Some uncertainty also existed as to the strength of the preparation used by Professor Frazer, and this led to the publication of an authenticated formula for a 1 in 8 rectified spirit tincture of seeds previously treated with ether. Subsequently Professor Frazer intimated his preference for a tincture of half the strength, and eventually Mr. Martindale published a formula for a tincture of the strength of 1 in 20. The point is one eminently fitted for the decision of the Formulary Committee appointed by the Conference.

Lanolin is another substance which, although introduced as an ointment basis in the latter half of 1885, has became practically established during the year that has just passed. It has had the advantage of a distinguished sponsor in Dr. Liebreich, who has dowered its advent with a considerable addition to previously existing knowledge of the class of fats to which it belongs. These compounds differ from

ordinary fats in being combinations of fatty acids with cholesterin instead of with glyceryl. They appear to be widely distributed in the animal economy, but especially in feathers, bristles, wool, etc., and it is from the wool of sheep that lanolin is at present prepared, it being neither more nor less than a "suint" purified by thorough washing. It is claimed for it that it takes up a large amount of water without losing its unctuous consistence, does not turn rancid, and is absorbed by the skin with remarkable facility. Numerous reported experiments appear to confirm the ready absorption of many medicaments mixed with it when applied to the skin; but the recent experience of Dr. TOPOROFF seems to indicate that at least for ointments intended to produce an anodyne effect lanolin must yield the precedence to lard. Now, too, that the nature of vaselin is better understood it is evident that in respect to capability of absorption, at least, it is inferior as an ointment basis to lard. Nevertheless its right to a place in the Pharmacopœia is indisputable, and a discriminating use of both lard and vaselin, and possibly of lanolin also, will become a part of the art of pharmacy. "Mollin" is a name applied to another material that has been introduced as a base for outward applications, which consists essentially of a neutral soap containing a residue of undecomposed fat. Besides this, dressings consisting of medicated mixtures of suet and lard spread upon undressed muslin have been recommended under the names "plaster mull" and "salve mull."

The past year has furnished a reminder that the history of several very important articles in the materia medica still remains uncompleted. It seems, for instance, almost inexplicable that any uncertainty should still exist as to the mother-plants of articles so long and widely used as the umbelliferous gum resins, asafœtida, galbanum and ammoniacum. Some of this uncertainty has, however, now been removed, the appointment of Dr. AITCHISON to accompany the Afghanistan Delimitation Commission having given this accomplished naturalist and energetic collector an unusual opportunity of making inquiries respecting the plants in their native country, and the account of his observations which he gave last month at an Evening Meeting of the Pharmaceutical Society constitutes a most important addition to the information previously available on the subject. Whilst the gaps in our knowledge of old remedies are thus being gradually filled up, the vegetable kingdom still continues to yield fresh candidates for therapeutical experiment. "Pichi" (*Fabiana imbricata*), a Chilian remedy for urinary disorders, has been somewhat elaborately described and partially investigated. To the chemist it has given up a fluorescent body resembling æsculin and an alkaloid that has been named "fabianine;" but it is not clear whether its medicinal action is attributed to both or either of these. The rhizome and rootlets of *Aletris farinosa*, also a South American plant, have been recommended for the treatment of some disorders peculiar to females, their virtue presumably residing in a bitter principle that is most conveniently extracted by spirit. *Anchietea salutaris*, a Violaceous plant having a popular reputation in Brazil as an alterative, has been again recommended as a remedy in skin diseases. A new remedy for gout and renal disorders has been put forward in the leaves of *Orthosiphon stamineus*, an Indian labiate, from which a bitter glucoside has been separated and named "orthosiphonin. The root bark of the North American "snowdrop tree" (*Chionanthus Virginica*) has been recommended as useful as an aperient, cholagogue, diuretic and alterative. The umbelliferous *Amni Visraga*, besides supplying toothpicks, is said to be capable of yielding a narcotic principle—kelline—whilst the leaves are alleged to possess aperient and diuretic properties. The leaves of the *Agave americana* have also been credited with an acrid and balsamic constituent, useful as a rubefacient in rheumatism. "Itshongwee" is the name of an unidentified plant used by the Kaffirs as a febrifuge, which has been recommended as worthy of investigation. The leaves of the *Piper Betle*, used in the east to chew with areca-nut, are said to yield an essential oil that has given good results in the treatment of catarrhal disorders. The areca-nut itself, too, has yielded a volatile alkaloid—arekane—that is said to increase the secretion of saliva and have a purgative action.

A large number of more or less well-known plants have also been submitted to chemical examination, with results that may in some cases enrich materia medica. Thus the common furze has given up to Mr. GERRARD an alkaloid—ulexine—that appears to possess paralysing properties. The *Lobelia inflata* has proved to contain a second, but solid alkaloid, resembling lobeliine in its emetic action, both alkaloids being also present in *L. nicotianæfolia*. The alkaloid of conessi bark (*Wrightia antidysenterica*), widely used in India as a remedy for dysentery, has been definitely ascertained to be free from oxygen, being only the second solid non-oxidized alkaloid known, and a closely allied bark, having a similar reputation in tropical Africa, has yielded an alkaloid that is either identical with, or a homologue of conessine. From "kava-kava" (*Piper methysticum*) Dr. LEWIN has separated two resins, one of which is said to act powerfully as a local anæsthetic, and a similar property is claimed by Dr. REID for "drumine" an alkaloid separated from *Euphorbium Drummondii*. From the well-known "wisteria" plant a glucoside and a resin have been separated that appear to possess toxic properties. *Acorus Calamus* has yielded "acorin," an interesting glucoside that splits up into essential oil of calamus and sugar, as well as "calamine," an alkaloid. A species of *Lycopodium*, *L. Saussurus*, has yielded an

alkaloid that is said to possess powerful emetic and cathartic properties. "Tumbeki," a narcotic leaf used for smoking purposes that has remained hitherto an unidentified article of Persian and Turkish commerce, has been referred by Mr. HOLMES with great probability to *Nicotiana persica*, and some samples examined by Messrs. EASTES and INCE gave indications of containing from 2·046 to 5·835 per cent. of nicotine. Last, but probably not least in importance, Dr. PECKOLT has separated from cassava root—the source of tapioca—among other compounds one that on account of its powerfully antiseptic action he has named "sepsicolytin," which probably plays an important part in the West Indian "casareep" or "pepper pot." In addition to the foregoing the comprehensive report that has appeared in this Journal on the Colonial and Indian Exhibition has disclosed an almost indefinite number of vegetable substances that appear to deserve chemical and therapeutical investigation.

A number of other preparations have been described in the course of the past year, some of which may eventually take a place among the official remedies. A most interesting note on the preservation of ethyl nitrite, read by Mr. JOHN WILLIAMS before the Pharmaceutical Conference, showed how this important constituent of a most unstable preparation can be preserved in a concentrated condition in a mixture of glycerine and alcohol. Lactate of morphine has also been described by Mr. D. B. DOTT, and oleate of quinine by Mr. ROTHER. It would, however, be impracticable to enumerate all the articles that have been advocated as remedies one way or another during the last twelve months, some of them for the first time, others as revivals or old friends put to new uses. Beyond those that have already been mentioned it must suffice just to refer to the following. Two new aluminium compounds, described as an aceto-tartrate and an aceto-glycerinate have been recommended as astringent caustics. In consequence of the inconveniences attending the administration of osmic acid the potassium salt has been proposed as a substitute. Ammonium and iron fluorides have been reported on favourably in the treatment of splenic disorders. Bismuth and zinc salicylates have been in some demand, and bismuth nitrosalicylate has been added to the list of rivals to digitalis. Resorcin has been spoken of very favourably in the treatment of eczema and lupus. A compound of atropine and santonic acid has been recommended as possessing advantages in ophthalmic practice. Hydrated zinc sulphide has been spoken of as a convenient salt when it is desired to provide for a slow evolution of sulphuretted hydrogen, and, lastly, the use of medicated gases as therapeutic agents has been advocated.

Cinchona bark and the cinchona alkaloids have once more been the subject of a number of important communications. The controversy raised by the publication by Dr. DE VRIJ of inferences drawn from results obtained in the application of the polarimetric test to commercial samples of quinine sulphate has been prolonged through the year. The announcement that such samples frequently contained considerable quantities of cinchonidine was by no means an addition to previously existing knowledge, since the same fact, and the equally important one that the presence of such alkaloids was not inconsistent with official tests for the purity of quinine sulphate, had been made known long before at an evening meeting of the Pharmaceutical Society. But the attempt of Dr. DE VRIJ to set up a standard of absolute purity has led to a criticism of his methods and their defence profitable to the advance of science. Thus Dr. HESSE in pursuing his investigation found that quinine from different sources, when absolutely free from cinchonidine, did not always give the same polarimetric indications, and in fact with one sample he succeeded in obtaining a reading so much higher than the standard set by himself or by anyone else that he formally gave up the use of the optical test he had previously recommended. Subsequently he announced that one of the disturbing influences was the almost universal presence of hydroquinine, an alkaloid—hardly heard of before—closely resembling quinine in chemical properties, but having a rotatory power intermediate between quinine and cinchonidine. Professing to defer to prejudice against the optical test, Dr. DE VRIJ then reported the result of the testing of a sample of Dr. HESSE's make by the bisulphate method, which was somewhat less unfavourable. This led to an assault upon the bisulphate method, which according to Dr. HESSE is invalidated by the occurrence of a considerable proportion of quinine in the separated substance assumed to be cinchonidine. It cannot be supposed, however, that the last word has been said upon this point. In addition, Dr. DE VRIJ has recently introduced a new test for the purity of quinine, based upon the relative insolubility of the chromate of that alkaloid. Dr. HESSE, on his part, has prepared and described a number of the salts of cupreine, the peculiar alkaloid of cuprea bark discovered by Dr. PAUL. An interesting paper by Mr. HOOPER, upon the effect of age in the development of alkaloid in cinchona trees, seemed to show that the maximum richness in succirubra and Ledger trees is attained in about six years, that the limit when the shaving process exercises a beneficial effect is reached soon after, and that the application of manure is less useful to old trees than to younger ones. These results, however, may be affected by the uncertainty appertaining to the optical method of determining the amounts of the alkaloid.

In other departments of pure and applied chemistry where compounds more or less interesting to pharmacists are dealt with some very remarkable work has been done. The first place must be given to the synthesis of coniine, which appears to have

been really accomplished at last by Professor LADENBURG. It is not a little interesting that the chemical product was originally optically inert, but was successfully split up into a portion corresponding in rotation to natural coniine and a portion rotating polarized light in the opposite direction. It may be mentioned here, also, that a dextrogyre compound that appears to be the counterpart to the lævogyre asparagin already known has been met with. Next comes the practical application of methods for converting morphine into the higher-priced codeine. The synthetical manufacture of salicylic acid also has been improved so as to give a much larger yield from the same materials. Of somewhat less practical interest has been the discovery of a new element, germanium, whilst several others have been claimed, including one that has been named austrium. Another element, fluorine, is reported to have been isolated for the first time by an electrolytic process.

The pathological importance of the occurrence of some of the lowest forms of organized life is now so well recognized in methods for the prevention and cure of disease, that the subject has become of great interest to the pharmacist, and, indeed, may at some future time widely influence the practice of his calling. In regard to the interest excited, the first place must be accorded to Professor PASTEUR'S prophylactic treatment of hydrophobia, which has attracted patients to Paris by hundreds during the past year. Some interesting investigations on the occurrence, persistence and effects of microbes in water and the atmosphere have been published, and Dr. KLEIN has pleaded for a more rigorous application of scientific precautions in conducting such researches. A remarkable paper has also been published by Dr. VAUGHAN, explanatory of numerous reported cases of poisoning by ice creams, which he attributes to the development in the milk by an obscure fermentation of a powerful poison that he has named "tyrotoxicon." The subject has also been approached from the chemical side, and Mr. A. J. BROWN has studied the chemical action of pure cultivations of *Bacterium Aceti*, and ascertained among other things that it is without action upon pure solutions of cane and milk sugar, starch, and methylic and butylic alcohols. He has also found that another species, *B. xylinum*, better known as the "vinegar plant," contains cellulose, which it must develop at the expense of carbohydrates decomposed by it, the formation of gluconic acid being probably an intermediate stage. Other important problems have also been attacked, such as the influence of certain medicines on the action of the physiological ferments, and the extent to which micro-organisms are affected by sunlight. Attention has also been drawn to the necessity for precautions to prevent the development of such organisms in solutions intended for administration hypodermically.

The past year has been unenviably notable for the number of quasi-scientific statements put forward in respect to medicinal substances that have been challenged, and about which perhaps the most charitable remark to make is that as yet they are "not proven." Early in the year it was announced by a French chemist that a substance then being supplied at a relatively high price, under the name of "hopeine," as a narcotic principle extracted from the hop, presented most of the characteristics of morphine. This was subsequently confirmed by other experimenters, and at the evening meeting in April Dr. PAUL was able to announce that not only did a sample of this alleged product from "Arizona wild hops" contain an alkaloid that could not be distinguished from morphine, hitherto supposed to be yielded only by the opium poppy, but also an admixture of another alkaloid that could not be distinguished from cocaine. The individuality of "hopeine" —or, as it has also been since called, "morphine of hops"—has been strenuously insisted upon by the "discoverer," but no one else appears to be able to extract such a substance from hops from Arizona or anywhere else. The discovery of a method of producing quinine artificially at an extremely low cost has also been announced, and if confirmed would no doubt be of great chemical, if not commercial, interest. Considerable reticence has, however, been manifested as to the process, and practically all that is known is that some specimens of quinine sulphate supplied as having been produced artificially have been alleged to present the peculiarity of being contaminated by impurities corresponding in their properties to those of the alkaloids accompanying quinine in cinchona bark. Lastly, a substance largely advertised in the United States as a substistitute for quinine, under the name of "kaskine," has in Dr. HOFFMANN'S hands simulated the appearance of finely powdered sugar; but, notwithstanding the announcement of this experience, a "new quinine" has been largely advertised in this country recently under the same name.

The newly-appointed reporter to the Pharmacopœia Committee is not likely to complain of lack of material for his first annual report, since the year has been productive of a fair number of literary criticisms of the official preparations and processes. Of these, ipecacuanha wine has perhaps been the subject of the greatest number, but nevertheless it may be said to have stood the ordeal well, and established its position as an improvement on its predecessor. Evidently some of the loudest complaints were based on inconveniences resulting from unfamiliarity with the new official process, and possibly, in many cases, consequent minute deviations from it. It seems to be admitted, however, that although the new preparation keeps better than the old one, it still deposits more or less, and this has been attributed variously to the oxidation of ipecacuanhic acid and to the action of tannin contained in the sherry. Taking the former view, Mr. BOA is inclined to look to the preservative influence of sugar, whilst

Mr. MABEN would find a remedy in the precipitation of tannin from the sherry before using it. Recognizing both causes as possible factors in the deposit, Mr. A. W. SHENSTONE has suggested the abandonment of the sherry in favour of an acidulated mixture of spirit, glycerine and water. Mr. WELLS has reported that by dissolving an alcoholic extract, instead of one prepared with acetic acid and water, in sherry acidulated with citric or tartaric acid, a preparation is obtained that remains permanently clear. Another defect that has been made apparent is the wide range in the amount of extract obtained by different operators, one person giving the average yield at 84 grains from the ounce of root and another at 119 grains. It may be that the smaller quantity of extract contained practically as much alkaloid as the larger, but this would hardly be a safe assumption, and moreover, if the alkaloid were the only ingredient that had to be considered a solution of emetine would be the simpler preparation. But Mr. BOA calls attention to the fact that, as it is, the new preparation does not froth so much as the old one, and may be deficient in some saponin-like constituent, such as is known to occur in other expectorants, like senega root and quillaia bark. It may be added that Mr. WELLS speaks of the occurrence of a frothing substance in the preparation above referred to, but implies that its disappearance is coincident with a separation of acid tartrate of potassium. Besides the effect of divergences in the way of operating, of course variations in the quality of different samples of root are indisputably a disturbing element, and should it be thought desirable to introduce into a future edition of the Pharmacopœia a process for approximate standardization possibly the observations recorded in a paper read by Mr. W. H. JONES before the Conference might be utilized.

The altered official formula for linimentum terebinthinæ has been as provocative of conflicting opinions as it appears to be prolific in diversity of products, which have been reported as ranging from thin more or less permanent emulsions to solid jellies. This variety in results has been referred with equal confidence to peculiarity in the turpentine used, the quality of the soft soap, the quantity of the water and the method of manipulation. The discussion has been so far useful as to make it apparent that the method of manipulation has at least an important influence on the final form of the product. But since some uncertainty exists at present as to what this should be, an authoritative statement on the point has been asked for in order that available experience may be utilized in providing for uniformity in this preparation. Linimentum potasii iodidi c. sapone is another preparation that has undergone some alteration, and the testimony of correspondents is that with care in the manipulation there should now be no difficulty in obtaining a satisfactory product.

The new formula for belladonna liniment has been criticized from a manufacturer's point of view by Mr. RANSOM, who would use a coarser powder, and economize spirit by shortening the percolation and pressing the marc. He has also reported that the uniformity of the products is affected by the fact that the roots richest in alkaloid are the most readily exhausted, and he therefore favours this liniment being added to the list of standardized preparations, a step for which the work done by himself in association with Professor DUNSTAN paves the way. On the other hand, Mr. MARTIN has expressed an opinion that the provision that has been made for ensuring uniformity of alkaloidal strength in preparations of nux vomica fails to secure the object intended. The official process for testing elaterium has also been criticized adversly by Messrs. JONES and RANSOM.

In addition to the foregoing comments upon Pharmacopœia articles, the official test for the purity of ether has been criticized by Mr. WERNER; Mr. GREEN has pointed out that liquor morphinæ bimeconatis will sometimes require filtration, and that care must be taken not to use a filter paper containing iron; Mr. MACEWAN has condemned the process for making liquor bismuthi citratis, on the ground that the official bismuth citrate is not completely soluble in ammonia; Mr. ROTHER has objected to the addition of glycerine to tincture of kino, and stated that gelatinization is preventible by an admixture of catechu; Mr. SEWARD has suggested still another formula for spiritus ammoniæ aromaticus, and Mr. GRAVILL has recommended the application of ALLEN's nitrometer to the estimation of carbonate of ammonia in that preparation.

It is satisfactory to note that pharmacists are utilizing their scientific attainments in testing the genuineness of samples of the materia medica that pass through their hands. As instances of a high order of this class of work may be mentioned the histological papers by Messrs. PETERSEN and KIRKBY on "sandal woods" and a paper by Mr. KIRKBY on a false pareira brava from West Africa. In view too of the increasing use of sandal wood oil Mr. HOLMES did useful service by summarizing the botanical origin of the different "sandal woods" met with, and the oils that are represented to be derived from them. Mr. HOLMES has also recorded the appearance in the market under the name of "rhatany" of a root probably not derived from any species of *Krameria*, but nevertheless containing a fair quantity of tannin. The fruit of *Daphnidium Cubeba*, the spurious cubebs met with in commerce several times during the last two or three years, has been the subject of a chemical investigation by Messrs. BRAITHWAITE and FARR, and if they be correct in stating that it contains two alkaloids soluble in ether this would appear to afford a convenient means of recognizing its substitution or admixture. Professor MAISCH has contributed an exhaustive summary of the varieties of saffron and the sophistications to which they are subjected

Lupulin has now a place in the Pharmacopœia, with a maximum limit of 15 per cent. of ash; but the ash yielded by four samples examined by Mr. J. S. Ward ranged from 27 to 31 per cent. Cream of tartar has been the subject of an inquiry by Mr. J. W. Bostock, who found only twenty out of twenty-six commercial samples to answer to the requirements of the Pharmacopœia. In the hands of Mr. Alcock samples of citrate of iron and quinine also gave an unfavourable result, only one out of six commercial samples coming up to the standard of containing 15 per cent. of alkaloid, and even this, as well as other samples, giving indications of having been prepared direct from quinine sulphate. Further, in some interesting "analytical notes," read before the Chemists' Assistants' Association, Mr. Burnett gave some reasons for thinking that prescribers are warranted in a preference for natural over artificial salicylic acid, and mentioned that it was not advisable to use pharmaceutically any bismuth compounds that turn a wrapping paper pink.

An inevitable part of such a task as that which is now drawing to a close is to allude briefly to men who during the twelvemonth have been lost by death to pharmacy and science. The Pharmaceutical Society has lost several members from whom it had received good and faithful service. Among these may be mentioned Mr. Henry Sugden Evans, a former President of the Society; Mr. James Baynes, of Hull, a former member of Council; Mr. William Southall, of Birmingham, for many years an esteemed member of the Board of Examiners and at one time President of the Pharmaceutical Conference; Dr. Frederic John Farre, more than thirty years an honorary member; Mr. William Henry Baigent, one of two surviving associates of 1842 and a repeated benefactor to the Benevolent Fund; and Mr. James Stannes, of Tavistock, under whose testamentary dispositions the Benevolent Fund will eventually benefit to a considerable extent. In addition death has removed Mr. Philip Williams, of Horsham; Mr. Henry Goodall, of Derby; Mr. R. Walker, of Maidenhead; Mr. A. Sapp, of Basingstoke, and Mr. Henry Davis, of Leamington, all of whom have served the Society as Local Secretaries. In Professor Morris, the eminent geologist, one of the earlier members of the Society passed away. Abroad among the names that were familiar to British pharmacists were Professor Bouchardat, of Paris, Professor Wayne, of Cincinnati, and Mr. Moens, the eminent Dutch quinologist.

The next meeting of the School of Pharmacy Students' Association will be held on Thursday, January 6, when a paper on "Nitrification, or the Formation of Nitrates in Nature," by Miss E. A. Munro, will be read, and Mr. E. H. Farr will make a Report on Materia Medica.

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A meeting of the London Section of the Society of Chemical Industry will be held on Monday next, at Burlington House, when a paper on "The Explosive Kinetite," by Mr. Watson Smith, will be read.

Parliamentary and Law Proceedings.

Prosecutions under the Sale of Food and Drugs Act.

At the Town Hall, Sheffield, on Wednesday, Dec. 22, before the Stipendiary (Mr. E. M. E. Welby), Mr. George Bywater, druggist, of 215, Arundel Street, was summoned under the Sale of Food and Drugs Act, at the instance of the Health Committee, for having sold tincture of opium which was not of the nature, substance, and quality of the article demanded.

Mr. H. Sayer, Deputy-Town Clerk, prosecuted.

Dr. Sinclair White, Medical Officer of Health, proved that he personally purchased at the defendant's shop three ounces of tincture of opium. The sample was duly divided, and a portion submitted to the Borough Analyst, Mr. A. H. Allen, who certified that the proportion of opium in the sample was less than one-third of that contained in the tincture of opium of the British Pharmacopœia, while the proportion of alcohol was somewhat more than one-half the proper quantity. The facts were admitted by the defendant, who stated that he purchased and sold the tincture as of British Pharmacopœia quality.

Dr. White, Mr. Allen, and Mr. G. T. Wilkinson-Newsholme, President of the Sheffield Pharmaceutical and Chemical Society, all gave evidence to the effect that only one tincture of opium was recognized by pharmacists or the public, and that an article sold as tincture of opium ought to be the British Pharmacopœia tincture.

The Stipendiary said that no doubt the action of the Health Committee was very laudable, but he was of opinion that if a preparation contained any opium and any alcohol whatever it could legally be sold as tincture of opium.

The case was dismissed.

Mr. Joseph Sanderson, of 220, Nottingham Street, shopkeeper, was summoned under the same Act for having sold paregoric elixir, which, according to the certificate of the Borough Analyst, was "wholly destitute of opium, which was the most important ingredient of paregoric elixir."

Mr. Allen, Dr. White and Mr. Newsholme again gave evidence in support of the prosecution, and adduced various authorities to show that opium was an essential ingredient of paregoric.

Mr. Allen stated that the existence of paregoric without opium was as impossible as that of whisky without alcohol. If the preparation had no opium in it, it had no right to be called or sold as paregoric.

For the defence, Mr. A. Muir Wilson called Mr. J. T. Leslie, who represented his brother, a druggist in Trippet Lane, who had supplied the defendant with the preparation in question. It was shown that the bottle out of which the inspector was served was labelled "Paregoric Elixir, guaranteed free from opium," but the attention of the purchaser was not called to the label until after the purchase was completed.

Mr. Leslie said that he supplied shopkeepers with the article complained of, so that they might not infringe the Pharmacy Act, they having no licence to sell poisons. He could not name any ingredient of a medicinal value that the paregoric without opium supplied by him contained.

The Stipendiary said that the name "paregoric" failed to give him any definite impression any more than soothing syrup.

Mr. Sayer pointed out that, for all the defence amounted to, they might simply sell coloured water, and call it paregoric.

The Stipendiary said he did not see that the law prevented it, and dismissed the case.

Mr. Sayer stated that there were several other cases of a similar nature, but in consequence of the ruling of

the Stipendiary, he applied for them to be adjourned in order that the instructions of the Health Committee might be taken with regard thereto.

The cases were adjourned accordingly.

Obituary.

Notice has been received of the death of the following:—

On the 24th of November, Mr. William Parrington, Chemist and Druggist, Batley. Aged 44 years. Mr. Parrington had been a Member of the Pharmaceutical Society since 1877.

On the 8th of December, Mr. Samuel Royle, Chemist and Druggist, Manchester. Aged 53 years.

On the 9th of December, Mr. Henry Thorburn, Chemist and Druggist, Bishop Auckland. Aged 73 years.

On the 16th of December, Mr. William Houghton, Pharmaceutical Chemist, Southport. Aged 53 years. Mr. Houghton had been a Member of the Pharmaceutical Society since 1859.

On the 18th of December, Mr. Joseph Abbey, Chemist and Druggist, Nottingham. Aged 50 years.

On the 22nd of December, Mr. Samuel Thomas Sedgwick, Chemist and Druggist, Bexley Heath. Aged 66 years.

On the 28th of December, Mr. James Marwood Hucklebridge, Pharmaceutical Chemist, Ebury Street, London. Aged 69 years. Mr. Hucklebridge was one of the Founders of the Pharmaceutical Society.

On the 25th of December, Mr. George Atkinson, Aldersgate Street, London. Aged 51 years.

On the 27th of December, Mr. George Frederick Hodgkinson, Waddon. Aged 69 years.

Correspondence.

**** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

The Sheffield Drug Prosecutions.

Sir,—In the interests of chemists generally I think it only fair to draw attention to the enclosed cuttings* from the *Sheffield Daily Telegraph*, referring to the prosecutions for the sale of adulterated drugs. As one of those present in court, I can testify that the reports are not in the least exaggerated, but, on the contrary, somewhat underdrawn. I wish particularly to emphasize the way in which the Bench ignored the British Pharmacopœia, and to ask whether in view of the 15th section of the Pharmacy Act, 1868, this conduct is legal? The clause runs thus:—"Any person . . . . . who shall compound any medicines of the British Pharmacopœia except according to the formularies of the said British Pharmacopœia shall, for every such offence, be liable to pay a penalty or sum of £5." The point at issue is this: Is the title "tincture of opium," without the addition of the letters "B.P.," legally understood to mean a "medicine of the British Pharmacopœia?" You will note that the defendant admitted having (bought and) sold the tincture as a B.P. preparation. Moreover, the proceedings were taken under the "Sale of Food and Drugs Act." If this is not a case of *bonâ fide* adulteration, what is the adulteration of a drug to mean? Again, the British Pharmacopœia is published in accordance with the Medical Act, 1858, which enacts that a book shall be "published containing a list of medicines and their compounds, and the manner of preparing them, together with the true weights and measures by which they are to be prepared and mixed . . . . . " If these medicines can now be prepared according to any formula or whim which an individual, intent on money making by fair means or foul, may devise, whence the use of this enactment? Once more, the effects of such a precedent as this will be bound to be, that in the face of competition the orthodox pharmacist will cease to make his tinctures with spirit of proof or rectified strength, but will use weaker spirits in each case to lessen the cost, and the result will be inferior solution of active constituents and deterioration of products.

In the second case, the analyst reported absence of opium from the paregoric. As stated by the Town Clerk in his opening remarks, the case was instituted with a view of putting down the growing practice of supplying grocers with paregoric *sine* opium for the purpose of allowing them to sell it without transgressing the Pharmacy Act. The defence was that there were known two varieties of paregoric, one with, and the other without opium; the one with for chemists to sell, the one without for anyone to sell: As was pointed out in court, this is quite contrary to time-honoured custom and usage, and the practice, if not suppressed, will lead to dangerous instances of customers getting into the habit of taking the one, then on being supplied from a chemist with the true article taking the same dose (or more likely administering it to children), and thereby producing opium poisoning.

As both of these cases are of burning interest to pharmacists generally, I thought it very desirable that the question should be thoroughly ventilated. It ought to be settled definitely whether the British Pharmacopœia is a legal authority or only a guide to be followed at pleasure.

294, *Uxbridge Road, W.* Jos. F. Burnett, F.C.S.

* A report of the cases will be found on p. 543.

Special Preparations.

Sir,—If anything could illustrate the folly and inconvenience of medical men prescribing "special preparations," the following case, which occurred to me to-day, surely does so. A woman, who had had a miscarriage, sent up by the hands of a child a prescription for two draughts, each containing 1 drachm of "liq. ergotæ ammon." The maker's name was not stated; I did not know the prescriber or where he lived, and I failed to obtain the preparation at any of the neighbouring chemists. Under such circumstances what was the correct thing to do? I presume that had I known the maker I should have had to get either a 4 ounce, or perhaps an 8 ounce bottle just to dispense 2 drachms, the remainder being put away, never probably to be wanted again. Does this sort of thing pay the chemist? It may be all very well for the medical man who dispenses his own medicines.

Pharmacist.

Aconitum Napellus.

Sir,—It is considered that a considerable portion of what is sold as *Aconitum Napellus* is not true to name, and that some at least of these substitutions contain little or no aconitine. It is most desirable that this most important question should be settled. Any pharmacists who grow aconite will confer a favour if they will furnish me with roots to grow, as Mr. Holmes informs me it is only in the young leaf state that *A. Napellus* can be identified.

31, *London Street, Norwich.* Octavius Corder.

A Suggestion.

Sir,—Being in want of a silicated box to post an ointment in, and finding I was not possessed of one of the size required, I bethought me of a substitute, which was as follows.

I took an ordinary turned wood box of the size required and coated the interior twice with a solution of sandarac in absolute alcohol 1 in 2, and am glad to say it answered perfectly.

Serous.

"*Metabolism.*"—We think your criticism is somewhat harsh, considering that the paper was only presented as a report. We will nevertheless, if you wish it, pass on your communication to the reporter.

Assistant.—The preparation of the old London Pharmacopœia is now little used, but a solution of carbonate of ammonia is usually supplied when asked for under that name.

Doubting Thomas.—We are not aware that any analysis of the nostrum referred to has been made.

Communications, Letters, etc., have been received from Messrs. Hustwick, Armstrong, Whelphy, Davies, Elborne, D. A. F., W. J. B.

EXPERIMENTS ON THE GELATINIZING CHARACTER OF CRYPTOPIA.

BY T. AND H. SMITH, EDINBURGH.

The following experiments were made by us in consequence of a statement made by Mr. Dott in a paper communicated by him, and published in the Journal of January 26, 1884, page 581.* They would have been published at the time but the notes were mislaid. They seem to us, however, of sufficient interest to be submitted to the readers of the Journal.

1. As a standard of comparison, a 2 per cent. solution of gelatine, which may be considered as the type of gelatinization, was prepared; it formed, on cooling and standing for a short time, a jelly.

2. A solution of cryptopia made with water, in the proportion of 1½ part to 100 parts of water, with the addition of 1½ part hydrochloric acid. In a few hours it had set into a firm jelly, like that made with gelatine, colourless and transparent.

A disk ¾ of an inch in diameter was placed on the cryptopia jelly and a 100 grain weight laid upon it. The weight was supported without showing any tendency to sink. On the other hand, the same disk loaded with 100 grs. sank in the 2 per cent. jelly made with gelatine. Further, the cryptopia jelly was quite firm, while the other was tremulous. So that a jelly of cryptopia containing a little less than 1½ per cent. actually gives a jelly much firmer than one containing 2 parts of gelatine to 100 parts of water.

Having now a standard with which to compare narcotine for the character attributed to it by Mr. Dott, we made these further experiments.

One and a half parts of narcotine, 1½ parts of hydrochloric acid, and 100 parts of water gave a solution which presented no appearance of gelatinization. Three to 100 gave a like negative result. An increase of the quantity to 6 parts gave the same negative result. Even when the quantity of narcotine was brought to 10 and 20 parts respectively in 100 parts of water the liquids gave not the slightest appearance of either gelatinization or crystallization; for days they retained their original liquid state.

We next dissolved, with the aid of heat, 50 parts of a pure crystallized muriate of narcotine in 50 parts of water. A little of the salt remained undissolved. The solution next day had the appearance of a thick syrup, and could not be considered to have a gelatinous character; for days the solution remained in the same condition.

We now prepared a solution with 50 parts of narcotine, 50 parts of water, and 40 parts of hydrochloric acid, so that the solution should be strongly acid. This solution showed no more tendency to gelatinize than the neutral solution.

We next dissolved narcotine in an equal quantity of glacial acetic acid, and although with difficulty a perfect solution was effected, it formed a thick syrupy liquid, but not in the least gelatinous.

We next dissolved 20 parts of narcotine in 100 parts of water, with the addition of 15 parts of a 40 per cent. sulphuric acid; the result was, as in all the other cases, a solution showing no tendency to gelatinize.

One and a half parts of cryptopia dissolved in 100 parts of water acidulated with 1½ parts of a 40 per cent. sulphuric acid gave a jelly like the hydrochlorate of cryptopia of the same strength.

A very striking and interesting change takes place in the jelly of muriate of cryptopia.

If examined in a day or two after it is formed, a number of opaque white spots are observed, and these go on increasing in number and size, growing into beautiful radiated tufts of crystals, till they fill almost the entire space of the original jelly, forming to the eye a crystalline compact mass, with a thin liquid at the top.

The disk, weighing 11½ grains, used for the gelatine and cryptopia jellies, when put on the surface of the 50 per cent. solution of narcotine, sank at once to the bottom.

* The statement was that "strong solutions of hydrochloride of narcotine show a curious tendency to gelatinize, like the salts of cryptopia."

ASH OF CINCHONA BARK.

BY DAVID HOOPER,

Government Quinologist.

I have recently been engaged in examining the inorganic constituents of cinchona bark, and the analysis has been communicated to the Government of Madras for information of the cinchona planters of the Presidency. As the chemistry of this drug will always be of interest to pharmacists, I send some notes relating to the amount of ash and the quality of the ash occurring in barks cultivated in India.

In Flückiger and Hanbury's 'Pharmacographia' the following statement is made:—"The cinchona barks yield but a scanty percentage of ash, not exceeding 3 per cent., a fact well according with the small amount they contain of oxalate and kinate of calcium."

With regard to the quantity of ash, my experience is that cultivated barks yield over 3 per cent.; the average of three hundred estimations made on samples from this country was calculated at 3·42 per cent. Renewed and old natural barks are the poorer in mineral constituents, but they never fall below 2 per cent. On the other hand, young and branch bark gives as much as 4 per cent., and it is interesting to notice that the leaves afford as much as 5, and sometimes 6 per cent. With regard to the species of cinchona, there is a marked difference in the amount of ash yielded by each, provided that natural bark is operated upon. The crown bark is richer in ash than that of the red, and the red richer than that of the Ledger; and knowing that crown bark grows at an elevation of 7000 to 8000 ft., the red at 5000 to 6000 ft., and the Ledger at 3000 to 5000 ft., the altitude may have something to do with this gradation of ash in the different species.

When gently incinerated at a low red heat cinchona bark should always leave a greyish-white ash. If it is at all reddish, it points to the presence of dust or dirt adhering mechanically to the sample, if weighed, it will be found much in excess of that obtained from clean bark. The two most dirty samples of bark I have met with came from Ceylon, leaving, when burnt, a reddish residue of 18·8 and 19·5 per cent. respectively, but as they were both labelled "dust," neither the vendor would be blamed for the impurity, nor could the purchaser rave on account of its poverty in alkaloids.

A complete analysis was made of the ashes of the two species of cinchona grown on the Nilgiris, the *C*

officinalis growing in the Dodabetta plantation, and the *C. succirubra* from the lower elevation at Naduvatam. Notwithstanding the barks were from different species and localities, the result of the examination shows that there is a great similarity in the composition of the ash.

	C. officinalis.	*C. succirubra.*
Soluble in water	27·33	24·46
Soluble in acid	66·92	69·94
Residue	5·75	5·60
	100·00	100·00

	C. officinalis.	*C. succirubra.*
Insoluble silica	5·75	5·60
Soluble silica	1·42	4·40
Alumina	2·70	4·24
Iron oxide	2·85	3·21
Manganese	trace	—
Lime	32·70	32·80
Magnesia	2·07	2·52
Potash	16·35	12·49
Soda	3·40	2·28
Carbonic acid	27·22	27·77
Sulphuric acid	1·16	1·08
Phosphoric acid	3·93	3·19
Chlorine	·45	·42
	100·00	100·00

The chief constituent is the lime which forms nearly one third of the whole, and exists in the ash in the form of carbonate. The next element of importance is the potash, which amounts to one-sixth and one-eighth of the whole ash respectively.

About fourteen years ago P. Carles wrote a paper on the "Complete Analysis of Cinchona Barks," in the *Répertoire de Pharmacie* (new series), vol. i., p. 60 (which appeared in the *Pharm. Journ.*, March 15, 1873), and a complete analysis is given of the ash of Huanuco, calisaya and succirubra barks from South America. His examinations agree on the whole with the above, but he finds traces of copper and appreciable quantities of manganese present. Although there was quartz present in most of my samples, weighed as insoluble silica, yet there was no trace of copper; and the absence of more than traces of manganese is in accordance with the nature of the Nilgiri soils. I can confirm Carles in showing what a small quantity of chlorine is present. As to barks rich in quinine associated with abundance of lime salts, I cannot agree that there is any relation between the alkaloids and the mineral elements. The cinchonas of South America were poorer in quinine then than the Indian barks are now, and they yielded about half the amount of ash. On the other hand the Ledger barks, which are richer in quinine than succirubras, always contain less ash, and consequently a less amount of lime. There is not much lime in the Nilgiri soil, yet it seems an essential ingredient in cinchona bark, and is taken up in large quantities whether the cinchona is grown in India or America. However different the soils of these two countries may be, a comparison of the analyses of Mr. Carles and myself will show that cinchona bark appropriated to itself a peculiar arrangement of chemical elements. If the arrangement of the inorganic constituents of plants were at all constant it would be a means whereby the chemist could assist the botanist in discriminating between different natural orders, genera, if not species of plants.

Ootacamund, India, December 7, 1886.

BUCHU AND OIL OF BUCHU.*

BY R. SPICA,

Professor at the Royal Institute of Venice.

In 1827 Cadet de Gassicourt (*Journ. de Pharm.*, xiii., 106) found that 100 parts of buchu leaves contain 0·6 to 0·8 parts of an ethereal, yellow oil, lighter than water, 21·17 parts of gum, 5·17 parts of extractive, 1·1 parts of chlorophyll and 2·15 parts of resin. Brandes (*Arch. Pharm.*, 1827, xxiii, 229) prepared, beside the ethereal oil, etc., a glutinous, amorphous substance, soluble in water, chemically allied to colocynthin and cathartin, which he called diosmin. Bedford obtained from the leaves of *B. serratifolia*, 0·66 per cent. of volatile oil, and from *B. crenata* and *B. betulina* 1·21 per cent. Landerer (*Buchn. Repert.*, 1830, xxxiv., 63), by extraction with alcohol, found a crystalline body, insoluble in water, to which he gave, also, the name diosmin. Jones (*Pharm. J. Trans.*, 1879, ix., 673) determined the quantities of ash in the several species to be from 4 to 5·5 per cent., containing a large quantity of manganese, and, by successive treatment with solvents, ascertained that 3·8 to 5·86 per cent. was soluble in ether, 7·7 to 15·7 per cent. in alcohol and 13·9 to 22·38 per cent. in water. Wayne (*Am. Journ. Pharm.*, 1876, p. 18) found that the ethereal oil, treated with caustic soda, and then with hydrochloric acid, gave crystals, which he claimed were salicylic acid. Flückiger, whose researches (*J. Pharm.*, 1880, ii., 404, and *Pharm. J. Trans.*, 1880, No. 533, p. 219) are very important, made his experiments upon *B. betulina*, using the ethereal oil obtained from 35 kilograms of leaves (180 gm. of oil), from which he secured a solid crystalline body, fusing at 83° C., boiling at 233° C., which he called diosphenol, and ascertained the chemical formula to be $C_{14}H_{22}O_3$; also, an oil isomeric with borneol $C_{10}H_{18}O$, boiling at from 205° to 208° C. J. M. Maisch, finally, studying the ethereal oil of *B. betulina* (*Am. Journ. Pharm.*, 1881, p. 331), confirmed the data of Flückiger and disproved Wayne's statement concerning the presence of salicylic acid, which, while sometimes present, was thought to be due either to fermentation or to the presence of other leaves among the buchu examined.†

Extraction of Volatile Oil.—The leaves in a finely powdered state were distilled until no more oil passed over. The oil was lighter than water, and left, while floating upon the surface of the liquid, prismatic crystals. The aqueous distillate contained a feeble acid, whose chemical nature, together with that of the residual, strongly acid, brown liquid remaining in the retort, will be further examined. In order to obtain a larger quantity of the volatile oil, the process of extraction was modified and repeated upon more material. The powdered leaves were macerated with ether for three days, when the liquid became green in colour from dissolved chlorophyll. The larger quantity of ether was then distilled off, while the balance was evaporated, spontaneously, and the oily residue distilled with steam, until no further oil passed over. Every 1000 parts of leaves yielded about 6·5 parts of a greenish yellow oil, having a grateful odour, similar to peppermint and bergamot, and lighter than water. Separated from the water and desiccated over fused calcium chloride, a portion was fractionally distilled. The greater part passed over between from 200° to 235° C., and the last portions were manifestly decomposed and

* From the *American Journal of Pharmacy*, October.

† In the translator's opinion, if the results of Professor Spica be accepted, the more probable theory would seem to be, that salicylic acid does not pre-exist in the leaves; but since a portion or all of the elæopten and the stearopten is of phenylic origin, that that portion is decomposed, first, by the added soda, to form sodium salicylate and then, by the hydrochloric acid, to form salicylic acid, in a similar manner to oil of wintergreen, when that liquid is treated with the same reagents. Further, it is shown, that only in neutral solution does the stearopten possess its characteristic mint-like odour, and any change in this characteristic, must necessarily indicate some change in chemical composition.

gave a different and rather more phenol-like odour than the first. In order to ascertain if the first fractions contained substances soluble in potassium hydrate, a small quantity of the mixed fractions was agitated with KHO, in strong solution, after which separation into two parts took place. Using a second quantity, with a more dilute solution of KHO, it became evident that the KHO solution was not as sensibly coloured, as in the first instance. The insoluble part (elæopten) was then separated, washed with water and desiccated over fused calcium chloride, while the aqueous washings were added to the KHO solution and the remaining elæopten was removed by agitation with ether. The alkaline solution was then treated with hydrochloric acid until slightly acid, when a precipitate formed which, after several minutes, assumed a crystalline aspect. The supernatant liquid was removed and the residue agitated with ether, the ethereal solution evaporated at a low temperature, when the stearopten crystallized in the form of long, flat needles, slightly impure from adhering brown oil.

Examination of the Elæopten (*Diosmelæopten*).—It is a greenish-yellow oil of grateful odour, and constitutes about two-thirds of the volatile oil. It has a pungent, cool, aromatic, and finally, sweetish taste. Desiccated over fused calcium chloride and then distilled, it fractions very irregularly. The first fraction (*a*), very small in quantity, came over at from 180° to 200° C., the second (*o*) at from 200° to 203° C., the third, the largest in quantity, at from 203° to 206° C., the fourth (*d*) at from 206° to 209° C., the fifth (*e*) at from 209° to 211° C.; leaving in the retort a small yellowish-brown residue. Repeating the distillation, after having reunited the more abundant fraction, there was obtained a portion boiling at from 204° to 206° C. (not corrected). This fraction constitutes a perfectly colourless, mobile liquid, lighter than water, having the odour and taste before mentioned, and when subjected to ultimate analysis, gave H 12·00 and C 77·66; while the portion boiling at from 209° to 211° C. yielded H 12·19 and C 77·48. This points to the elementary formula $C_{10}H_{18}O$, isomeric with borneol, which, in 100 parts contains H 11·68 and C 77·92. The portion boiling at from 204° to 206° C. corresponds better, in its results, with this formula, while the higher boiling fractions probably contain compounds less carburetted, and inversely.

The determination of the vapour density was made by Meyer's method, upon the portion boiling at from 204° to 206° C., and conduced to the formula $C_{10}H_{18}O$, but the substance decomposed at the temperature at which the vapour density was taken.

The Action of Sodium upon the Elæopten (*Diosmelæopten*) resulted in the formation of a brownish decomposition product. The addition of sodium was continued until decomposition ceased and water was then added. The brown semi-solid decomposition product was separated from the liquid by filtration through wetted paper. The filtrate was agitated with ether, then treated with more sodium, and acidulated with hydrochloric acid, which separated an oil having a thymol-like odour. It was extracted with ether, and the solvent evaporated spontaneously, when it distilled at from 225° to 238° C., and on fractioning the greater part boiled at from 230° to 232° C. This portion constitutes a light yellowish liquid, very dense, of the odour and taste of thymol and whose aqueous solution (it is slightly soluble in water) does not become coloured on the addition of ferric salts. A combustion of this substance gave H 9·62 and C 77·54, which points to the formula $C_8H_{12}O$, having in 100 parts H 9·67 and C 77·42. The determination of the vapour density by Mayer's process, led to the same formula.

The composition of this liquid, which has phenol-like qualities, would seem to indicate that it is a homologue inferior to ordinary camphor and until its true chemical character is better understood, it is proposed to name it dioscamphor.

Examination of Stearopten (Diosphenol of Flückiger).—The crude stearopten, as previously obtained, was depurated from adhering brown oil by compression between dry paper and then crystallized repeatedly by dissolving in the smallest possible quantity of alcohol, then lightly heating, adding water, slowly, until a slight turbidity ensued, and cooling, when long, white, needle-shaped crystals are formed, having a camphoraceous odour. Heated at 82° C. they sublime, partially, and commence to boil at 220° C., when decomposition ensues. The diostearopten is slightly soluble in water, very soluble in alcohol or ether, and *in neutral solution* has a mint-like camphoraceous odour. The alcoholic solution treated with ferric chloride was tinged an apple-green and then, on addition of more of the reagent, deepened into a bottle-green colour. The hydrates of potassium and sodium dissolve it well, and from their solutions hydrochloric acid precipitates it in minute crystals. Carbonate of ammonium does not dissolve it. It acts, then, like a compound of phenol origin.

The analyses made give different results from those obtained by Flückiger, viz.:—

	Obtained.		Theory. (*F.*) $C_{14}H_{22}O_3$	(*S.*) C_5H_8O.
H	9·79	9·85	9·24	9·52
C	71·65	71·44	76·58	71·44

Apparently, then, the buchu camphor is much more simple in its chemical structure than the results of Flückiger would seem to indicate; it appears to be nothing more than an oxycamphor $C_{10}H_{16}O_2$. This product is perfectly identical in all the characteristics published concerning the diosphenol of Flückiger.

The determination of the vapour density does not tend to establish the formula at $C_{10}H_{16}O_2$ as the substance was decomposed during vaporization, but, in the future with more time and material, correct results will be sought for through another method, and the chemical relation will be ascertained between the diostearopten $C_{10}H_{16}O_2$ and the liquid compound $C_8H_{12}O$. The former is probably a phenylic ether containing, also, one phenol hydroxyl.

Certain other compounds isolated, with alcohol, from the leaves after the separation of the volatile oil, will also be investigated. One of these substances, called *diosmin*, differs completely from the diosmin of Brandes, but may, perhaps, be identical with the diosmin of Landerer, although obtained by a new method of extraction.

THE TESTING OF BALSAMS, RESINS AND GUM RESINS.*

Dieterich and, more recently, A. Kremel have attempted to extend the Köttstorfer method of examining fats and oils to the testing of substances included in the groups of balsams, resins and gum resins. The leading idea in Köttstorfer's method, it will be remembered, is that in fats and oils, besides free fat acids, there are present glycerine ethers of fat acids. By titration it is ascertained how much potassium hydrate is required by a unit of the fat or oil to combine with the free acid, and, further, how much is used up in the saponification of the glycerine ether. The former quantity is distinguished as the acid number, the latter as the ether number, and the sum of the two as the saponification number. Quite similar data are yielded by balsams, resins and gum resins, as all these substances contain free acids mixed with varieties of ethers.

The determination of these bodies may, therefore, be carried out in a manner quite analogous to the Köttstorfer method. About one gram of the substance to be examined is dissolved in alcohol free from acid reaction, some drops of phenolphthalein added and then titrated with half-normal potash solution until there is a permanent red coloration. The quantity of caustic potash used for one gram of the substance is taken in milligrams,

* *Pharmaceutische Zeitung*, August 11, p. 477.

and this is called the acid number. In those substances where ether is present in addition to acid, a definite portion of the liquid is heated with excess of half-normal potash solution, and then titrated back with hydrochloric acid. The quantity of alkali used is calculated to one gram of the substance, and the number of the milligrams similarly taken as the ether number. The sum of the two gives the saponification number.

In the examination of substances not completely soluble in alcohol they are dissolved with the aid of ether-alcohol or ether-chloroform. Gum resins are first exhausted in a Soxhlet apparatus with alcohol, and the alcoholic extract, after drying and weighing, is estimated; the numbers obtained are not calculated in respect to the whole of the substance originally taken, but only for the quantity of resin soluble in alcohol. In the determination of light coloured substances the use of phenolphthalein presents no difficulty; with dark coloured substances, such as peru balsam, guaiacum resin, etc., the difficulty is overcome by adding water to the alcoholic solution up to the point of milky turbidity, and then dropping in alternately potash solution and, after shaking, phenolphthalein, the end reaction being easily recognized by the formation of a red ring upon the surface of the milky liquid. In some cases (copal and sandarac) there is a formation of precipitate after the addition of potash solution, due to the potassium salts of the particular resin acids being difficultly soluble in alcohol; when this occurs the addition of water will redissolve the precipitate.

The following table, giving the results of the examination of different balsams, shows that a conclusion could be very well drawn from numbers obtained as to the nature of a sample. For instance, an addition of gurjun balsam to copaiba balsam would very considerably lower the acid number of the latter.

Balsams.	1 gram substance=mg. KOH.		
	Acid No.	Ether No.	Saponif. No.
Balsamum Canadense	83	—	—
" "	81·3	—	—
" Copaivæ Maracaibo.	73–75	—	—
" " "	76	—	—
" Cop. Mar. from Capaifera nitida	78·7	—	—
" Copaivæ Maturin	77·1	—	—
" Copaivæ Para	29·6	—	—
" " " (?)	78·2	—	—
" Dipterocarpi (Gurjun Bals.)	20·0	—	—
" Dipterocarpi (Gurjun Bals.)	19·3	—	—
" Dipterocarpi (Gurjun Bals.)	14·2	—	—
" Dipterocarpi (Gurjun Bals.)	5·8	—	—
" Mecca	45·1	—	—
" "	51·8	—	—
" Peruvianum	40·4	189·8	230·2
" "	40·8	199·2	240·0
" "	49·4	181·1	230·5
" " fr. Myroxylon Peruiferum	36·7	104·9	141·6
" Tolu	127·2	26·7	153·9
" "	100·6	58·7	159·3
Terebinthin. comm.	128·7	—	—
" "	124·4	—	—
" Venet.	68·4	—	—
" "	70·3	—	—
" Chia	47·8	—	—
" "	53·4	—	—
Styrax liquid.	47·6	31·9	79·5
" Alcohol. depur.	61·0	76·0	137·0

The important kinds of resins are also distinguishable from one another by considerable differences in the figures, as will be seen from the following table :—.

Resins.	1 gr. substance=mg. KHO.		
	Acid number.	Ether number.	Saponif. number.
Benzoin, Siam	141·4	55·4	196·5
" Penang	122·2	57·0	179·2
" Sumatra	96·0	60·9	156·9
Colophonium, light	163·2	—	—
" dark	151·1	—	—
" americ.	173·0	—	—
" anglic.	169·1	—	—
Copal	132·0	—	—
" afric.	147·3	—	—
" indic.	140·2	—	—
" brasil.	127·4	—	—
" fr. Guibourtia copalifera	128·9	—	—
" Zanzibar	85·3	—	—
" "	80·0	—	—
Damar.	31·0	—	—
"	34·3	—	—
" from Damara orient	34·2	—	—
" blanc from Vateria indica	15·4	—	—
Elemi, Manilla	3·0	24·2	27·2
Elemi	17·6	7·8	25·4
Euphorbium.	13·4	64·6	78·0
Guaiacum	23·28	—	—
"	44·0	—	—
Jalapin	14·7	172·9	187·6
Jalap resin	12·9	119·8	132·7
" "	12·1	120·7	132·8
Lacca in granis (alc. depur.)	—	—	174·8
Shellac, white	73·7	102·8	176·5
" yellow	65·5	50·2	115·7
Mastic.	61·8	—	—
"	90·9	—	—
Pix burgund.	142·2	—	—
Resina Pini	77·8	—	—
" " (alcoh. dep.)	102·6	—	—
Sandarac	144·2	—	—
Scammonium e radice	14·6	171·0	185·6
" Aleppo.	8·2	172·0	180·2
Succinum	34·4	74·5	108·9
"	33·4	91·1	124·5

With gum resins the indications are not so useful :—

Gum resin.	Per cent. of resin.	gr. resin=mg. KHO.		
		Acid No.	Ether No.	Saponif. No.
Ammoniacum, afric.	77·6	59·0	123·0	182·0
" persic.	67·7	112·0	30·6	142·6
" "	67·1	110·0	50·0	160·0
" "	70·7	100·0	50·6	150·6
Asafœtida	72·1	26·8	145·2	172·0
"	35·6	54·8	182·1	236·9
Bdellium	48·6	26·0	34·7	60·7
Galbanum	74·3	28·3	119·3	147·6
"	74·2	28·0	132·2	160·2
Gamboge	79·6	100·0	56·7	156·7
Myrrha, indica	30·7	42·1	130·8	172·9
Myrrha	39·5	64·0	95·0	159·0
"	—	60·2	116·5	176·7
"	—	70·3	145·8	216·1
Olibanum	—	59·3	6·6	65·9
"	72·1	46·8	41·0	87·8
" indicum	67·0	50·3	60·5	110·8

The titration of a gum resin is best effected by mixing one gram of the substance with some indifferent body (powdered gypsum by preference) and extracting it with 95 per cent. alcohol. The residue from evaporation of the alcoholic extract, which gives the percentage of resin, is then redissolved in 50 c.c. of alcohol; half of the solution is used in the acid determination and the remainder in the ether determination, the quantity of potash used being calculated to the gram of pure resin. The numbers obtained with gum resins were not very concordant, whilst the differences between the different kinds are not so great as with the resins. At present, therefore, it seems that titration will only have a limited application to the determination of gum resins.

PRODUCTION OF PULQUE AND MESCAL IN MEXICO.*

Pulque and mescal, which are fermented and distilled liquors with a great variety of modifications, are made from the sap and root of the maguey plant or aloe, known as the *Agave Americana*. This plant, in some thirty varieties, grows wild throughout Mexico, and in many districts it is carefully cultivated. It enters into the domestic economy and habits of the Mexicans, and forms one of the most useful products of the republic. Its most important production is the fibre yielded by the long narrow serrated leaves when pressed, and this fibre is said to be almost equal in quality to the best Yucatan heniquen, or jute. Ropes of great strength are made from some varieties of the plant growing in special localities, but the pressed leaves are everywhere of importance for the manufacture of paper. For many centuries past, textile fabrics have been made from them by the Indians. It is stated in a report of the United States Agricultural Department, that the Mexican Government is liberally encouraging the paper manufacture, and a large company has been organized to cultivate maguey plants on Government lands. The list of products furnished by the maguey is very large, and besides pulque, or Mexican beer, and mescal, the chief spirit of the country—a distillation resembling a coarse quality of gin, and very intoxicating in its character—there is a fine quality of brandy, known as *tequila*. The daily consumption of pulque, or beer, in the city of Mexico alone appears to be about 150,000 quarts, and it appears to be the universal beverage of the country. Being in strength about equal to common cyder, it is of whitish hue, and has a slightly acid taste, with an odour which makes it very disagreeable to all but the natives. A maguey plant will reach its maturity in from five to ten years, and grows most rapidly in the warm sections, though not so luxuriantly in the hot coast belts. Large quantities of mescal are produced in the State of Oajac, and *tequila*, or maguey brandy, comes chiefly from the district of the same name, in the State of Jalisco. *Tequila* is highly valued on account of its purity and strength. The Mexican Indians are said to be inordinately fond of pulque; it is consumed in large quantities, and forms the basis of a great number of liquors, all of which are intended to make it stronger or more agreeable. Pulque is made a source of large domestic revenue by all the States; the daily tax paid on it at the gates of the city of Mexico is estimated at about £1000. Another liquor produced direct from the maguey is known as hydromel, or honey juice, being the pure and unfermented juice or sap of the agave. *Pulque de chirmoya* is made from the hydromel of the cultivated agave, cut unripe at the age of three or four years. This is put into skins which have contained the "mother," or pulque made at the regular age, five years and upwards. When transported, the shaking gives it flavour and strength. A choicer liquor is made by heating, underground, old heads of agaves, grinding them coarsely on a stone, and then settling them to ferment in a pulque vessel, after which the contents are distilled. The first jar is known as *bingeré*, and the rest as *bingarroté*. *Pulque tlachique*, a favourite beverage, is made from tender agaves; cut when unripe. There are various admixtures made in connection with this. It is quite thick, and *quahchan* is the same, with the fruit of the Peru tree, deprived of its peel, and left in the liquid for three or four days. *Capololte* is made of the same variety of the pulque, with the seed of the red Peru tree infused therein. After fermentation it is hot and noxious. A species of mescal is made by distilling *pulque tlachique* and molasses, after being allowed to ferment in goat-skin vessels. In addition to these, there are about seventeen other compounds made by mixing sugar and sweet almonds ground with the juice of corn-stalks, sugar or honey being added; by mixing white pulque with blackberries, capulins, pepper, and sugar; by mixtures of prickly-pear juice and fermenting or distilling the same; by adding to white pulque, honey, pepper, anise, and capsicum, leaving the same to ferment for twenty-four hours; by mixing pulque with wild plums (*jabos*) and sugar. *Mantequila* is made of pulque, brandy, and sugar. A wine named *rescado* is made of the trunks of agaves deprived of leaves, cooked in an oven for about a fortnight, then mashed and put with pulque into skins, to which is added mountain hysop, and the liquid is left for two days. *Tepemé* is a wine or liquor produced from the pressed leaves of the narrow agave, in which acacia wood is boiled in order to give it strength. *Mescalde guadalajara* is made by first fermenting in skins, water, honey, and agave heads, and then distilling the liquor. The maguey plant from which the pulque is made grows as high as ten or fifteen feet, and the miel or juice is sucked up through a syphon made of a large gourd with a cow's horn in it, which is called *acajete*. Accompanying the men whose business it is to collect this juice, and who are called *thachiqueros*, are donkeys, which have their backs laden with sheep skins, into which the juice is poured after being sucked up by the syphons. The plant is prevented from flowering at the age when it usually yields pulque, and during its growth it throws out shoots or young plants which are removed from the parent plant when about three feet high, that is after two years' growth. These are planted out at a distance of a yard apart. The *thachiqueros* go periodically among the plants, and mark those which are fit for tapping by cutting a cross on the top of the highest stalk of each plant. When the maguey is fit for tapping, the *thachiqueros* thrust aside the spiky stalks, and cut out the meyolote or central spoke, leaving a cavity which they visit after eight days, when it is full of juice. The plants only begin to yield juice when the flower stalk is on the point of its development, and this is generally discovered by the direction of the radical leaves. When the flower stalk is on the point of formation, these leaves rise from the earth to which they are inclined and endeavour to form a junction so as to protect the flower. They become also of a clearer green, and there are other signs which are closely watched by cultivators. The maguey, after the expiration of eight days, is tapped regularly three times a day, and yields over a gallon a day, and bears for three months, each plant producing about one hundred and twenty gallons before it dies. The juice, when extracted, is conveyed to a large building fitted with square wooden frames, on which are stretched cow-hides shaped like vats, the hair being upwards. The liquid appears to curdle during fermentation, and has an offensive odour; fresh juice is applied three times a day, and when drawn off the liquor is placed in barrels and and sold to the pulqueries, or drinking places. The city of Apam produces the finest pulque sent to the city of Mexico, and this sells readily at about fourpence a gallon. The maguey will flourish on the most arid and rocky soils, is not affected by drought, hail, or even severe frosts, and the plant is used for almost every domestic purpose, from making intoxicants to the thatching of huts.

* From the *Journal of the Society of Arts*.

COCAINE COTTON.*

BY K. ELLER.

A very easy, neat and successful way whereby to obtain the effect of cocaine is to combine it with absorbent cotton. As thus prepared it can easily be applied in a variety of ways to assuage pain and bring quick relief to those suffering. It requires the suggestion merely in order to insure its ready preparation by any ordinarily skilful pharmacist; for instance, a given weight of absorbent cotton, a certain quantity of solution of cocaine of definite strength, and the requisite skill, and a cocaine cotton of exact cocaine value will be the result. A three per cent. solution of cocaine is a good average strength to work with, and on this basis the following formulæ are suggested, unless an exception be noted:—

Cocaine Cotton.

Solution cocaine, 3 per cent.	1 oz.
Absorbent cotton	1 oz.

Thoroughly saturate the cotton, carefully, dry same in a current of warm air and card the cotton to restore it to its former appearance.

Cocaine Cotton with Morphia.

(For toothache.)

Solution cocaine, 3 per cent.	1 oz.
Sulphate of morphia	12 grs.
Absorbent cotton	1 oz.

Dissolve the morphia in the solution of cocaine, and proceed as above.

To be used by introducing a small piece of the cotton into the cavity of the tooth. It can also be used for ear-ache by moistening a suitable piece, with a few drops of water, laudanum or alcohol, and carefully placing it in the ear passage.

Borated Cocaine Cotton.

(For burns and scalds.)

Cocaine solution, 2 per cent.	1 oz.
Boracic acid	30 grs.
Glycerine.	1 dr.
Carbolic acid	20 grs.
Absorbent cotton	1 oz.

Dissolve the boracic acid in the glycerine and cocaine solution, add the carbolic acid, and proceed as in making plain cocaine cotton.

Very useful in the treatment of burned and scalded surfaces, and also in troublesome chafing, where pain and persistent inflammation are attendants.

This list is capable of very large extension. Only this short suggestion is needed to enable the pharmacist to carry his experiments to the limit of wish or convenience.

JABORINE.†

BY HARDY AND CALMELS.

Pure dry pilocarpine does not yield jaborine when heated at 100° for six hours, neither can this substance be obtained by the action of alcoholic iodides on argentopilocarpidine. If, however, carefully dried pilocarpine is heated rapidly to 175°, kept at this temperature for about half an hour, and the product extracted with water made alkaline with baryta, and shaken with ether, the ether contains jaborine and the aqueous solution contains pilocarpidine and jaboric acid. *Jaborine* separates from alcohol or ether in a brown mass, which changes to a brittle, resinous solid. It is insoluble in water, but dissolves readily in ether, and is also soluble in jaboric acid. From solutions of the hydrochloride it is thrown down by potash as a curdy precipitate, which readily agglomerates under warm water. When boiled with concentrated aqueous potash it is converted into pilocarpidine.

Jaborine hydrochloride is extremely soluble in water and alcohol. When boiled with excess of hydrochloric acid, it is converted into pilocarpidine hydrochloride. Solutions of jaborine are brown with a greenish fluorescence, which is not completely removed by animal charcoal. An alcoholic solution of free jaborine yields with a limited quantity of platinic chloride, a dirty white, gelatinous precipitate of the composition

$$(C_{22}H_{32}N_4O_4)_2,PtCl_4\ ;$$

with platinic chloride in excess, a yellowish-white precipitate of the composition $C_{22}H_{32}N_4O_4,PtCl_4$, and with auric chloride a precipitate of the composition

$$C_{22}H_{32}N_4O_4,2AuCl_3.$$

In presence of a slight excess of hydrochloric acid, platinic chloride, whether in excess or otherwise, precipitates the compound $C_{22}H_{32}N_4O_4,H_2PtCl_6$.

Jaboric acid is separated from pilocarpidine by precipitating with excess of silver nitrate, which forms a curdy precipitate of the composition $C_{19}H_{24}N_3O_5Ag.AgNO_3$. Jaboric acid resembles jaborine in appearance, but is very soluble in water, and is not removed from its aqueous solution by ether. With alkalies it forms gummy salts, which dissolve in water and alcohol, and are not decomposed by carbonic anhydride. With silver nitrate in limited quantity it forms the compound $C_{19}H_{24}N_3O_5Ag$, which is precipitated by alcohol in the form of a brown powder. Hot concentrated potash or boiling hydrochloric acid converts jaboric acid into pilocarpidine and β-pyridine-α-lactic acid. Alcoholic solutions of jaboric acid give with platinic chloride in limited quantity a viscous precipitate of the compound $(C_{19}H_{25}N_3O_5)_2,PtCl_4$; with platinic chloride in excess, a yellow precipitate of a hemiplatinochloride

$$(C_{19}H_{25}N_3O_5)_2,PtCl_4 + 2\,C_{19}H_{25}N_3O_5,PtCl_4.$$

With auric chloride a diaurochloride, $C_{19}H_{23}N_3O_5,2AuCl_3$, is formed. The hydrochloride and nitrate of jaboric acid are viscous substances; an aqueous solution of the former gives a viscous precipitate of the composition

$$(C_{19}H_{25}N_3O_5)_2,H_2PtCl_6,$$

with a limited quantity of platinic chloride.

Jaborine and jaboric acid are products of the condensation of pilocarpine, this condensation taking place on the betain nucleus, and may be thus represented (Py = pyridyl):—

$$NMe_3{<}\begin{matrix}CMePy\beta\cdot CO\cdot O\\ O\cdot CO\cdot CMePy\beta\end{matrix}{>}NMe_3.$$

Jaborine.

$$OH\cdot CMePy\beta\cdot CO\cdot O\cdot NMe_3\cdot CMePy\beta\cdot COOH.$$

Jaboric acid.

THE BEVERAGES IN COMMON USE.*

BY PROFESSOR DUJARDIN-BEAUMETZ.

For convenience I shall treat of beverages under three heads,—water, aromatic beverages, and alcoholic beverages.

Water plays an indispensable part in the alimentation of man, constituting more than two-thirds (70 per cent.) of the bulk of the organism. It cannot, then, be omitted from the daily rations of man, and if we include in our estimate the aqueous principles contained in foods, a man ought to consume 3000 grams (or somewhat more than three quarts) of water a day.

I cannot here do more than touch upon this question, which is so important from a hygienic point of view, and if I were to attempt to treat the subject of drinking-waters with any proper degree of fulness I should require several lectures. Therefore I can only call your attention to a few points of interest which have especial reference to hygienic therapeutics, then I shall briefly consider water in reference to certain general properties, and I shall lastly allude to the mineral waters (called table-waters), natural and artificial.

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* From the *Druggists' Circular*, December.

† From *Compt. Rend.*, cii., 1251–1254. Reprinted from the *Journal of the Chemical Society*.

* A lecture on Hygienic Therapeutics, delivered in Cochin Hospital. From a translation in the *Therapeutic Gazette*.

Water contains air and salts. The presence of air is absolutely necessary to render water potable. Boussingault insists that such water should contain at least from 25 to 50 cubic centimetres of gases per litre. These gases should consist of from 8 to 10 per cent. of carbonic acid, and of a mixture of oxygen and nitrogen containing from 30 to 37 per cent. of oxygen and 63 to 70 per cent. of nitrogen.

When water is deprived of these gases it becomes "flat" and indigestible, as is the case with boiled water and the water that melts from the glaciers. Boiled water must first be aerated by churning before it is fit to drink, and glacier water becomes aerated naturally as it forms cascades in its course.

Are the salts also as useful as air in rendering water potable, and is drinkable water fairly represented by water which is chemically pure, corresponding exactly to the formula H_2O?

In France, since the experiments of Dupasquier, and those especially of Boussingault, the opinion prevails that the mineral ingredients, carbonates, sulphates, etc., must attain at least the figure of 50 centigrams per litre in order that water may be fit for drinking purposes. These salts are absolutely necessary for the constitution of the skeleton, especially in the early life of man and animals. In England this view is not entertained, and Frankland has given expression to the opinion that as man finds in his food the quantity of lime necessary for his nutrition, the water which he drinks is the purer and better the more it resembles distilled and thoroughly aerated water. However this may be, when the proportion of calcareous salt is too high, the water becomes hard, and is liable to cause constipation.

Therapeutics has utilized the properties of these limy waters in the treatment of diarrhœa, persons suffering from this affection being often benefited by drinking the hard water of certain wells; and lime-water, which is the familiar combination of water and slaked lime, renders us great services in diarrhœas (especially in infantile therapeutics); the constipating properties of milk are augmented by the addition of lime-water.

Water contains a great number of micro-organisms, the study of which has so recently been made, and the schizomycetes of various waters have been investigated. In this interesting line of study Marie Davy and Miquel, at the Observatory of Montsouris, have made valuable contributions. Taken in their aggregate, these micro-organisms may be divided into three groups. Those of the first are favourable to the health of those using the waters, those of the second are indifferent, those of the third injurious.

The first assimilate the carbon and eliminate the oxygen of carbon-dioxide; they aerate the water. This is the office of certain algæ containing chlorophyll, and especially the *rôle* of diatoms. The baneful micro-organisms consist of the microphytes of putrefaction. They set free nitrogen under the form of ammonia, and render the water putrid and injurious.

The waters of drinking sources may also contain the micro-organisms of infectious diseases, among which the bacteria of cholera and typhoid fever claim especial mention. Lastly, the ova of various entozoa may also infect sources of water-supply, and it is, as you know, through the contamination of water with the dejections of dogs infested with the Tænia echinococcus that man, drinking this water, becomes the victim of hydrated cysts.

Leaving on one side the "infinitely little," one may, as Gérardin has shown, judge of the quality of any kind of water by its flora and fauna. As for the flora, if the water-cress (*Nasturtium officinale*) is not, as it is held to be in popular estimation, the health of the body it is the health of the streams. Wherever it grows the water is wholesome, while on the contrary, the duck-weed or water lentil (*Lemna minor*) always indicates a water of bad quality. As for the fauna, it is everywhere known that the water of streams which are deprived of fishes and molluscs is unfit for drinking purposes.

The temperature of water destined to be drunk is a matter of some importance. Water when iced stimulates the digestive functions when taken in small quantity, and lowers the temperature. Liebermeister estimates this depression of temperature at 0·45° C., and Winternitz at 0·22° C. for the axilla. The usage of ice-water, however, when prolonged, leads to diarrhœa and intestinal irritation, and doubtless much of the gastro-intestinal disorder of countries where free use is made of ice-water is due to this cause.

As for the refrigerant action in general of cold water, if it may be the determining cause of pulmonary and other congestions, as has been observed as a sequel to lavage of the stomach with too cold water, it may, nevertheless, be utilized as a powerful antithermic means in the febrile process: in fact, in pneumonia and typhoid fever we derive a real advantage from the use of cold drinks.

Warm water, on the other hand, determines a rise in the temperature of the body, and it may be affirmed that all our sudorific herb teas, with the exception of such as may contain jaborandi and its alkaloid pilocarpine, which act directly on the sweat-glands, owe their property not to the medicinal principles which they contain, but to their temperature. These hot draughts render us great service, as is known, in the initial periods of eruptive fevers, but they are likely to disturb digestion and provoke vomiting, and they do not quench thirst.

All parts of the digestive tube may absorb water. This is so true of the buccal mucous membrane, that liquor-tasters—a class of professionals whose business it is to test the quality of liquors by holding a mouthful, mingled with air, in their mouth, and then spitting it out—have been known to experience more or less intoxication from the simple testing of liquor in this way, and many a liquor-taster has become a drunkard. It is, however, in the intestine that the absorption of liquids principally takes place. Béclard has shown that water passes very rapidly into the intestinal canal. He has found it two minutes after being swallowed in the duodenum of a man the subject of a duodenal fistula, and, six minutes after being swallowed, in the cæcum of a horse.

I have in my hospital service instituted another series of experiments, showing with what rapidity water disappears from the stomach. In a patient affected with a slight degree of dilatation of the stomach, after having well emptied the gastric cavity by means of a stomach-pump, I introduced a quart of water. At the end of an hour there remained but a half-pint in the stomach. On frequently repeating this experiment, I have found that, on an average, a quart of water per hour will pass from the stomach into the intestine.

The water after being absorbed is rapidly eliminated by the kidneys; it never accumulates in the blood, and determines no alteration of the hæmoglobin. Leichtenstern, in an individual who had drunk seven quarts of water, found no modification in the composition of the blood. This rapid absorption, and no less rapid elimination of water by the urine, sufficiently explain the diuretic effects of water, and my regretted master, Bouchardat, was right in saying that water is the best and most powerful diuretic.

The greater part of our mineral waters, called diuretic waters, such as Contrexville, Evian, Vittel, etc., are only such by virtue of being well tolerated by the stomach, and their ready absorption and elimination. This diuretic action of water is of exceeding importance, and the numerous applications thereof will be apparent in the course of these lectures. As for the action of water on nutrition, I shall not refer to this again. Already, in a previous lecture on the primordial alimentary principles, I showed you that experimenters have arrived at different conclusions, one party maintaining with Genth, Bischoff, Forster, Henneberg, Stohmann, Schmiedeberg, Germain-

Sée, Albert Robin, that water augments the excretion of urea, and may be considered as an agent of disassimilation; the other party, basing itself on the very accurate experiments of Débove and Flamant, claiming that water has no influence on the excretion of urea; nor can it be said that the question is yet definitely settled.

I come now to the subject of the table mineral waters.

In the volcanic region of Central France (Auvergne) we find a great number of springs charged with carbonic acid. These waters, which do not differ in their composition save in the quantity of carbonic acid which they contain, constitute in France our principal table mineral waters; chief among them are St. Galmier, Condillac, Chabetout, Morny-Châteauneuf and De l'Ours. These table-waters are pleasant to take and of great purity. By the carbonic acid which they contain they quiet the stomach and regulate digestion. Their purity makes them especially sought after in times of epidemic. At the same time it will not do to use them exclusively, for they get the stomach accustomed to their stimulation so that it will not digest food without the help of its gaseous draught, and they eventually exhaust the stomach. Lastly, do not forget that certain patients are absolutely rebellious to the administration of these effervescent waters, which may provoke in such persons irritations of the digestive tube.

In connection with these natural mineral waters, I shall say something about the artificial seltzer waters, manufactured now on so large a scale. They are in reality not nearly so good as the natural, and by reason of the low price of the latter, there is but little justification for the substitution.

Moreover, the closeness of union between the carbonic acid and the water which exists in the water as it flows from the springs cannot be imitated in any artifical combination. When the manufactured seltzer water is drunk the gas escapes with too much force and volume, and may oppress the stomach; besides, the gas with which the water is charged may contain impurities from faults in its fabrication. Moreover, the presence of the carbonic acid in the water is no guarantee of the purity of the latter, whose source may not have been free from pollution. Lastly, according to Armaud Gautier, the metallic armatures of the siphons contain lead, and this metal is almost always found in the artificial seltzer waters.

I have finished what I had to say regarding water, and I come now to our second division, which comprises the aromatic beverages.

Under the head of aromatic beverages I propose to speak exclusively of such as contain a certain alkaloid, with the formula $C_8H_{10}N_4O_2$, which Runge, in 1820, found in coffee, and to which he gave the name *caffeine*, which Oudry, in 1827, found in tea, and which he called *theine*, which Martins discovered in the *Paullinia sorbilis*, and which finally Hæckel and Schlagdenhauffen have isolated, along with theobromine, from kola nuts.

In order to simplify the exposition into which I am about to enter, I will admit that all these alkaloids are identical, although I know very well that it is by no means demonstrable that isomeric bodies have absolutely the same physiological action. I shall not touch upon the different hypotheses which have been put forth relative to the atomic composition of this body. I have already called attention to this point in a recent study on the derivatives of caffeine.* I have shown that if, according to Strecker, caffeine is only the methyltheobromine, according to Fischer, on the other hand, caffeine and theobromine are derivatives of xanthine; theobromine is the bimethylxanthine, while caffeine is the trimethylxanthine. But I cannot now take up your time with these chemical researches.

All the aromatic beverages containing caffeine (or the isomeric alkaloids above mentioned) for their bases are used in immense quantities all over our globe, and their employment is much more extensive than that of alcoholic beverages.

Many opinions have been put forth as to the physiological and hygienic action of coffee. These may be reduced to three hypotheses. Coffee diminishes the excretion of urea and is a waste-restrainer; it does not modify the urea excretion, and is a force-producer; or lastly, it acts as a food, supplying elements of nutrition.

The first view is supported by Schultz, Gasparin, Boker, Lehman, Frölich, Trousseau and Pidoux, Rabuteau, Marvaux, etc., who claim that coffee diminishes the quantity of urea excreted; that it does not nourish, but that it prevents denutrition. This is the waste-restraining-aliment theory.

But to facts advanced by these physiologists other facts are opposed, and we see Roux and Giraud in France, Binz in Germany, Brackenridge in England, maintain that coffee, as well as caffeine, in no respects modifies the figure of urea. Hence Gubler, basing himself on the researches of these authorities, affirms that coffee has no action on nutrition, but that it is a tonic, or, rather, a force-producer.

Lastly, Payen has shown that coffee contains nitrogen, and this in quite notable proportion, since in green coffee this essential element exists in the proportion of 4·48 per cent., and in roasted coffee in the proportion of 1·75 per cent. He shows, moreover, that the admixture of coffee with milk, in ordinary usage in many parts of the world as a breakfast beverage, is one of the most nutritious of all drinks, a mixture of 500 grams of infusion of coffee, 500 grams of milk, and 75 grams of sugar containing, according to his estimate, 49 grams of nitrogenous substance and 100 grams of hydrocarbon and salts.

This view has been adopted by Fleury, Bouchardat and Jomand, and is supported by facts, being in accordance with the experience of entire populations (in England, Germany, Switzerland and the United States), who find sustenance in their breakfast dish of coffee.

Coffee is, then, by virtue of the nitrogen which it contains, a food, and you remember that in the primordial alimentary principles I included caffeine among the azotized substances. Moreover, recent experiments of Guimaraës show positively that augmentation of urea follows the administration of coffee.*

But is coffee anything but an aliment? It possesses special tonic properties on the circulation and nervous system. All experimenters are agreed in the fact that under the influence of coffee the beatings of the heart become more rapid and more energetic, the circulation more active, and the urine more abundant. Leblond's study has given us in this regard tracings of high importance. Moreover, whether by the activity which it impresses on the circulation, or by a direct action on the nervous elements, coffee directly affects the brain, and may be called "a cheering and thought-inspiring beverage."

This threefold action, on nutrition, on the circulation, and on the nervous system, makes coffee an admirable tonic, and we are justified in saying that it is largely by reason of the strong coffee, which habitually forms a part of their diet, that our troops have been enabled in the in the burning climate of Algiers to endure the most exhausting campaigns.

It is also owing largely to the coffee, which is becoming more and more an article of daily consumption among the farmers in the country, that we see this class of people able to endure the great increase of toil to which they are subjected in haying and harvesting seasons.

Coffee, in order to be fit for nutrition, must first be torrefied. Payen has made a special study on the modifications which coffee undergoes by roasting, and has shown that during the process there is a breaking up of the chlorogenate of potassium and caffeine, and a setting free of a part of the caffeine held in combination.

* Dujardin-Beaumetz, "On the Physiological and Therapeutic Properties of the Derivatives of Caffeine." (*Bull. de Ther.*, 1886, t. cx., p. 241).

* Guimaraës, "On the Physiological and Hygienic Action of Coffee" (*Arch. de Phys.*, 1884, t. iv., p. 253).

I cannot here touch upon the different modes of preparing coffee, modes by which the properties of roasted coffee are doubtless more or less modified. While in Europe it is the infusion which is drunk almost exclusively, the inhabitants of the East prefer the decoction, and, if we may believe their statement, the decoction, while preserving the tonic and alimentary properties of the coffee, is quite devoid of the exciting properties which characterize the infusion.

The different physiological properties of coffee have caused this food medicine, and its congeners, tea, Paraguayan maté, guarana and kola, to be applied to the treatment of a great number of affections. Its tonic action on the circulation has led to its use in the treatment of diseases of the heart, and Gubler, Lépine and Huchard have shown us all the advantages derivable therefrom. Its diuretic properties have led to its being recommended in dropsies, urinary gravel, and gout. Its cerebral tonic action has rendered it useful in the treatment of migraine and cephalalgia. Lastly, we see its utility recognized in intestinal strangulations and opium poisoning.

I have finished what I wished to say concerning coffee, leaving aside what appertains to infusions made from roasted acorns and chicory, which contain nitrogen, and probably have some food value, but are devoid of caffeine, and therefore of the tonic and excitant properties of coffee.

It remains for me to speak of alcoholic beverages. This is a topic of special interest and importance, and you will permit me to dwell on it at some length. We will study successively alcoholic beverages in general, then the physiological action and digestibility of these beverages. As for alcoholic beverages in general, I shall divide them into three classes: the first includes wine; the second cider, perry and beer; the third distilled spirits and aromatized liquors.

Wine.—It is a profound mistake to suppose that wine is only a mixture of water and alcohol. It is a complete *living whole*, if I may so express myself, all the elements of which constitute so complex and homogeneous an aggregate that we cannot alter any one of them without introducing profound modifications into the composition of the wine. Apart from the water and the alcohol, wines contain glycerin, tannin, essential oils, ethers, salts, and, in particular, tartrates; and according to the period when you examine the wine the quantity of these different elements varies.

Wine, is in fact, as I just told you, a living thing, by the fermentations which it undergoes. It has its youth, its maturity, and its old age. Such crude wines as those of Burgundy are short lived, and their old age is early. Other crude wines, like those of Bordeaux, have a much longer life, and to hasten their maturity are even sent to distant places. Lastly, wines have their diseases, which generally result from want of skill in their fabrication, and from a vicious fermentation determined by the presence of impure products.

The following table from Chevalier and Baudrimont gives the percentage of alcohol in different wines:—

Wine of Marsala	23·83
„ Red Madeira	20·52
„ White Madeira	20·00
„ Port	20·00
„ Bagnols	17·00
„ Malaga	17·42
„ Roussillon	16·88
„ Malaga	15·00
„ Chypre	15·00
„ Red Jurançon	13·70
„ Lunel	13·70
„ d'Angers	12·90
„ Champagne	12·77
„ Grave	12·30
„ White Beaune	12·80
„ Frontignan	11·80
Effervescent Wine of Champagne	11·77
Wine of Cahors	11·36
„ White Mâcon	11·00
„ Volnay	11·00
„ Orléans	10·66
„ Red Bordeaux	10·10
„ Larose	9·85
„ Pouillac	9·70
„ White Vouvray	9·66
„ Château-Latour	9·33
„ Léoville	9·10
„ White Pouilly	9·10
Wine on retail in Paris	8·80
Wine of Château-Margaux	8·75
„ Château-Lafitte	8·73
„ White Chablis	7·88

By glancing over this table you can judge how variable are wines in respect to their richness in alcohol. From a fiscal point of view all wines having more than twenty-five per cent. of alcohol are in France considered as liquors, and all that are above 15·90 per cent. pay double duties. This limit ought to be made even lower, and no wines that contain more than 10 or 12 per cent. of alcohol should be allowed to pass for wines of ordinary consumption. Bear in mind, in fact, that our table wines, and our most celebrated raw wines,—the Château-Lafitte, the Château-Margaux,—do not contain more than 8·75 to 8·88 per cent. of alcohol, and that our wines of Central France scarcely have 7 per cent.

If I insist so much on this point it is because vehement debates have been aroused in our legislative assemblies and in the Academy of Medicine concerning vinage, or the alcoholic adulteration of wines. I am a thorough opponent of the practice of vinage, which, by introducing into wines foreign spirits, modifies and profoundly changes the wine; in fact, in my estimation, spoils it. By the commercial treaties which bind us to Spain, and which allow the introduction of wines with 16 per cent. of alcohol, we see all the spirits of bad quality fabricated in Germany enter our country under the cover of wine.

These wines thus alcoholized entail deplorable consequences on public hygiene, and they have substituted for the drunkenness resulting from the abuse of wine all the worst evils of intemperance seen in other countries where alcoholic stimulants of bad quality are in common use, and we see the fruit of this abundant consumption of strong wines in the grave disorders of the nervous system and the other tissue-degenerating diseases now so prevalent.

But the limits of this lecture will not allow me to dwell further on the alcoholization of wines, which is a subject of the greatest importance.

From a medical point of view wines may be considered under four heads,—the strong wines, the red wines, the white wines, and the sparkling wines.

The strong wines are those which contain 15 per cent. or more of alcohol. These are generally dry wines, which, by their great richness in alcohol, are indicated in febrile maladies and states of prostration where stimulants are required. Unquestionably the wines of Marseilles, of Madeira, of Malaga, also sherry and port, are superior to Todd's potion, which is ordinarily prescribed in our hospitals.

The red wines, by the tannin which they contain, are the tonic wines *par excellence*. Their intoxicating power is not necessarily in relation with the alcohol which they contain, but rather with the ethereal principles which enter into their composition; and I need only remind you here of the distinction so well recognized between the Burgundy and the Bordeaux. The first, by the heady "bouquets" which distinguish them, excite the brain much more than the Bordeaux wines; hence it is that the latter are the most often prescribed in sickness.

(*To be continued.*)

The Pharmaceutical Journal.

SATURDAY, JANUARY 8, 1887.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE TESTING OF QUININE SULPHATE.

A SOMEWHAT tedious controversy has been raised within the last eighteen months concerning the amount of cinchonidine sulphate in the quinine sulphate of commerce, and a number of papers have been published on this subject in various pharmaceutical journals, but without such a settlement being arrived at as is desirable from a practical point of view. Unquestionably it is a point of primary importance that a medicinal preparation such as quinine sulphate should be pure, and accordingly we find in all pharmacopœias directions for applying tests by which the purity of this salt is to be ascertained. Thus, for instance, the British Pharmacopœia, 1867, directed that the presence of salts of other alkaloids besides quinine should be tested for by treating a portion of the salt with solution of ammonia and ether; the German Pharmacopœia, 1872, directed that this point should be ascertained by shaking the salt with cold water and adding to the clear filtered solution a certain proportion of solution of ammonia. If these tests gave negative indications, it was to be inferred that the quinine sulphate to which they were applied was, from a practical point of view, pure. Such, at least, was the general opinion at the period referred to, and although neither of the tests prescribed in these pharmacopœias were supposed to be conclusive means of proving the absolute chemical purity of quinine sulphate, they were respectively founded upon the knowledge of the relative solubility of quinine and cinchonidine in ether, and upon the knowledge of the relative solubility of quinine and cinchonidine in ammonia, so as to give indications of the presence of anything more than small quantities of the alkaloid that was then commonly known as quinidine, but is now termed cinchonidine. It is not to be supposed that the application of either of these tests was anything more than a means of ascertaining that quinine sulphate came up to a certain standard in regard to purity, which was regarded as practically sufficient to meet the requirements of the case. It is now nearly ten years ago that a paper was read at an evening meeting of the Pharmaceutical Society, in which it was shown that the conditions under which both of these tests were directed to be applied were not such as would furnish evidence that the amount of cinchonidine present in quinine sulphate was really only a comparatively small quantity. As regards the test of the British Pharmacopœia, it was shown that in the presence of quinine there was always a certain proportion of cinchonidine that did not separate in crystals from an ether solution of the two alkaloids, and that consequently this portion escaped recognition. It was then shown that when the test was applied as the Pharmacopœia directed at least ten per cent. of cinchonidine would be overlooked in this way, and that if the full proportion of ether mentioned in the Pharmacopœia were used an admixture of as much as thirty per cent. of cinchonidine sulphate might escape detection. As regards the test of the German Pharmacopœia, it was shown at the same time that although the data upon which it was based were correct there was a defect in the mode of applying the test. Notwithstanding the great difference in the solubility of quinine sulphate and cinchonidine sulphate the mere treatment of the quinine sulphate to be tested with cold water is insufficient to separate the more soluble salt from the less soluble salt, and hence it was shown that the cinchonidine salt would not be taken up into the liquid where it was to be tested for by the addition of ammonia. The remedy for this defect was at the same time pointed out as consisting simply in heating the quinine sulphate in question with water to the boiling point, and then testing the solution after it had become cold and the greater part of the quinine sulphate had crystallized out. By operating in this way a much more complete separation of the more soluble cinchonidine sulphate could be effected, and it was found that a salt giving no indications of the presence of cinchonidine when treated with cold water would give distinct indications of it when treated with boiling water. The main object of the paper just referred to was to point out the defective character of the tests generally relied upon at that time for ascertaining the purity of the quinine sulphate of commerce, and to show the necessity for a more precise method of testing this article.

As an incidental illustration of the subject the results obtained in the examination of nine samples of commercial quinine sulphate were stated as showing that while the actual amount of cinchonidine salt present in them varied from one to ten per cent. all of these samples, when tested by the Pharmacopœia method, gave results which seemed to indicate that they were of equal purity. The details of the method of testing by which these results were obtained were published very shortly after the paper was read before the Pharmaceutical Society,* and it was shown that by applying in this way the test with ether and ammonia the

* *Pharm. Journ.*, [3], vii., 672.

presence of one per cent. of cinchonidine sulphate could be detected with ease and certainty. Shortly after the publication of this paper, Dr. O. HESSE, of Stuttgart, formulated a mode of applying this test with the use of a graduated tube, which he termed a quinometer, and except in so far as the quantity of material operated upon by him is rather too small, it may safely be said that there is no more convenient, speedy and trustworthy method of testing the degree of purity of commercial quinine sulphate. This method of testing has also been adopted in the present British Pharmacopœia, but with an unfortunate addition, to which reference will be made subsequently. In the *interim*, however, Dr. DE VRIJ had been occupied with the examination of quinine sulphate by the optical method, and, although the presence of traces of cinchonidine salt in the commercial article had long been known, he arrived at the somewhat remarkable conclusion that he had discovered the presence of a very much larger quantity than had been previously suspected, amounting, in some instances, to as much as 18 per cent. There is much reason for believing that this was a very exaggerated view of the matter, and that a considerable portion of the cinchonidine assumed to have been detected in commercial quinine sulphate by the optical method of testing was referrible to inaccuracies in the results furnished by that method, much in the same way that Dr. DE VRIJ has been led to assume the presence of cinchonidine in cuprea bark, though no chemist has yet been able to detect the smallest trace of it. But for the present purpose it is unnecessary to say more on this point, since the whole question as to the validity of the optical method of determining cinchona alkaloids has been but recently discussed in this Journal. The practical result of Dr. DE VRIJ'S conclusion as to the large amount of cinchonidine in the quinine sulphate of commerce was the suggestion of a new method of separating the two alkaloids in manufacturing operations by first crystallizing the acid quinine sulphate, and by that means he considered that a pure quinine salt could be obtained which was afterwards to be converted into the ordinary neutral sulphate. The same method of treatment was also applied to the analysis of quinine sulphate, and it was maintained by Dr. DE VRIJ that in this way a perfect separation of cinchonidine from quinine could be effected, that the whole of the cinchonidine would remain in the mother liquor from which the acid quinine sulphate had crystallized, and that the amount of cinchonidine could be ascertained by treatment of the mother liquor with ether and ammonia.

This bisulphate test is, however, to be regarded more correctly as a chemical pitfall, and very little consideration will suffice to shew that none but those who are very blind would be likely to follow Dr. DE VRIJ in its adoption. In the first place the bisulphate method involves a violation of the most essential principle to be observed in the determination of cinchonidine when associated with quinine. For the purpose of ensuring accuracy it is above all things necessary in the first place to make such a separation of the two alkaloids that the quinine may be reduced to a minimum. When that is done the cinchonidine associated with it will always crystallize out from an ether solution pure, and if proper precautions are taken to avoid the formation of gelatinous quinine the quantity may be ascertained by collecting and weighing the crystals. There is no way in which this preliminary separation of cinchonidine from quinine can be better effected than by dissolving the perfectly neutral sulphates in boiling water, and allowing the quinine salt to crystallize out by cooling the solution. Almost the whole of the quinine salt will separate as crystals, and by far the greater part of the cinchonidine salt will remain in solution together with a very minute quantity of the quinine salt, amounting to only $\frac{1}{700}$th part of the weight of the solution. Under these conditions it is possible to apply the ether and ammonia method, and to obtain the cinchonidine in a crystalline form for weighing. But by the conversion of the quinine salt into acid sulphate the mother liquor will retain $\frac{1}{10}$th its weight of quinine salt, and consequently the quantity of quinine associated with the cinchonidine will be relatively so very much larger than when the neutral sulphate is operated upon that all possibility of an accurate determination of the cinchonidine by treatment with ether and ammonia will be done away with. This is done to some extent in the British Pharmacopœia test by the addition of sulphuric acid, and the delicacy of the test is proportionately destroyed. But the defects of the bisulphate method are not merely those already indicated; it cannot be relied upon as a means of separating cinchonidine completely from the acid sulphate, and a number of experiments made in regard to this point have shown that when the bisulphate crystals are converted into neutral sulphate and tested, in the manner above described, by boiling with water, and shaking the clear cold mother liquor with ether and ammonia, the presence of a residuum of cinchonidine is always recognizable. It appears therefore to be an altogether superfluous and roundabout way of dealing with quinine sulphate to convert it into acid sulphate for the purpose of ascertaining the presence of cinchonidine and determining its amount, since the characters of the neutral sulphate as it comes to hand are incomparably more suitable for obtaining the desired result than the acid sulphate, the formation of which appears to be little else than a perverse obliteration of all the conditions essential for obtaining accurate results.

During the official year 1885-86, the Royal Prussian Medical and Pharmaceutical Commission examined 220 pharmaceutical candidates. Of these 192 passed, the knowledge displayed by 40 candidates being as "sufficient," 125 as "good," and 25 "very good." From several of the universities all the men who went up were successful. The number of successful candidates during the same period in the whole of the German Empire was 442, being an increase of 22 as compared with the passes in the previous year.

* * *

A project for the formation of an official Pharmacopœia Commission in Germany is now under consideration, and it is proposed that it shall consist of two sections, each having six members. One section is to represent applied chemistry, pharmacy and pharmacognosy, the other is to represent clinical medicine, physicians and pharmacology. The head of the Government Health Department is to be Chairman of the Committee.

* * *

Scientific pharmacy appears to be in a very unsatisfactory condition at present in Peru, so much so that the question of pharmaceutical instruction is being examined and reported on, by a committee of the Faculty of Medicine of Lima, in the hope of some reform being insisted on which may lead to the establishment of professional education on a really scientific basis. It seems that prior to 1856 no public scientific training was required of pharmacists, a mere system of apprenticeship, with a certificate of competence from a pharmaceutical board, which was granted after a very simple theoretical examination, being needful as a qualification to practise. In 1856, the supervision of pharmaceutical professional instruction was entrusted to the faculty of medicine, to which body were added two pharmacists, who were doctors of science, as professors. The students of pharmacy too were obliged to take the degree of Bachelor of Science. This, however, has of late years been dispensed with by the faculty, and it seems that, in consequence of the lack of scientific training experienced by the later generations of students, since the death of the two professors, no candidates have appeared to fill their posts. It is agreed on all hands that the first step towards pharmaceutical reform is to provide and insist upon a satisfactory scientific training. Another matter too requires regulation. *La Farmacia Española* complains bitterly of the depressed state of the profession, saying that within the last few months eight or ten pharmacies have been closed, and that it is pretty certain that several more will soon have to follow their example.

* * *

In Russia it appears that the proprietors of secret remedies require to have official permission to sell their preparations, for which purpose these are first submitted to chemical examination by a medical committee, and in pursuance of this regulation a medicinal water that has been described as effecting marvellous cures has recently been found to be absolutely identical with the water of the Neva. It is probable that in this country the exercise of some analogous control over the sale and puffing of quack medicines would have a wholesome influence in restraining the barefaced exploitation of popular credulity, of which evidence is now so abundantly furnished. In Austria it is customary to deal with such preparations in a very decisive way by means of a Government edict prohibiting their sale. In the current number of the *Pharmaceutische Post* a recent edict of this description is published in reference to certain secret medicinal preparations that have been much advertised, and the local authorities of the provinces are reminded that while it is unlawful for pharmacists to keep or sell these preparations unless they are furnished by the proprietor with a statement of their composition and mode of preparation it is not lawful for traders of any other class than pharmacists to sell them under any condition. The local authorities are therefore called upon to take proceedings through the police in cases where the law is infringed.

* * *

Arnica is regarded by many as a sovereign remedy for contusions, and in such cases it is often applied copiously in the form of a tincture of the flowers for bathing the part affected. But in some instances the use of the remedy appears to be attended with unpleasant results. A case of this kind is reported by a correspondent, which shows that the use of tincture of arnica requires caution. While returning from America, our correspondent was suffering from a heat bump on his hand, for which the doctor gave him a lotion containing arnica. Next day his hand was much swollen, as well as his head, and erysipelas set in so severely that his friends could not recognize him, the eruption eventually spreading over the whole body. For some time he was seriously ill. This was probably an exceptional case, but Brunton states that in applying tincture of arnica flowers to the skin, if evaporation he prevented its stimulant effect may extend to producing redness, and sometimes an erysipelatous inflammation extending for some distance. In the case above referred to the tincture was mixed with glycerine, and this may have had the effect of preventing evaporation sufficiently to cause the inflammation experienced.

* * *

In a series of experiments as to the effect of different essential oils in masking the odour of iodoform, Mr. Dreier, of Chicago, reports that he obtained the best results with the oils of wintergreen, sassafras and melissa. He found that when either of these had been added in the proportion of one drop to one gram of iodoform the odour of the iodoform remained imperceptible at the end of a week.

* * *

The name of Mr. William Bastick, Pharmaceutical Chemist, formerly of Brook Street, London, has been added to the list of gentlemen entitled to serve as Justices of the Peace for the county of Buckingham.

* * *

We regret to report that information has been received as to the death on the 2nd inst., at the age of eighty-nine years, of Mrs. Hester Snowdon, who was elected an annuitant on the Benevolent Fund in 1881.

* * *

On Wednesday evening next the Chemists' Assistants' Association will hold a "Musical and Social Evening" at the Rooms, 103, Great Russell Street.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, January 5, 1887.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT

MR. THOMAS PRESTON GOSTLING, VICE-PRESIDENT.

Messrs. Allen, Baildon, Bottle, Butt, Cross, Greenish, Hampson, Hills, Radley, Richardson, Robbins, Savage, Schacht, Southall, Symes and Woolley.

The minutes of the previous meeting were read and confirmed.

The PRESIDENT said he had received a note from Mr. Atkins, saying he was unable to be present on that day, on account of a domestic affliction, of which most members were probably aware, the sudden death of his son's wife. Mr. Atkins had always been remarkably regular in his attendance, and he was sure that all his colleagues would sympathize with him in the painful circumstances which kept him at home on this occasion.

ELECTION OF ANNUITANTS.

The PRESIDENT formally reported the result of the election of annuitants, which has already been published.

THE LATE DANIEL HANBURY.

Mr. HILLS said he had been asked by Mr. Thomas Hanbury to present to the Council a plaster cast of a medallion, executed by Mr. Woolner, of Mr. Daniel Hanbury. In this medallion were represented not only an excellent likeness of the great pharmacographist, whose work and name they all so highly esteemed, but also a faithful and artistic representation of two of the plants which had been very closely associated with his name. On the one side *Ipomœa simulans*, which Mr. Hanbury described and named, and showed to be the source of the Tampico jalap; on the other side the *Liquidambar orientale*, which, after a long investigation, he showed to be the plant yielding the liquid storax of commerce. He had only to ask the acceptance of this cast by the Council, and add that he was very much gratified at being the medium of communication between Mr. Hanbury and the Council.

The PRESIDENT said he was very pleased on behalf of the Council to accept this medallion, and to say how much they all felt indebted to Mr. Thomas Hanbury for this thoughtful gift, one of a series of good deeds which he had done for the Society; and he was sure they would all appreciate this last as much as any of the former. The longer they lived, the more they learned of the fame and reputation of the subject of the medallion. Those who came officially and actively in contact with many of the officers of the late Indian and Colonial Exhibition, were very gratified to find in what high esteem Daniel Hanbury was held, with what reverence his name was mentioned, and how thoroughly his work was appreciated by botanists throughout the world.

THE BOARDS OF EXAMINERS.

The usual letter from the Privy Council had been received, approving the appointment of the Examiners, as reported last month.

ELECTIONS.

MEMBERS.

Pharmaceutical Chemists.

The following, having passed the Major examination and tendered their subscriptions for the current year, were elected "Members" of the Society:—

Gilson, Charles Boulter .....Margate.
Hilton, Ivor Ajax Robinson ...London.
Liverseege, John Francis .....Birmingham.
Rye, Frank ....Cannes (France).
Southall, Wilfred Francis .. ...Birmingham.

Chemists and Druggists.

The following, who were in business on their own account before August 1, 1868, having tendered their subscriptions for the current year, were elected "Members" of the Society:—

Thomas, Jonathan Jowett .....Garstang.
Waldie, Agnes .....Linlithgow.

ASSOCIATES IN BUSINESS.

The following, having passed the Minor examination, being in business on their own account, and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society.

Flintan, Francis Robert .....Chertsey.
Oliver, Frederick Josiah .....Tunbridge Wells.
Thomas, Edward .....Rochdale.

ASSOCIATES.

The following having passed the Minor examination and tendered their subscriptions for the current year, were elected "Associates" of the Society:—

Barratt, George Frederick .....Penzance.
Blackham, William George ...Liverpool.
Calhaem, Richard Edmund Kean Bristol.
Cruickshank, Gavin Lang .....Aberdeen.
Cumming, John .....Portsoy.
Dalziel, Charles Michie .....Aberdeen.
Evans, Edgar Michael.....Cardiff
Hoare, Walter .....Christchurch.
Hindle, Joseph..... .....York.
Jennings, William Henry .....London.
Philp, William John Ignatius ..London.
Raffan, Robert .....Buckie.
Watson, Frederick Percy .....Lincoln.
Woolley, Samuel Walter.....Stamford.

APPRENTICES OR STUDENTS.

The following, having passed the Preliminary examination, and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Allanson, James .....Wishaw.
Andrews, Charles Russell .....London.
Aplin, John Henry .....Chard.
Averill, George .....Stafford.
Baker, Alfred .....March.
Baldwin, George Joseph.....Loughborough.
Bancroft, Charles Frederick ...Great Grimsby.
Barden, Tedbar ....Dewsbury.
Billington, Herbert Bennett ...Barnsley.
Blomfield, Francis Henry .....Braintree.
Bradbury, Charles .....New Fletton.
Butchart, Robert .....Edinburgh.
Clarkson, Joseph .....Skipton-in-Craven.
Cox, Matthew .....Bishop Auckland.
Cooper, Edwin .....Lincoln.
Crawley, William Pashler .....Oundle.
Crossling, Frank .....Newcastle-on-Tyne.
Davidson, James A. M. .....Aberdeen.
Davies, David Hughes .....Llanddewi Brefi.
Davis, Henry Baker .....Swansea.
Devereux, Arthur Edward ...Stoke-on-Trent.
Drackley, Thomas .....Coventry.
Emerson, Richard Wm. James.Hull.
Eyles, John Robert .....Newbury.
Foot, Wm. Rolstone Whiteway.Totnes.
Gallimore, James Samuel .....Tutbury.
Gautry, Frank ....Goole.
Goulding, Ernest .....Holloway.
Griffith, Edward .....Bodedern.
Gwillim, Walter Robert .....Abergavenny.
Harrington, William .....St. Bees.
Hindle, Robert George .....Wirksworth.
Jeffery, Elias.....Falmouth.
Kay, Harvey George ....Aberdeen.
Kirk, James Robert .....Rawcliffe.
Long, Sydney George Hadlow..Dover.

Macaulay, Donald .....Inverness.
Magor, Martin, Jun. .....Birmingham.
Medd, Frank Edward .....Gloucester.
Monks, Ernest ....Radcliffe.
Onyon, Ellis Atkin .....Lincoln.
Petter, Edward Arthur .....Folkestone.
Place, Edward Bland .....Pickering.
Rae, Robert Burns .....Lenzie.
Ralph, William .....Nairn.
Robins, Harry Hollies.....Dudley.
Roughton, Robert Wilkinson...Chester.
Salmon, John R. .....Coventry.
Scobell, Hubert William.....London.
Skipworth, Bertram George ...Grantham.
Sutherland, Alexander..... .....Pilrig.
Tollitt, William.....Liverpool.
Tottle, Samuel Harpham.....London.
Tudor, William.....Carmarthen.
Turton, Frederick William.....Liverpool.
Vincent, William.....Truro.
Walker, Charles Herbert.....Hull.
Walker, David .....Edinburgh.
Walker, George B. .....Wellingborough.
Webber, James Wilkie .....Taunton.
Wilson, William Oliver .....Royston.
Williams, Timothy .....Carmarthen.
Woodman, Edward, Jun. .....Sutton.

Several persons were restored to their former status in the Society upon payment of the current year's subscription and a fine.

Restorations to the Register.

The names of the following persons, who have severally made the required declarations and paid a fine of one guinea, were restored to the "Register of Chemists and Druggists":—

Frederick Johnson, Wilford Road, Nottingham.
Benjamin Thomas Mills Neale, Sherston Magna, Wilts.

Addition to the Register.

The Registrar reported that—

Alfred Harrison, of Headingley, Leeds,

having made a statutory declaration that he was in business before the passing of the Pharmacy Act, 1868, and this declaration having been duly supported, his name had been placed on the Register.

Reports of Committees.

FINANCE.

The report of this Committee was, on the motion of the President, received and adopted, and various accounts ordered to be paid.

BENEVOLENT FUND.

The report of this Committee included a recommendation of the following grants:—

£15 to the widow (aged 35) of a pharmaceutical chemist, a member and subscriber to the Benevolent Fund. She has three children, the eldest aged four. (Middlesex.)

£15 to a pharmaceutical chemist (aged 65), member from 1853 to 1885, and subscriber for several years to the Fund. Applicant was in business for twenty-seven years, but had to give it up after a long illness. (Surrey.)

£10 to the widow (aged 45) of a registered chemist and druggist. Applicant has had six previous grants. (Lancashire.)

£15 to the widow (aged 46) of a registered chemist and druggist. (Bucks.)

£10 to the widow (aged 30) of a registered chemist and druggist, who has three children, girls, dependent upon her, the eldest aged five. She is endeavouring to obtain employment as a nurse. (Wales.)

£5 to the widow (aged 56) of an associate from 1842 to 1845. Applicant has had ten previous grants, the last in August 1886. Has been very ill for the last two months. (Middlesex.)

One application had been adjourned for further inquiries, and three had not been entertained.

The Vice-President, in moving the adoption of the report and recommendations, remarked that in each case where the Committee had declined to entertain the application, ample reasons existed for the course taken.

Mr. Richardson desired to make an observation on the discussion which took place last month with reference to the administration of the Benevolent Fund. He should be very sorry for it to go forth, as he understood to be the purport of Mr. Symes's remarks on that occasion, that when once annuitants were placed on the Fund, there was no restriction on their future conduct. He believed, on the contrary, that every annuitant was strictly looked after, and in any case of unworthy behaviour, the name would be struck off.

Mr. Symes thought it was a pity to raise a fresh discussion on this subject. It was not his intention to convey what Mr. Richardson had stated, and as he read the report it conveyed exactly what he said. He merely wished to say that where the Committee made a casual grant, and thus sometimes helped the applicant over a period of difficulty, and prevented the necessity for a permanent grant, it had the advantage of thoroughly investigating the circumstances on each occasion. In the case of annuitants the most severe inquiry was made in the first place, and then it was taken for granted that the recipients would go on in the same way in which they had been going up to that time. If anything to the contrary came to the knowledge of the Committee, of course the annuity would be discontinued, but the Committee did not make fresh inquiries from year to year. That was all he meant to say, and he believed it was quite correct.

Mr. Woolley said he was very happy to say that through the exertions of Mr. A. Balmforth, a member of the Society in Manchester, the child of Mrs. Taylor had been successful in getting into the Commercial Travellers' School.

The President also mentioned that in the case of one of the applicants to whom a grant was made last month to complete the purchase money for an annuity, the annuity had been purchased.

The motion was then carried unanimously.

Mr. Bottle suggested, in reference to what fell from the President at the commencement of the business, that there was not quite sufficient touch between the scrutineers appointed at the meeting for the election of annuitants and the Council. It occurred to him that in future it would be well for the scrutineers to present a report to the Council.

The President said no doubt that would be the proper course.

The Society's Business in Scotland.

The President said a statement had been received from the Assistant-Secretary of the income and expenditure on account of the Society in Scotland for the past year, duly authenticated by the Honorary Treasurer. This, in accordance with the usual practice, he proposed to refer to the Finance Committee. Another report had also been received from the same source stating the work which had been done in various departments under his care during the year. This the President proposed should be referred to the Library, Museum, Laboratory, and House Committee.

This course was unanimously agreed to.

LIBRARY, MUSEUM, LABORATORY AND HOUSE COMMITTEE.

Library.

The report of the Librarian had been received, including the following particulars:—

Attendance.		Total.	Highest	Lowest.	Average.
November	Day . .	393	26	7	15
	Evening . .	154	17	2	7

Circulation of books.	Town.	Country.	Total.	Carriage paid.
November . .	130	154	234	£1 18 8½

The undermentioned donations to the Library had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors :—

For the Library in London—

Allgemeiner österreichischer Apotheker - Verein, Zeitschrift, 1886. From the VEREIN.

American Druggist, [continuation of] New Remedies, 1886. From the EDITORS.

American Journal of Pharmacy, 1886.

Annual Announcement, 1886.
From the PHILADELPHIA COLLEGE OF PHARMACY.

Analyst, 1886. From the EDITOR.

Archiv for Pharmaci og technisk Chemi, Jan.-Feb., 1886. From the PUBLISHERS.

Asclepiad, 1886. From Dr. B. W. RICHARDSON.

Botanical Society of Edinburgh, Transactions, vol. 16, part 2. From the SOCIETY.

British and Colonial Druggist, 1886.
From the PROPRIETORS.

British Pharmaceutical Conference, Year-Book of Pharmacy and Transactions, 1885. 2 *copies.*
From the CONFERENCE.

Canadian Pharmaceutical Journal, 1886.
From the ONTARIO COLLEGE OF PHARMACY.

Chemical News, 1886. From the EDITOR.

Chemical Society of London, Journal, 1886.

— Abstract of the Proceedings, 1886.

— List, 1886. From the SOCIETY.

Chemist and Druggist, 1886.

Chemists' and Druggists' Diary, 1887.
From the PROPRIETORS.

Chemists' and Druggists' Trade Association, Tenth annual report, 1886. From the ASSOCIATION.

College of Preceptors, Calendar, 1886.
From the COLLEGE.

Drugs and Medicines of North America, 1886.
From Messrs. J. U. and C. G. LLOYD.

Guy's Hospital, Reports, vol. 43.
From the HOSPITAL.

Hamilton Association, Journal and Proceedings, vol. 1, part 2, 1885. From the ASSOCIATION.

Hooker, Flora of British India, part 13.
From H.M. GOVERNMENT.

Illinois Board of Pharmacy, Annual Reports, 1885-86. From the BOARD.

Illinois Pharmaceutical Association, Proceedings, 1885-86. From the ASSOCIATION.

Imperatorskie S. Peterburgskie Botanetsheskie Sad, Acta Horti Petropolitani, tom 9, fasc. 2.
From the SAD.

Institution of Civil Engineers, List of Members, 1886. From the INSTITUTION.

Kaiserliche Akademie der Wissenschaften in Wien, Anzeiger, mathematisch - naturwissenschaftliche Classe, 1886. From the AKADEMIE.

Linnean Society of London, Journal, 1886.
From the SOCIETY.

Mason Science College, Calendar, 1886.
From the COLLEGE.

Massachusetts State Board of Health, Sixth Annual Report, supplement, 1885. From the BOARD.

Massachusetts State Pharmaceutical Association, Proceedings, 1886. From the ASSOCIATION.

Middlesex Hospital, Reports for 1884.
From the HOSPITAL.

New South Wales, Department of Mines, Annual Report for 1885. From the DEPARTMENT.

New York State Pharmaceutical Association, Proceedings, 1886. From the ASSOCIATION.

Ny pharmaceutisk Tidende, Nos. 1-3, 1886.
From the PUBLISHERS.

Ohio State Pharmaceutical Association, Proceedings, 1885. From the ASSOCIATION.

Owens College, Manchester, Calendar, 1886.
From the COLLEGE.

Pharmaceutical Record, 1886. From the EDITOR.

Pharmaceutical Society of Ireland, Calendar, 1886.
From the SOCIETY.

Pharmaceutical Society of Australasia, Australasian Journal of Pharmacy, 1886.

—Annual Report, 1886. From the SOCIETY.

Pharmacie Centrale de France, L'Union pharmaceutique et le Bulletin commercial, 1886.
From the PHARMACIE CENTRALE.

Philosophical Society of Glasgow, Proceedings, vol. 17. From the SOCIETY.

Photographic Society of Great Britain, Journal and Transactions, 1886. From the SOCIETY.

Provincial Medical Journal, 1886.
From the PROPRIETORS.

Radcliffe Library, Catalogue of books added during 1885. From the LIBRARY.

Royal Botanic Society, Quarterly record, 1886.
From the SOCIETY.

Royal College of Physicians of London, List of fellows, etc., 1886. From the COLLEGE.

Royal College of Surgeons of England, Calendar, 1886. From the COLLEGE.

Royal College of Veterinary Surgeons, Register, 1886. From the COLLEGE.

Royal Dublin Society, Scientific Proceedings, vol. 4, parts 7-9 ; vol. 5, parts 1-2.

— Scientific transactions, vol. 3, nos. 7-10.
From the SOCIETY.

Royal Institution of Great Britain, Notices of the Proceedings, no. 79.

— Additions to the Library, 1882-86.

— List, 1885. From the INSTITUTION.

Royal Medical and Chirurgical Society of London, Proceedings, new ser., nos. 11-13.

— Additions to the Library, supplement 4.

— Medico-Chirurgical Transactions, vol. 69.
From the SOCIETY.

Royal Society of London, Proceedings, 1886.
From the SOCIETY.

St. Bartholomew's Hospital, Reports, vol. 21.

— Statistical tables for 1885. From the HOSPITAL.

Sei-I-Kwai, Medical Journal, 1885-86.
From the SOCIETY FOR THE ADVANCEMENT OF MEDICAL SCIENCE IN JAPAN.

Société botanique de France, Bulletin, 1886.
From the SOCIÉTÉ.

Société des pharmaciens de l'Eure, Bulletin, no. 12.
From the SOCIÉTÉ.

Société française de botanique, Revue de botanique, 1886. From the SOCIÉTÉ.

Society of Chemical Industry, Journal, 1886.
From the SOCIETY.

Timehri, vol. 5, part 1, 1886. From the EDITOR.

University College, Dundee, Calendar, 1886.
From the COLLEGE.

University College, London, Calendar, 1886.
From the COLLEGE.

University of Durham, Calendar, 1886.
From the UNIVERSITY.

University of Edinburgh, Calendar, 1886.
From the UNIVERSITY.

University of Glasgow, Calendar, 1886.
From the UNIVERSITY.

University of London, Calendar, 1886.
From H.M. GOVERNMENT and the UNIVERSITY.

Victoria, Pharmaceutical register for 1886.
From the PHARMACY BOARD OF VICTORIA.

Yorkshire College, Annual report, 1886.
From the COLLEGE.

Bert (P.), First Year of Scientific Knowledge, 3rd ed., 1886. From the PUBLISHERS.

Bastelaer (D. A. van), Brochures diverses, 1886.
From Mr. R. BREMRIDGE.

Flückiger (F. A.), Elementi di farmacognosia, 1886

— Notiz über das erste sauerstofffreie natürliche Alkaloïd und die Arariba-Rinde, 1886.

Flückiger (F. A.), Zur Geschichte der ältesten Beziehungen zwischen Ostasien und dem Abendlande, 1886. From the AUTHOR.

Hamberg (N. P.), Arseniksyrlighetens förändring i beröring med ruttnande animaliska ämnen, 1886. From the AUTHOR.

Laurentz (H.), Beitrag zum forensisch-chemischen Nachweis des Hydrochinon und Arbutin im Thierkörper, 1886. From Professor DRAGENDORFF.

Méhu (C.), Sur les urines sucrées, 1886. From the AUTHOR.

British Pharmacopœia, 1864.

Pharmacopœia Londinensis, translated by Tuthill, 1824.

Pharmacopœia Londinensis, translated by Phillips, 5th ed., 1848.

Smith (J. E.), Compendium Floræ Britannicæ, ed. quarta, 1825.

Browne (J.), Adenographia, a Treatise of the Glandules, 1684. From Mr. J. BAINBRIDGE.

For the Library in Edinburgh—

Australasian Journal of Pharmacy, Jan.-Feb., 1886. From the PHARMACEUTICAL SOCIETY OF AUSTRALASIA.

British and Colonial Druggist, 1886. From the PROPRIETORS.

Canadian Pharmaceutical Journal, 1886. From the ONTARIO COLLEGE OF PHARMACY.

Royal Society of Edinburgh, Transactions, session 1884-85 and 1885-86. From the SOCIETY.

Society of Chemical Industry, Journal, 1886. From Mr. J. R. YOUNG.

Sixieme Congrès International pharmaceutique, 1885, Compte Rendu, 1886. From Mr. R. BREMRIDGE.

The Committee recommended the purchase of the undermentioned books :—

For the Library in London—

Ganot, Elements of Physics, 12th ed.

Provincial Medical Journal.

Roberts, On the Digestive Ferments, 2nd ed.

Robinson, 500 Practical Trade Receipts, 4th ed., 1886.

Willson, Chemical Notes, 2nd ed., 1886.

For the Library in Edinburgh—

Beale, How to work with the Microscope, 5th ed.

Fownes and Watts, Manual of Chemistry, 13th ed.

Sutton, Volumetric Analysis, 5th ed.

The Committee recommended that the *Pharmaceutical Journal and Transactions* be forwarded regularly to the Ecole Supérieure de Pharmacie de Paris.

Museum.

The Curator's report had been received, and included the following particulars :—

Attendance during November.	Total.	Highest.	Lowest.	Average.
Morning .	347	22	4	13
Evening .	123	11	1	5

The following donations had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors :—

To the Museum—

From the Colonial and Indian Exhibition.

The whole exhibit of Messrs. A. S. Watson and Co. in the Hong Kong Court, comprising a series of medicinal oils, oil seeds, and other drugs ; a model of a sesamum oil apparatus, for preparing, crushing the seed, and expressing the oil ; a model of a medicinal seed oil press, and of a ground nut oil press ; a model of the apparatus used in the distillation of Chinese peppermint oil, a model of a mill used for grinding cosmetic powders, and specimens of cosmetics ; a Chinese mortar for preparing internal and another for external remedies, and a canoe-shaped mortar for powdering roots. From Messrs. A. S. WATSON and Co.

Specimens of very large quills of Calisaya bark grown in India ; sections of the trunks of *Cinchona officinalis* and *C. succirubra*, showing the method of renewing and mossing the barks, and sections of the trunks of *Cinchona micrantha* and *C. nitida*. From Dr. GEORGE WATT, India Court.

Specimens of the seeds, roots, and barks of some of the rarer medicinal plants of Ceylon. From Dr. H. TRIMEN, Ceylon Court.

Specimens of Balata milk, the seeds of *Cacoucia coccinea*, *Maximiliana Martiana*, and *Abrus precatorius*. From Mr. G. H. HAWTAYNE, Executive Commissioner, British Guiana.

The whole exhibit of Mr. W. Fresson in the British Guiana Court, including vanilla, isinglass, crab oil, balsam of copaiba, castor oil, cocoa nut oil, cassareep, etc. From Mr. W. FRESSON, Demerara.

The valuable collection exhibited by Dr. Brooks in the Seychelles Court, comprising very fine vanilla ; and the essential oils of cloves, cinnamon, neroli, verbena ; also, kino and other medicinal products prepared from plants cultivated in the Seychelles. Presented by Dr. BROOKS through Messrs. WRIGHT, LAYMAN and UMNEY.

Specimens of *Eucalyptus globulus* in flower. From Mr. E. N. BUTT.

Specimens of a Chinese blistering beetle (*Epicauta Gorhami*). From Messrs DAVY, YATES and ROUTLEDGE.

Specimens of essential oil of sweet basil and ecuelled oils of bergamot, limes, and shaddock fruits. From the MONTSERRAT Co.

To the Herbarium—

A collection of about 150 medicinal plants of the Mauritius, lately exhibited in the Mauritius Court at the Colonial and Indian Exhibition. From the SUPERINTENDENT of the Woods and Forests Department, Mauritius.

A select series of excellently preserved specimens of South African medicinal plants, from the Cape of Good Hope Court. Presented by Dr. ANDREW SMITH, of the Lovedale Mission, South Africa.

A second series of about 150 beautifully prepared specimens of British plants. From Mr. J. W. WHITE, Clifton.

The following donations to the Museum of the Society in Edinburgh had been reported by the Assistant Secretary, Mr. J. Rutherford Hill.

Specimens of the sulphocarbolates of barium, cadmium, cobalt, copper, lithium, manganese, nickel, strontium, and borophenol. From Messrs. CRACE-CALVERT and Co., Manchester.

Professors Bentley and Attfield had attended and reported on their respective classes.

The Committee had further considered the application for a grant from the Aberdeen and North of Scotland Society of Chemists and Druggists, and recommended that a grant of £50 be made.

It was further recommended that £50 be allowed to Professor Dunstan towards expenses in connection with research work in the Octagon Laboratory during the ensuing year, and that he be requested to furnish a report of his work at the end of the year.

The PRESIDENT, in moving the adoption of the report, said the most important item was the grant of £50 to Aberdeen. It was a source of gratification to him that after having considered the subject further with the assistance of material furnished by the Secretary of the Aberdeen Society, the Committee was able unanimously to recommend that this grant should be made. He was the more gratified because Aberdeen was a long way from London; in fact it was a long way from anywhere, as far as he knew. Aberdeen was almost a special part of the kingdom of Scotland, and therefore it was pleasant

to feel that in this way the Council was able to put itself in touch educationally with the brethren in Aberdeen. The Committee was thoroughly satisfied that extremely good work was being done in Aberdeen, and as an instance of what he considered the right way of carrying on local associations, he might mention that having taken larger premises and otherwise enlarged their operations, each member of the Association had agreed to double his annual subscription. The Council always made grants with greater pleasure when it found that local effort was active, and he was quite sure the Aberdeen Association would appreciate this grant.

The motion was then carried unanimously.

The PRESIDENT then read a letter which he had received from Mr. Bosisto on his departure for Australia, enclosing a handsome photograph of himself, and expressing his thanks for the good offices and attention which he had received at the hands of the Council during his stay in England. The President said he was sure the best wishes of the Council would go with Mr. Bosisto, and they would all hope that in the future, as in the past, he would do good work for pharmacy in Australia. Mr. Bowen, the President of the Pharmaceutical Society of Australasia, who had also returned, had desired him to express his acknowledgments for the courtesy he had received, and to him also they would all wish Godspeed on his return to his adopted country.

A letter had been received from Mr. Stephen, of the Victoria Dispensary, Hong Kong, asking for a copy of his certificate of having passed the Minor examination, the original having been lost.

The PRESIDENT explained that it was impossible to accede to this request, but there would be no objection to the Registrar sending Mr. Stephen a certificate of his having passed his examination and being on the Register, which would answer every legal purpose.

BUILDING.

The report of this Committee stated the steps which had been taken for the protection of the back portion of the adjoining premises, in consequence of the pulling down of the old buildings. The architect had submitted plans for the new premises in Pied Bull Yard, under which the laboratories could be placed on the top floor, and the Examination Hall on the ground floor. The Committee having carefully considered this plan, and compared it with the one previously submitted, considered that the balance of advantage was in favour of No. 2, and recommended that it be adopted. It further recommended that tenders be invited from eight or ten builders.

The Council went into committee to discuss this report, and inspect the plans. After a full discussion the report and recommendations of the Committee were unanimously adopted.

GENERAL PURPOSES.

The report of this Committee included the usual letter from the Solicitor, stating the progress of cases which had been placed in his hands.

George Walker, late of Hurst, Ashton-under-Lyne, had confessed judgment for a penalty.

C. J. Jarman, 27, Montague Street, Lower Broughton, Manchester, had been ordered to pay two penalties and costs.

— Hull, Dock Street, Monkwearmouth, had been ordered to pay two penalties and costs.

J. M. Rhodes, Post Office, Penge Road, S.E., had paid £5 5*s.* for penalty and costs, without the case going into court.

Israel Nuttall, Lee Lane, Horwich, near Bolton, had paid £5 as penalty, without the case going into court.

Several fresh cases of alleged infringement of the Pharmacy Act had been considered by the Committee, in some of which immediate proceedings were recommended.

The Council went into committee to receive and consider this report.

On resuming, the report and recommendations were unanimously adopted.

LAW AND PARLIAMENTARY.

The PRESIDENT stated that though notice of a report from the Committee had been placed on the agenda, it had been found that the Committee was not yet in a position to report, the draft bill which had been prepared being found to require alteration in some respects. He hoped that it would be ready for consideration at the next meeting of Council.

REPORT OF EXAMINATIONS.

December, 1886.

ENGLAND AND WALES.

	Candidates.		
	Examined.	Passed.	Failed.
Major (9th)	5	5	0
„ (15th)	5	3	2
	—10	—8	—2
Minor (9th)	26	8	18
„ (10th)	28	9	19
„ (15th)	27	7	20
„ (16th)	30	17	13
„ (17th)	30	11	19
	—141	—52	—89
	151	60	91

Preliminary Examination.

Eight certificates received in lieu of the Society's Examination :—

2 College of Preceptors.
1 Society of Apothecaries.
2 University of Cambridge.
3 „ „ Oxford.

Provincial Transactions.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The sixth meeting of the ninth session was held in the Society's House, 36, York Place, on the evening of Wednesday, December 22, at 9.15. In the unavoidable absence of the President and Vice-President the chair was taken by Mr. W. S. Turnbull, Ex-President.

The minutes of last meeting having been read and confirmed, the Chairman called upon Mr. A. M. Macdonald to read a paper on "Light, Natural and Artificial; its Properties and Uses."

Mr. Macdonald treated the subject at considerable length, and in a lucid and interesting manner; dealing with the nature and sources of light, and the theories and laws by which its various phenomena are explained. Speaking of the electric light he said it was undoubtedly the light of the future, and gave some interesting particulars showing the state of perfection to which this means of lighting had been brought in its adaptability to the lighting of dwelling houses and public buildings.

On the motion of the Chairman a cordial vote of thanks was unanimously awarded to Mr. Macdonald.

The Chairman then called upon Mr. Hill to read a "Note on some Recent Donations to the Herbarium." One of these was a fine specimen of *Lycopodium clavatum*, in the spore-bearing condition, from the wildest part of Aberdeenshire. Another was a specimen in flower and fruit of *Vaccinium Vitis-idæa*, interesting as being one of the adulterants of *Arctostaphylos Uva-ursi*. The specimen showed the spotted under-surface of the leaf, with its slightly crenate and distinctly revolute margin, and

also the inferior fruit, by which *Vaccinium* may be known from *Arctostaphylos*. It was mentioned that the herbarium had now been arranged in natural orders, and could be consulted by members of the Association.

Thereafter specimens of aceto-tartrate and glycerinite of aluminium, sulpho-icthyolate of ammonia, and Unna's gelatine and zinc paste containing 2 per cent. of the sulpho-icthyolate were shown.

The Chairman intimated that the next meeting would be held on Wednesday, January 12, and would be devoted to "Notes and Queries," under the charge of Mr. Macdonald.

Parliamentary and Law Proceedings.

Alleged Fatal Mistake in Dispensing by a "County Drug Company."

The adjourned inquest on the body of Frank Downes Dodwell, aged two years and four months, was resumed at Cheltenham, before Mr. E. W. Coren, coroner, on Monday. Mr. W. Heath appeared to watch the case on behalf of Mr. James Dudgeon,* the assistant who made up a certain powder administered to the child.

The father of the child stated that it was a healthy child from the date of its birth, and had never had an illness until Sunday fortnight last, when it appeared to be suffering from a cold in the head. On the following day the cold appeared to have removed to the chest, and the same evening Mr. Dighton, surgeon, was called in to see the child. A prescription was given, and witness took it to Mr. Hands, chemist, of High Street, Cheltenham, and he gave witness four powders and a bottle of mixture. Mr. Dighton directed that the child should be put in a hot bath, which was done, and as soon as the powders were procured one of them was given to the child, as directed by the doctor. Another powder was to be given to the child about six o'clock on the following morning unless he became more "croupy," in which case the powder was to be given earlier. A dose of the mixture was given to the deceased about an hour after the first powder was administered. About a quarter of an hour after the child had taken the powder he vomited; the mixture appeared to ease the throat a little, but made not much perceptible difference in his condition. Between five and six o'clock on the Tuesday morning another powder was given to the deceased, and that also caused the child to vomit. Mr. Dighton came on the Tuesday afternoon, between three and four o'clock, and saw the deceased again. Two of the four powders were then in hand, and Mr. Dighton directed witness to give the child one of the remaining powders at once—which was done—and also directed a powder to be given every four hours. The fourth powder was given between eight and nine o'clock the same evening, and another hot bath was also administered. Mr. Dighton had increased the number of powders from four to seven, on the occasion of the last-mentioned visit, and between five and six in the evening witness took the prescription to the County Drug Company, in the High Street, and obtained seven powders from that Company's shop. Witness gave the deceased the last of the four powders which Mr. Hands had made up before opening the packet containing the seven powders supplied by the Drug Company. He received the prescription (produced) back with the seven powders. One of the seven powders was given to the child about two o'clock on Wednesday morning. On opening the powder he remarked to his wife how much smaller it was than those which had been supplied by Mr. Hands. Witness mixed up the powder with a little water, and he saw his wife give it to the child. Almost directly the child had taken this powder he began to get drowsy. [Witness here observed that after the the child had taken the last of Mr. Hands's powders, from which he vomited, he became much better, and would not go to sleep till between eleven and twelve that night.] The child could not vomit after taking the first of the powders supplied by the Drug Company, but gradually got worse. Witness directed his wife to use the means he described to the jury to make the child vomit, but the child was unable to do so, becoming quite purple in the face in the attempt. Between four and five the same morning deceased opened his eyes, which by this time had become quite glazed, and the pupils of which were almost invisible. Mr. Dighton was then fetched, and he came soon after five the same morning. On opening one of the powders, Mr. Dighton, he believed, remarked that there appeared to be some mistake, and requested witness to go with him to the Dispensary. Witness went, and the doctor gave him three other powders for the deceased. These powders were administered at intervals of four hours during the day. Towards midday deceased became a little better, but grew worse an hour or two later; he seemed to be in a state of semi-consciousness all day. Mr. Dighton came again about one o'clock the same day, when he told witness that the powders were evidently wrong, and sealed the five remaining powders, together with the prescription, and forwarded them to the county analyst for analysis. On this occasion Mr. Dighton gave witness another prescription for more powders, and a liquid mixture; one dose of this mixture was given to the deceased between four and five o'clock, but none of the powders were given. As far as he could tell, the mixture did not have any effect upon the child, who remained in a partially unconscious state till his death. Witness's wife gave milk and port wine to the child while it was in this state. At eight o'clock Mr. Dighton again came to see the child, and tried to bring on vomiting, but did not succeed. Directly Mr. Dighton had left—about nine o'clock—the child had a turn for the worse, and at a quarter to eleven the same night he died.

Cross-examined by Mr. Heath: Deceased was taken with croup on December 20. He was quite sure he had not given the first of the powders received from the Drug Stores before it went to sleep on the Tuesday night. The child lived for twenty-one hours after taking the powder from the Drug Store.

Mr. A. A. Dighton, surgeon, said he was first called in to see the deceased on the evening of Monday, the 20th ult., and found the child suffering from croup. Witness prescribed for the child, among other things, four powders containing 10 grains of ipecacuanha. He ordered one of the powders to be taken at once, to be followed in an hour by a dose of a mixture, and the powder to be repeated if the child became more croupy. A hot bath was ordered, a linseed poultice was ordered to be applied to the throat, and milk and port wine were to be given. He saw the child on the following afternoon, and finding it was going on well, he ordered seven powders to be sent instead of four, one of which was to be taken every four hours. The powders were prescribed as emetics. On the Wednesday morning, about 5.15, witness was again called in to see the deceased, and found him in a semi-comatose condition; the pupils of his eyes were dilating slightly, and responded slightly to light. His breathing was heavy, and witness immediately asked who dispensed the powders. Witness took one of the powders and remarked that he was afraid there had been a mistake, and that he should take one of the powders away to analyse it. He also got the father of the child to accompany him to the Dispensary, where he gave him three powders of the right sort to go on with. Before leaving the house witness ordered the child some castor oil. Each of the three powders referred to contained 10 grains of ipecacuanha and nothing else. Between that time and when he next saw the child he tested the contents of the powder he took away from the house, and came to the conclusion that it was not the sort of powder he had ordered. At about mid-day the same day he saw the child, when he

* This name is not to be found in the Register of Chemists and Druggists.

appeared to be better than in the morning, being conscious; the pupils of the eye dilated and freely acted to light. Some fresh powders of the same nature as those previously ordered were again ordered, and witness then told the father of the child that something was wrong in the powders supplied by the Drug Store. Witness received from the deceased's father a box of five powders, which he labelled and forwarded to the county analyst, accompanying it with a letter in which he stated: "I should be obliged if you will test the enclosed powders, as I believe that instead of being pulv. ipecacuanhæ, as ordered by me, they are pulv. ipecacuanhæ co. If this is the case, I shall leave it in your hands." About eight on the same evening he saw the deceased again, and found him in a very exhausted condition, and perspiring profusely. Witness tried to produce vomiting, but failed, and the child died the same night. Compound ipecacuanha powder would contain sulphate of potash, ipecacuanha, and opium, while an ipecacuanha powder would contain ipecacuanha only. The compound powder would not be a proper powder to give to a child suffering from what the deceased suffered from. Opium would be a very improper thing to administer to the deceased. The effect on a child in the condition of the deceased who had taken one of the compound powders would be drowsiness, contracted pupils of the eyes, profuse sweating, and the passing into a state of unconsciousness.

The Coroner: Supposing the child to have taken a compound powder containing a grain of opium, would that be likely to have caused or accelerated the death of the child?—It might have caused the death of the child.

Would it have accelerated death?—It would have retarded his recovery.

Is a grain of opium a fair dose for a child of the age and condition of the deceased?—It is an unheard-of dose.

Is the prescription you have written a perfectly clear and intelligible prescription to any dispenser of medicine?—Yes.

Is there anything in the prescription that could possibly induce any dispenser to make up a compound powder for a simple one?—Certainly not.

Cross-examined: Croup is a serious malady, and recovery depends upon the severity of the attack. I should say that the relapse that this child suffered was the result of taking the powder supplied by the Drug Company, the injurious part of which was the opium. It was unusual for a child to have lived twenty-one hours after taking a grain of opium. An ordinary ipecacuanha compound powder for an adult would contain from 5 to 10 grains of opium. The ordinary Pharmacopœia dose of opium is from ½ a grain to 3 grains.

Mr. Heath drew attention to the fact that in the prescription the word ipecacuanha was contracted to ipecac., with a full stop after the seccnd c—which was a large one—and asked if that might not have been taken for "ipeca co."

Witness: Certainly not; if lawyers read dots for o's there is no knowing what they will do. I should think that any dispenser, knowing the close similarity between pulv. ipecac. and pulv. ipecac. co., would take extra care in reading the prescription and dispensing the same.

Cross-examination continued: Unfortunately my medicine did not act after the powder supplied by the Drug Company had been taken. The symptoms after taking the powder were not all those of croup, neither were there any symptoms of croup sufficient to cause the death of the child when I last saw it—two hours before death. It was an unusual thing for the symptoms of opium to have continued so long in the child. It is a common thing in the cases of opium poisoning for the persons affected to get better and then to have relapses, according to Taylor's 'Medical Jurisprudence.' The medicine I prescribed for the child on December 22, was "ipecacuanha wine 2 minims, antimony wine ½ a minim, glycerine 10 minims, water a teaspoonful; one teaspoonful every four hours." The powder was "pulv. ipecac., grains 10; send 4." I should not order a "pulv. ipecac. co." powder every four hours.

By the Coroner: In my opinion the great exhaustion of the child was the cause of death. The powders which I prescribed would not have produced exhaustion to such an extent as was the case in this child. The taking of the compound powder, added to the condition of the child, would have increased the exhaustion. If my prescriptions and orders had been carried out, and no other powder given to the child beyond those I prescribed, in my opinion the child would have recovered.

Kate Teall, in the employ of Mr. Dighton, proved the posting of a box and letter from her master to Mr. Embrey, county analyst.

Gertrude Eliza Dodwell, mother of the child, corroborated her husband's evidence.

Cross-examined: One dose of the mixture, three powders, and a dose of castor oil were given to the child on the day of its death.

Mr. George Embrey, county analyst, gave the result of his analysis of the five powders forwarded to him by Mr. Dighton. He first proved the nature of each powder, then mixed them, and then made a quantitative analysis of the whole. The percentage composition of the powders was 77·5 parts of potassium sulphate, and organic matter 22·5. The organic matter consisted approximately of opium and ipecacuanha powder in equal proportions. The five powders weighed 61 grains, or a little over 12 grains each. There would be more than 1 grain of powdered opium to each powder, which, as far as his information went, would be a large dose for a child. He should say the prescription produced was a very clear and legible one; although not an expert in reading prescriptions, he read it the first time he saw it. Witness had made an analysis of the contents of the stomach of the deceased (received from P.S. Woolford), together with the brain, part of the liver, and kidney. The stomach contained a very small quantity of fluid. Witness specially searched for potassium sulphate and opium, and found traces of both. The quantity of opium was very small; he could not estimate the amount.

Cross-examined: Opium was in the stomach, but how much I cannot say.

At this stage the inquest was adjourned till Monday next, at half-past-two.—*Cheltenham Examiner.*

Conviction under the Sale of Food and Drugs Act.

At the Westminster Police Court, on Monday last, Mr. William Aston, pharmaceutical and dispensing chemist, of 36, Sloane Square, Chelsea, appeared to a summons before Mr. Partridge, at the instance of the Vestry of Chelsea, charging him with selling a compounded drug, namely, iodide of potassium solution, not in accordance with the prescription of the purchaser, the inspector under the Foods and Drugs Act. A second summons was for the offence of selling a drug not of the nature, quality and substance demanded.

The inspector employed by the Vestry said that the medical officer of the parish, Dr. Seton, who was also the appointed analyst, had found that there was considerable carelessness in making up prescriptions at chemists', and by his direction a prescription for a mixture of 90 grains of iodide of potassium, and 6 ounces of water was left with the defendant to make up. The result of analysis was the discovery that there was only 71 grains of the drug used in the preparation, or 19 short of the number prescribed.

The defendant thought that technically he was not in a position to question the accuracy of the analyst's certificate; but he was quite unconscious that any inaccuracy occurred in making up the prescription.

Mr. Partridge thought it was of the utmost importance that doctors' prescriptions should be dispensed with absolute accuracy, and fined the defendant 20*s.* and 4*s.* costs.

Obituary.

ALFRED BISHOP.

We regret to have to record the dealth, somewhat suddenly, of Mr. Alfred Bishop, of Speck's Fields, Mile End New Town. The name of Mr. Bishop has been long associated with the manufacture of granular preparations, the most popular of which, known as "granular citrate of magnesia," was first introduced by him upwards of a quarter of a century ago. Before that time, we believe, Mr. Bishop travelled for one or two wholesale houses, and he was at one time employed as an assistant in the house of Dinneford and Co., New Bond Street. Mr. Bishop was an examined pharmaceutical chemist and a man of great perseverance and very considerable practical experience. He became a Member of the Pharmaceutical Society in 1859, and was always a loyal supporter of it, as well as a munificent donor to the Benevolent Fund.

Notice has also been received of the death of the following :—

On the 20th of December, Mr. William John Jones, Pharmaceutical Chemist, Newland Terrace, Kensington, London. Aged 63 years. Mr. Jones had been a Member of the Pharmaceutical Society since 1845.

On the 25th of December, Mr. Alderman Henry Gilham Martin, Fishpool, St. Albans. Aged 60 years. Mr. Martin was formerly in business as a Pharmaceutical Chemist in St. Albans, and was then a Member of the Pharmaceutical Society. He took an active part in local affairs, and was elected to the civic chair in 1869.

Correspondence.

**** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Sir John Lubbock's Shop Hours Regulation Bill.

Sir,—Upon perusing your report of the admirable paper read by Mr. Magor at the last meeting of the Midland Counties Chemists' Association, one cannot help being struck by the favourable impression Sir John Lubbock's Bill has produced on the minds of our brethren in the Midland Counties; but, it is deeply to be regretted that the far-seeing and much esteemed President should consider "compulsory closing at eight o'clock" to savour of "grandmotherly legislation," and perfectly absurd to talk of it as an infringement of the liberty of the subject, especially, when the hours of labour of the working classes have to a considerable extent been regulated by legislation, which doubtless has had the support of many members of Parliament, holding the same political opinions as Mr. Barclay, whose place of business, I imagine, is not kept open till nine or ten o'clock at night.

That our grandfathers and perhaps grandmothers "mixed paint at six a.m., and found something to do at eleven p.m.," is surely not a sufficient reason, why, in these days of progression—when chemists must be abreast of the time—the present generation should have their noses to the grindstone fourteen hours a day.

Two blacks do not make a white; and if our noble ancestors were so particularly partial to long hours, and had the idea that the smell of paint at six a.m. would give them an appetite for breakfast, or that powdering aloes, or some such agreeable occupation, at eleven p.m. would make them sleep soundly and have pleasant dreams, this would surely not be an argument against the Shop Hours Regulation Bill; neither does it follow that we of more enlightened days should be deprived of all social intercourse and recreation, because they were foolish enough to spend their days in mere drudgery.

To me it appears that the narrow-mindedness and petty trade jealousy, which at present are so common with many of our brethren of the mortar and pestle, may be attributed to a great extent to the want of association with their fellow men, which the unreasonably long hours of business prevent their enjoying.

The Vice-President, in the recent discussion at Birmingham, also objected to compulsory closing, yet I have no doubt he is in favour of the examinations as at present existing, and perhaps of a compulsory curriculum. For my part, I have always found that chemists could never mutually agree to close early for any length of time; some would invariably break any arrangement which might have been agreed upon. Yet why we should work all hours of the day, and frequently be called up during the night, whilst men in other stations of life, with less responsibility and much better remuneration, should work about eight hours a day, I can scarcely understand.

The Shop Hours Regulation Bill is undoubtedly a step in the right direction, and my earnest hope is that it may soon be placed on the statute books of the realm, and that the author of so beneficial a measure may thus add another claim to be regarded as one of the benefactors of his time.

43, *Green Lane, Liverpool.* D. A. F.

Mr. Lee's Suggestion.

Sir,—In your issue of November 20, I noticed a letter, signed James Lees, Oldham, suggesting how to deal with unqualified men; and have been waiting to see if some more able writer of letters than myself would take the matter up. So far no one has, although it is a subject that should have brought forward numerous opinions. I, for one, cordially agree with Mr. Lees's suggestion, and should have a circular issued in even stronger language than he suggests. The time has arrived when something should be done to prevent unqualified men carrying on precisely the same business as ourselves, with this small difference, we are licensed to sell "poisons," they are not. And pray how much a year do we turn over in "poisons?" with the risk of some lunatic putting an end to himself by poisoning, and then have to be censured by a coroner for not being more careful, although, perhaps, after having carried out the Poisons Act to the letter. Although the unqualified are not supposed to sell poisons, I have no doubt they all keep them in stock for prescribing; and if they know their customer well, would not hesitate in selling them. The other day I had a bottle brought to my shop bearing a label "Paregoric," labelled "Poison," etc., etc., which had been supplied by an unqualified man. Now, one of two things is certain in this case; either the man was breaking the law by selling a poison, or he was liable under the Food and Drugs Act for selling an article which was not genuine. I do not suppose the Society has power to prosecute under the Food and Drugs Act, but it would be doing both the public and the chemists a great service by urging the proper authorities to do so. There are thousands of shops in the large towns where a preparation composed chiefly of water and burnt sugar is sold as paregoric. Unfortunately, the public in the lower-class neighbourhoods do not know but they are getting the genuine article; neither do they know the difference between a qualified chemist and an unqualified one, so long as he has his shop stocked with bottles, and sells all the sundries usually sold by chemists. To carry out Mr. Lees's suggestion would be the only means of teaching the ignorant public the difference.

In a few days I shall have the pleasure of having one of these "drug stores" not a hundred yards from my own shop, although the neighbourhood is already well stocked with chemists.

I hope some more of the readers of this Journal will take the matter up, and keep the ball rolling until we get something done to compensate us for the cost of our title.

Hull. A. P. S.

[*** The difficulty in obtaining a conviction for the sale of "paregoric" containing no opium was illustrated in a case reported last week, before, p. 543.—Ed. P. J.]

Ignorans.—The questions for the Jacob Bell Scholarship Examination are set every year by the examiners appointed by the Council to conduct the examination. The questions set for the last examination will be found before, p. 302.

Communications, Letters, etc., have been received from Messrs. Burroughs, Wellcome and Co., Shillinglaw, Sajoux, Thompson, Botham, Elborne, Pharmaceutical Chemist, J. K.

THE AMOUNT OF CAFFEINE IN VARIOUS KINDS OF COFFEE.

BY DR. B. H. PAUL AND A. J. COWNLEY.

Having recently had occasion to determine the amount of caffeine in several samples of coffee, for the purpose of comparison, it became necessary in the first place to make some experiments in order to ascertain what method could be relied upon for furnishing uniform and constant results. By extracting the beans with boiling water, completely precipitating the clear liquid with subacetate of lead, then removing any excess of lead from the filtrate and evaporating to a small bulk the caffeine may be obtained in a crystalline condition; but it is still very impure, and the recrystallization, after pressing between bibulous paper, so readily gives rise to loss that this method cannot be relied upon to give accurate results. It is, moreover, extremely tedious and troublesome. Dr. James Bell* recommends as a better method the extraction of coffee beans mixed with magnesia by boiling with strong alcohol, evaporating off the spirit and treating the residue with water to dissolve the caffeine. In this way a considerable portion of the colouring material is separated by the magnesia, and a further quantity is got rid of by evaporating the aqueous solution to dryness with a further quantity of magnesia, and then dissolving the caffeine in hot benzol. We have not, however, found this method to give more satisfactory results than the previous one, and one circumstance that greatly interferes with its application to coffee is the considerable amount of fat present in the bean. After several attempts to modify these methods of treatment for the determination of caffeine in coffee beans we had recourse to the use of lime as a means of separating the tannic acid while dissolving out the caffeine by boiling with alcohol. For this purpose it is advisable to mix the finely powdered coffee with moist lime and then to extract the mixture in a continuous percolator of the kind described by Waitt in this Journal (vol. xiv., p. 376). The alcohol is then evaporated off and the dry residue is mixed with some water and a few drops of dilute sulphuric acid, the addition of which has the effect of separating the fat and clarifying the solution by converting a small quantity of soluble lime salt into calcium sulphate. After filtering the cooled liquid it is quite free from fat, and may then be evaporated to obtain the caffeine in a crystalline state. A better plan, however, is to extract the caffeine from the solution by shaking it with chloroform, in which it is freely enough soluble to be readily taken up, and on evaporating off the chloroform caffeine will be obtained in a condition fit for weighing. The principal points to be observed in carrying out this operation are the acidification of the water solution from the spirit extract and the shaking with chloroform, but with proper care very uniform results can thus be obtained. We have hitherto been in the habit of operating upon 50 grams of coffee beans in each experiment, but after confidence in the method has been obtained and experience in operating a much smaller quantity might be taken.

On applying this method to the determination of caffeine in various samples of coffee we were at first somewhat perplexed by the great discrepancy of the published statements as to the amount of this constituent that is present, as will be seen from the following quotations:—

	Caffeine in raw coffee beans per cent.
Robiquet	0·32 to 0·64
Liebig	0·23 to 0·46
Zenneck	0·75
Graham, Campbell and Stenhouse	0·88 to 1·00
Dragendorff	0·99 to 1·22
Squibb	1·00 to 1·03
Bell	1·08 to 1·11
Allen	0·50 to 2·00

The discrepancy between the data given as applying to roasted coffee is still greater, and in the *Allgemeiner Kaffee Zeitung* for 1884 the amount of caffeine in roasted coffee is stated to range from 2·00 to 3·64 per cent.

The first result with which we were struck on carrying out a number of experiments with several different samples of raw coffee beans was the very narrow range within which the amount of caffeine appeared to vary. Instead of being a varying amount, it was more nearly a constant quantity in those kinds of coffee beans we had an opportunity of examining, which were the following:—

	Caffeine per cent.
Coorg	1·10
Guatemala	1·18
Travancore	1·16
Liberian.	1·20
„	1·28

In making these determinations the raw coffee berries were not dried, but taken just as they came to hand and powdered. A difference in the amount of water might therefore have altered the amount of caffeine in the dry material, but there is not much reason for expecting that the foregoing data would have thus been materially affected. It would be desirable to extend these determinations of caffeine to a number of other samples of coffee from various sources, and it is to a great extent with the hope of obtaining samples for examination that we now make known the results that have been so far arrived at. In a future communication we propose to deal with the determination of some of the other constituents of coffee.

The above determinations were all made with unroasted coffee, and it may be added that in experiments with roasted coffee we found a similar uniformity in the results obtained, so that a determination of the amount of this constituent may probably furnish a means of detecting the adulteration that is now so largely practised in the sale of ground coffee according to the custom that is general in this country. It has been stated that in the ordinary roasting of coffee the caffeine is to a great extent volatilized and lost. We have strong reason for believing that this statement is entirely incorrect, for in a number of experiments made by roasting coffee beans in which the amount of caffeine had been previously determined in the raw state we ascertained that there was an increase in the amount of caffeine in the roasted coffee and that this increase was uniformly proportionate to the loss of weight experienced by the coffee in roasting. As a general rule the amount of caffeine in pure roasted coffee is about 1·3 per cent. This may be more or less to some slight extent, according as the coffee is slightly or highly roasted, but there did not appear to be any evidence of the volatilization of caffeine during roasting.

* 'Analysis and Adulteration of Foods.' Part I., p. 16.

HISTORICAL RESEARCHES ON LOBELIA INFLATA.*

BY J. U. AND C. G. LLOYD.

Did the Indians use *Lobelia inflata*? Sir William Johnson, preceding the year 1800, bought a cure for syphilis from the Indians, which turned out to be the root of *Lobelia syphilitica*. It is asserted in most medical works that the American Indians used *Lobelia inflata*, but this assertion is not supported by the testimony of any writer that we can find who was acquainted with the medicines employed by the Indians, and the pioneer travellers of America failed, Schoepf excepted, to refer to the plant. We, therefore, conclude that these writers have confused the *Lobelia syphilitica* of Johnson with *Lobelia inflata*. We call attention to the facts that—

Bartram, a careful observer, who describes a number of plants and trees, omits it.

Carver (whose statements are often overdrawn), who describes the plants, trees and medicines of the tribes among whom he travelled, neglects it.

Lewis and Clark speak of the use of the vapour-bath, but do not mention that *Lobelia inflata* was used by the Indians of the upper Mississippi. In 'The Expedition to the Sources of the Missouri,' Lewis and Clark, vol. ii., pp. 135 and 136, speaking of syphilis, say :—"When once a patient is seized the disorder ends with his life only," but (p. 136) they state of the Chippewa Indians that "their specifics are the root of the lobelia and that of a species of sumach." It is evident that this is not from observation, as the Chippewas (also known as the Ojibwas) were not the Western Indians. They embraced "many formidable tribes" about the great lakes. Into their country Sir W. Johnson extended his treaties, and the statement of others regarding *Lobelia syphilitica* is evidently accepted by Lewis and Clark as authority.

The 'Book of the Indians,' by S. G. Drake (Boston, 1837), a very unique publication, gives no instance of its use or of any other emetic by the Indians.

The paper on "Indian Medicine," by J. M. Browne ('Indian Miscellany,' p. 74. Edited by W. W. Beach, 1877) does not refer to a substance that can be identical with lobelia. Major Long, 1819, in his account of the medicines and practice of the Indians of the West, evidently knew nothing of *Lobelia inflata*.

Professor Nuttall informed Dr. Mattson that in his excursions among the Indians he had never known them to use *Lobelia inflata*.

The interesting narratives in 'Indian Captivities' contain no record of *Lobelia inflata*, although rich in the experiences of persons who passed many years among the Indian tribes east of the Mississippi.

Samuel Stearns, M.D., 1772, in his 'American Herbal,' mentions other species of lobelia, but not *Lobelia inflata*, and he makes no reference to the Indians using an emetic. Dr. Stearns was a native of Massachusetts and travelled among the Indians of that State with intent to study their remedies, and would not have omitted this plant if it had come under his observation. Neither Schoepf, Barton or Rafinesque mentions *Lobelia inflata* from personal experience as an Indian remedy, and none of these authors would have neglected it if aware of its being in use.

Catlin ('Manners, Customs and Conditions of the North American Indians,' vol. i., p. 186), in his explicit description of Indian customs, omits it.

However, Mattson, in his 'American Vegetable Practice,' states that "there is abundant traditionary evidence that it was used by the Penobscot Indians long before the time of Dr. Thomson, its reputed discoverer; but with the exception of that tribe, I have not been able to discover by any research I have made that the American aborigines have any knowledge of its properties or virtues." Mattson, however, neglects to give any positive testimony or refer to any authority.

Therefore, from authorities quoted, and numbers of other works searched without avail, we conclude that the evidence is altogether against the reiterated assertion that *Lobelia inflata* is a drug handed down to us from the American Indians. We cannot find proof of a single instance where it was employed by them. If the Penobscot Indians used the plant, as Dr. Mattson believed (from tradition), it is possible that the adjacent settlers learned of its properties from them; but we would more rationally accept that the early use of *Lobelia inflata* in domestic medicine was an accidental discovery of the whites. Those were days of heroic remedies. Bleeding, emetics and blisters were the methods of treatment, and it is not to be presumed that so remarkable and common an emetic as lobelia could remain unknown. That Thomson and Cutler learned of its emetic properties by independent personal experience is undeniable, we think, Thomson especially insisting that he stumbled upon it; and there is no evidence at our command to support the supposition that the whites learned of its properties from the Indians, or that the Indians used it in medicine.

It is a common belief with some persons that the Indians used the lobelia in connection with their "sweat baths," to clear their minds and remove their ailments, but our endeavours to find the authority for such statements have resulted in failure. The "medicine men," it is true, in their incantations pretended sometimes to throw up bones, by which the future was foretold, but this, if not a deception, had no connection with lobelia.

Samuel Thomson introduced Lobelia.

Cutler, 1785 ('Account of Indigenous Vegetables,' American Academy of Sciences, 1785, p. 484), mentions that lobelia is emetic, saying, in reference to chewing the leaves of the herb, "at length they bring an extreme nausea and vomiting. . . . . A plant possessed of such active properties, notwithstanding the violent effects of chewing the leaves, may possibly become a valuable medicine;" but he knew nothing of its use in medicine. He afterwards states again that he was not then acquainted with its medical properties, for he writes to Dr. Thacher ('The American New Dispensatory,' Thacher, p. 147, 1810):—"When I was preparing my botanical paper, I had given it [lobelia] only a cursory examination. . . . . Accidentally ascertaining its emetic property, I inserted it with the specific name, 'emetic weed.'" Cutler afterwards used it in asthma, and refers to the fact that a Dr. Drury of Marblehead, Mass (most of the writers of the regular medical profession refer to Cutler and Drury as the first writers on the use of lobelia; they do not give historical credit to an irregular), used it in asthma by advice of a friend (doubtless this friend was a Thomsonian), and many medical writers have given credit to Cutler and ignored Thomson. Long before this, Thomson had become celebrated in the use of lobelia, and Thacher so admits indirectly, for he writes in the same paper as follows :—"The melancholy consequences resulting from the use of *Lobelia inflata*, as lately administered by a noted empiric." The trial of Thomson was in 1809, and good authorities of the regular profession have often since admitted that the first use of lobelia was by irregular practitioners. Thus, Pereira writes (Pereira's 'Materia Medica,' 1854, vol. ii., p. 538):—"After having been for some time used by quacks it was introduced to the notice of the regular profession by the Rev. Dr. Cutler, of Massachusetts," and Christison and Griffith agree that "it had long been used previously by the savages" (this is questionable) "and empyrics" (Christison and Griffith's 'Dispensatory,' 1848, p. 637).

Conclusion: Samuel Thomson introduced lobelia to medicine; he made it conspicuous and himself notorious in connection therewith. The assertions that Cutler and Drury introduced *Lobelia inflata* are not substantiated by the record.

* From advance sheets of 'Drugs and Medicines of North America,' the *Druggists' Circular*, January.

Did Thomson discover its Properties.

Thomson asserts that ('New Guide to Health,' p. 16): "Some time in the summer, after I was four years old (1773), I discovered a plant which had a singular branch and pods. The taste and operation produced were so remarkable that I never forgot it. I afterwards used to induce other boys to chew it, merely by sport to see them vomit. I tried this herb in this way for nearly twenty years, without knowing anything of its medical virtues. This plant is what I have called the emetic herb." (*Ibid.*, p. 27.)

Thus it seems that Thomson understood the emetic nature of *Lobelia inflata* before 1798, but he asserts that (italics our own) "*I have tried this herb in this way for nearly twenty years without knowing anything of its medical virtues.*" He further admits this by saying: "The herb which I discovered when but four years old I had often met with, but it had never occurred to me that it was of any value in medicine until about this time [1793], when moving in the field with a number of men one day, I cut a sprig of it and gave it to the man next to me, who ate it" (giving account of the action). "I have since found by twenty years' experience, in which time I have made use of it in every disease I have met with to great advantage, that it is a discovery of the greatest importance."

Thus Thomson admits that he knew nothing of the use of lobelia in medicine preceding 1793, and the first record we have of his making use of it in asthma is in 1807, to wit:—"In the fall of 1807 I introduced lobelia, tinctured with spirit, as a remedy in asthma."

Mattson, 1841 ('The American Vegetable Practice,' Mattson, vol. i., p. 164), states, however, that "it was used as a remedy by many people in New England long before his [Thomson's] time." He recounts as follows:—

"Mr. Phillip Owen, now eighty years old, relates that when a boy he was sent into the field by his mother to collect some lobelia for a child sick with the quinsy, and that the herb, administered in the usual manner, afforded a speedy and entire relief." This would show a use of it at about 1770.

"Mr. William Coburn, who also reached his eightieth year, says that lobelia has been used as a medicine in the State of Maine, both by the people and the Penobscot Indians, ever since he can remember, which is a period of not less than seventy years." This also carries the use back to 1770.

"Dr. John A. Hyde, of Freeport, Maine, then (1841) a very old physician, says that the people in that vicinity were in the habit of using lobelia under the name of colic weed when he first settled in the town, which was about fifty years ago. He says they employed it in various complaints, but particularly in colic, and considered it perfectly safe and harmless." This carries us back to 1790, and antedates Thomson again.

Dr. E. Harlow, of New Lebanon, Conn., writes under date of May 15, 1835, to a gentleman in Boston:—"I commenced the vegetable or botanic practice of medicine about 1796, under the instruction of Dr. Root, of Canaan, Conn., who was esteemed an able botanic physician. He made use of lobelia under the name Indian tobacco, and taught me the use of it, and from that period to the present I have continued to employ it in my practice. I may also state that Dr. Forbes, of Lebanon, used it when I was a boy, and from that circumstance it received the name of 'Forbes weed.'"

And lastly, "Doctress Charity Shaw Long, of Albany, N.Y., secured a patent for the use of *Lobelia inflata* in 1812, which was one year in advance of Thomson's patent."

Thus, from evidence that is entitled to credence, it seems that lobelia was somewhat known as a domestic medicine when Thomson was one year old, and there is little doubt that its use in domestic practice long antedated any positive information that can be found in print at this late day. Nevertheless, Thomson introduced it to medicine, and none will dispute that Samuel Thomson made lobelia a familiar name to hundreds of thousands of Americans; that he made it notorious none can deny. Whether the domestic use of lobelia by a few persons could have served to give Thomson a start with his "practice" is a question of little moment. He distinctly asserts that such was not the case, and that he discovered and introduced lobelia independently of all others. In our opinion his statement is entitled to credence. He was intensely enthusiastic on the lobelia subject, and, when writers on medicine ignored his claims, to give credit to Cutler and Drury, he considered it an act of injustice, and he expresses himself on the subject as follows:—"They cannot produce a single instance of its having been employed as a medicine till I made use of it" (Thomson's 'Materia Medica and Anatomy,' 13th edition, p. 585). This tendency to neglect him and, as he believed, to persecute him for opinion's sake, finally induced Thomson to seek Government protection, both for legal use and for monetary considerations, resulting in "Thomson's Patent."

Summary.

1. *Lobelia inflata* was not used by the Indians as a medicine.

2. It was employed in domestic practice and by botanics in New England before Samuel Thomson's day.

3. Samuel Thomson introduced *Lobelia inflata* to the public, and there is no evidence to show that he did not discover its emetic properties independently of all other persons.

4. The assertion that Cutler and Drury discovered the medicinal uses of *Lobelia inflata* and introduced the plant is not supported by the evidence.

NOTES ON PYRETHRIN.

BY C. J. S. THOMPSON.

The root of the *Anacyclus pyrethrum*, or pellitory of Spain, has long been used in medicine for its well-known properties as a sialalogue and local irritant. Its fusiform root that breaks with a resinous fracture, with its radiated structure and black spots, cannot easily be mistaken.

In earlier times it was official in the majority of the pharmacopœias of Europe, in which it formed an active ingredient, in numerous stimulating powders, tinctures, and gargle.

The root owes its irritating properties to its active principle pyrethrin, or pyrethric acid, a very acrid resinous substance, which resides mostly in the cortical portion. A good sample of pellitory will yield about 5 per cent. of pyrethrin. On analysis, the root is found to contain, besides pyrethrin, an acrid resin, volatile oil, yellow colouring matter, tannin, gum, and inulin. Pyrethrin is a soft dark brown resinous substance, having an unpleasant odour, and extremely hot and pungent to the taste. A very minute quantity placed on the tongue causes a strong burning sensation, which shortly increases, and remains for a considerable time, inducing a copious flow of saliva. A strong solution painted on the skin causes a sharp prickling sensation, and reddens the part where it has been applied. If the part is kept covered, a blister will be produced. Pyrethrin may be obtained by evaporating a washed ethereal extract, or the following more satisfactory method may be employed. Reduce the root to a coarse powder, and exhaust it by means of percolation with alcohol. Acidulate the percolated powder with acetic acid, and boil with more alcohol, and filter; mix the liquids and evaporate.

It is soluble in ether and alcohol, and readily soluble in oils or acetic acid. Pyrethrin is composed of an acrid, brown, resinous substance, which is soluble in alcohol, but insoluble in water and strong alkaline solutions; and a dark yellow oil, which is soluble in alkaline solutions. This oil is not nearly so acrid as the brown resinous matter, and it is probable that what burning taste it possesses is due to a small quantity of the resin being mixed with it.

SUNSHINE RECORDING.

The following communication upon the subject of "Sunshine Recording," from Mr. Richard Reynolds, has appeared in the *Leeds Mercury*:—

In introducing the subject of Sunshine Recording, it is proper to say a word or two upon some early endeavours to estimate variations in solar radiation. Pouillet constructed apparatus to accomplish this object by observing the heating effect upon a known quantity of water, whilst Sir John Herschel made a large thermometer filled with solution of ammoniacal sulphate of copper, and later he devised the black bulb thermometer *in vacuo*. But none of these, nor a multitude of the results of other attempts at indicating solar radiation, can lay claim to achieving the measurement of the duration of sunshine. Especial mention seems due to the inventions of Mr. T. B. Jordan, who, in 1838, published an account of his automatic daylight or sunshine recorder in the report of the Royal Cornwall Polytechnic Society. The instrument consisted of two metal cylinders, one revolving on the other. Round the outer surface of the inner cylinder was a sheet of sensitized photographic paper, whilst the outer cylinder revolved by clockwork once in twenty-four hours, being pierced by an opening, which constantly faced the sun. The distinctions between the action of bright sunshine and diffused daylight were only those of degree in the tinge conveyed to the paper. By a simple contrivance the cylinder was slightly altered in position daily, so that the paper could receive the records of a week. It is not surprising to learn that the same inventor tried the experiment of fixing a disk of sensitized paper upon the hour-hand of a clock, covering it by a metal plate with one perforation.

Campbell's Recorder.

It was in 1854 that the late Mr. T. F. Campbell, of Islay, conceived the idea of using as a lens a hollow glass sphere filled with acidulated water, in fact, an ordinary engraver's globe. This was mounted in the centre of a cup of mahogany, so that the sun's rays were focussed on the interior of the cup and charred it. By the happy notion of employing a sphere Mr. Campbell avoided the necessity of providing mechanical movements, as the earth's rotation accomplished the needful progressive track. When Mr. Campbell described his instrument to the Royal Meteorological Society in 1857 he reported an improvement in the substitution of a solid glass ball for a hollow sphere. Observations were commenced so early as 1854, when a recorder was placed on the roof of the General Board of Health in Whitehall, and here the record was maintained for twenty years. The diameter of the sphere used was 5¼ inches, and the hemispherical cavity in the block of mahogany was just large enough to receive the sphere. As the position of the concentrated rays of sunshine not only varied from hour to hour, but from day to day throughout the year, the same point on the interior surface of the bowl never charred twice. Each block lasted for six months. It is interesting to note that the forty bowls bearing the records of twenty years' observation, from 1854 to 1874, were placed in the hands of Professors Roscoe and Balfour Stewart, who estimated the relative degrees of carbonization by filling the cavities with a mixture of beeswax and olive oil. The result shows a much greater effect from the sunshine of the second half of the year than from that of the first half. Comparing annual periods, the years 1856 and 1857 showed a minimum value of solar-heat action. Professors Roscoe and Stewart call attention to this result in connection with the minimum of sun-spot action in 1856. In the years 1859 and 1870 they find a correspondence of maximum value of solar-heat with a maximum of sun-spot action. ('Proc. Royal Soc.,' xxiii., 578.)

Stokes's Recorder.

In 1875 the record was taken over by the Meteorological Office, cards in metal frames being substituted for the wood; and in 1880 the various stations were supplied with the modification devised by Professor Stokes, which is still considered to be the best form of scorching sunshine recorder. These observations have now been regularly taken at forty-two stations in Great Britain and Ireland, and in most cases cover a period commencing with the year 1880. York is a station, and the observer, Mr. J. Edmund Clark, B.Sc., states that the scorch begins the moment that the sun shines clearly, even if the card be damp. Soot may be deposited on the glass sphere and may require washing off. Rain serves to cleanse the sphere, and is free from objection. Frost and snow demand careful attention to the instrument. One unlooked-for caution has been given to observers—Beware of jackdaws! These birds have sometimes carried off the cards (as at Parsontown). But the use of Stokes's bright sunshine recorder did not become general among meteorologists. The cause was chiefly their cost; it must also be added that this "trap for sunbeams" permits some of them to escape. A hazy condition of the atmosphere, or the intervention of light cirrus cloud, suspends the scorching of the card, although the sun may be manifestly shining, and presumably exercising a great effect on the health and spirits of animals, and possibly on the life of plants also.

Jordan's Recorder.

The latest invention for sunshine recording depends, not on the heat rays of the spectrum, but on the action of the more actinic rays. Again a Mr. Jordan is the inventor, but this time it is Mr. Jas. B. Jordan, son of the Mr. Jordan already named as an investigator in the year 1838. Mr. Jas. B. Jordan, of the Home Office, Whitehall, is well known for his arrangement of the Glycerine Barometer of the *Times* newspaper. Jordan's Sunshine Recorder is a marvel of simplicity. It consists of a short cylindrical dark chamber, round the inner surface of which a sheet of sensitized photographic paper can be placed. The paper supplied has been prepared by a modified ferrocyanide or cyanotype method, and is ruled across its shortest diameter by lines for the hours, and sub-divisions for each period of ten minutes. The cylinder can be adjusted for any latitude, a scale by which to regulate its inclination being attached. It is set up with its lower end facing due south. When the sun shines in the forenoon, a ray of bright sunshine enters by a short and narrow slit on the east side of the cylinder, and reaches the paper, travelling along it by virtue of the earth's rotation. At noon the sunlight can no longer find access by this aperture, but it begins to enter by a corresponding opening on the west side of the cylinder, and continues to have access on this side as long as the sun is above the horizon.

In the sheets of prepared paper there are holes corresponding with these openings in the cylinder. After exposure for the day, the sensitized paper is removed from the cylinder, and (without exposure to direct daylight) is laid in cold water, face downwards, for ten or fifteen minutes, and then dried between blotting paper. This is the only fixing required, and they are now permanent. The time may be shortened by placing the dish under a tap of running water, when six minutes will suffice for fixing, and it is a good plan to remove the paper to an inclined glass plate to dry. It will then be found that any bright sunshine has left its evidence by a band of blue colour of varying intensity, according to the degree of brightness of the sunshine. The band for the morning will end not later than the line marked 12 on the paper, and the afternoon record will be a distinct track on another place. It is easy to reckon up the total amount of bright sunshine thus recorded.

Comparison of the different Instruments.

The different principles represented by Stokes's and Jordan's recorders respectively have already been alluded to. Some comparative trials have been made between instruments placed side by side, with the result that the photographic recorder showed about 11 per cent. more

bright sunshine than the scorching instrument. This is sufficient to prevent the indifferent employment of either instrument for furnishing returns that are afterwards to be collated. The scorching recorders are already represented by a fairly adequate number of stations. It is to be hoped that Mr. Jordan's simpler and much less costly instrument will receive the support of meteorologists.

Deductions from the Records.

Mr. R. H. Scott, F.R.S., President of the Royal Meteorological Society, in a valuable paper on "The Measurement of Sunshine" (*Quarterly Journal of Royal Meteorological Society*, July, 1885), has tabulated the results of the Stokes's recorder, as observed at the forty-two stations already alluded to.

Having recorded the actual hours of bright sunshine, its relation to the possible duration of sunshine for the period concerned must be reduced to a percentage value. The following results have been given by Mr. Scott for some typical stations:—

Mean Annual Percentage of Possible Sunshine.

Jersey	39
Pembroke and Geldeston (Norfolk)	35
Douglas	34
Bournemouth	33
Cambridge and Dublin, Parsonstown and Valentia	33
Oxford	31
Aberdeen	30
Silloth and Kew	29
Stonyhurst	27
Greenwich and Stornoway	26
Orkneys	24
Glasgow	22

Mr. Scott's leading deductions are as follows:—

1. The extreme south and south-west stations are the sunniest, Jersey standing first in this respect.

2. That in late autumn and winter Ireland is much sunnier than great Britain.

Respecting the periods of maxima, May is the sunniest month, and in the most favoured districts the percentage is then 50 (in Jersey 60). June and July show a falling off. In the late autumn the Midlands and Lincolnshire show the greatest deficiency. But the averages are taken from too short a period of years (five or less), and it may be expected that larger experience will extend and amend these deductions.

Local Variations.

Mr. Edge has published some comparative results for two stations, twenty-seven miles from each other, and differing in elevation. For these stations he traces the general result that although the higher station is deficient in sunshine in the forenoon, it "invariably" exhibits an excess of sunshine over the lower station during the afternoon. Local peculiarities of this kind deserve careful study.

Present Position and Prospects of the Subject.

It may be asserted that a good beginning has been made by the accumulation of the records already referred to. The subject is the latest addition to the science of meteorology, and already a standard mean value has been obtained by the observations of the five years 1881 to 1885, soon to be increased by the records of a sixth year. The Meteorological Office, in its 'Weekly Weather Report,' the summary of which is also published by the *Times* newspaper, records sunshine as well as temperature and rainfall. It compares this record with the mean value, indicating its + or − variation, and groups the stations into ten districts, of which one-half are chiefly grazing and the others arable land. By the report now before me, for the week ending November 8, 1886, it is shown that for the first eleven months all the stations (excepting North Scotland) exhibit a deficiency on the mean percentage varying from 1 (32 per cent. instead of 33 per cent.) in East Scotland to 5 (29 per cent. instead of 34 per cent.) in South Ireland. Now the subject appears to be specially open to fallacy if the number of stations in a district is inadequate to give a fair average. For example, the London values are at present the mean of observations at Bunhill Row, Kew Observatory, and the Meteorological Office, Victoria Street. I am able to give the results obtained at two stations in Leeds, during the months of October and November, by Jordan's photographic recorder. The first are those taken at the Philosophical Hall, under the care of Mr. W. Eagle Clarke, and the others have been observed by Professor Miall, at Cliff Road, Headingley. The first conclusion to be drawn from noticing them is that several stations should contribute their records before a mean value for Leeds could be formulated. So far as they go, the local story they tell is this:—In October the Philosophical Hall returned 6 per cent. of actual sunshine on the possible figure, and 5 per cent. in November. At Cliff Road, Headingley, October gave 8 per cent., and November showed 10½ per cent. A singular side-issue is raised when comparisons are made between the eight Sundays comprised in the period. When these are compared, the mean average deficiency of 40 per cent. shown on the two months against the Philosophical Hall as compared with Headingley is almost wiped out. On one of the eight Sundays Leeds enjoyed rather more sunshine than Headingley, and on the other seven Sundays the difference was very trifling. The influence of manufacturing smoke must be the factor here, for domestic smoke is not likely to be less at Headingley on Sundays than on other days. In conclusion, I have the conviction that the practical importance of this subject exceeds that of the older branches of meteorology. The mean rainfall and temperature of any place seem to be less important factors than the mean sunshine. As a consideration for the physician, in selecting the health-resort to which he shall send his patient, or for every man able to choose a residence chiefly because of the salubrity of the position, I feel sure that the inquiry as to sunshine will rapidly become appreciated. The sanitary reformer may appeal to this new witness for evidence of the artificial deterioration of our atmosphere, and it is to be hoped that the result will be favourable to the conservancy of our birthright in sunshine. The methods of the inquiry are now at our disposal, and it is to be desired that the new year may be selected by many new observers for taking part in this interesting investigation.

THE BEVERAGES IN COMMON USE.*

BY PROFESSOR DUJARDIN-BEAUMETZ.

(*Concluded from page* 553.)

The white wines, which contain much less tannin than the preceding, because being made from the black grape they owe their white colour to the fact that they were not kept in prolonged contact with the skins and pulp of the grape, contain, on the other hand, more of the potassic tartrate. They are the diuretic wines *par excellence*, and even Hippocrates noted their action on the kidneys. Certain of these white wines which are a little tart, when diluted with alkaline waters, constitute an agreeable beverage, and possess undisputed diuretic properties.

As for the effervescent wines, of which the type is champagne, they render us important service in medicine. By the carbonic acid they contain, and which is intimately combined with them, they have a marked calmative action on the mucous membrane of the stomach; hence whenever, in cases of irritation of that viscus with vomiting (as in peritonitis), there is indication for an alcoholic stimulant, these sparkling wines serve a good purpose. Here we often find nothing

* A lecture on Hygienic Therapeutics, delivered in Cochin Hospital. From a translation in the *Therapeutic Gazette*.

better than iced champagne, whose effects not seldom are marvellous.

The second class of alcohols consists of the fermented beverages,—cider, perry, and beer: the two former, which are the product of the fermentation of apples and pears, are widely in use in France. Girard, the director of the municipal laboratory of Paris, who has made a careful analysis of cider, has shown that an ordinary sample of this fermented beverage contains 5 to 6 per cent. of alcohol, about 3 per cent. of ash, and watery extract in the proportion of about one ounce per quart. As for the sweet ciders, they contain a much smaller quantity of alcohol, which does not exceed 1·70 per cent.

Apart from the alcohol which enters into its composition, cider contains a large quantity of alkaline salts, phosphates, carbonates, malates, etc.; hence it is that cider is diuretic, and Denis Dumont has highly extolled the usage of this beverage in the treatment of gout and the uric acid diathesis. The considerable proportion of potassic salts which it contains also renders it slightly purgative; and hence it is that cider is much resorted to by some persons for a laxative effect.

Compared with cider and perry, beer, ale, and porter are of much more general usage, and it may be affirmed that in Europe there are more beer-drinkers than wine-drinkers.

Beer, as you know, results from the fermentation of the starch contained in certain grains. During germination the starch of the grain is transformed by the vegetable diastase into grape-sugar, and this natural process is utilized in the fabrication of beer by the fermentation or maltage of barley. To this sweet infusion of malt or wort is added infusion of hops, which communicates its special taste, and the fermentation is effected either under heat or cold.

We find in the fermentation of beer a demonstration of the laws established by Pasteur, that each of these fermentations has its special organic conditions, the high yeast corresponding to the fermentation which takes place at from 15° to 20° C., and the low yeast corresponding to that which takes place at 4° or 5° C. Lastly, an impure kind of malt yeast—the *Saccharomyces Pastorianus* of Ress—produces a bad fermentation of the beer.

These beers, if we may trust Girard's analysis, which I place before you, contain a proportion of alcohol varying from 3 to 7 per cent. The strongest beers, as you well know, are the English.

Beers which contain less than 3 per cent. of alcohol are called small beers, or beers of consumption, and must be drunk as soon as made or they will spoil.

These malt liquors are very diuretic, and this property is largely proportioned to the quantity imbibed. The beer-drinker is not easily satisfied, for beer is a beverage that is not good to quench thirst. The more one drinks of beer the more he wants to drink, and it suffices to go through the breweries of certain countries, as those of Bavaria, to see what enormous quantities a man can drink. Some have been known to exceed twenty quarts a day. Fortunately, however, owing to the diuresis which it excites, a quantity so excessive does little but pass through the economy, transforming the beer-drinker into a veritable filter. This continued stimulation of the kidneys, however, is not unattended with serious evils, and we see renal degenerations follow the forced labour to which these glands are subjected.

CENTESIMAL COMPOSITION OF BEERS.

French Beers.

	Alcohol. Mean.	Extract. Mean.	Ash. Mean.
Strassburg	4·7	4·65	0·32
Lille	4·1	4·65	0·35
Paris	3·5	6·00	0·35
Nancy, Tantonville, etc..	5·6	5·70	0·9
Lyon	5·5	5·00	0·9

German Beers.

	Alcohol. Mean.	Extract. Mean.	Ash. Mean.
Saxony	3·7	5·8	0·25
Bavaria	4·5	7·2	0·29
Hanover, Holstein, Pomerania	4·2	5·9	0·25

Austrian Beers.

Vienna, Moravia	3 5	6·1	0·20
Bohemia	3·6	4·7	0·20

English Beers.

Ale of exportation	7·3	5·9	0·35
London porter	5·2	6·4	0·32

Belgian Beers.

Lambic	6·02	3·7	0·32
Faro	4·15	4·2	0·32
Barley beer	4·35	3·4	0·32
Different beers	5·8	5·5	0·32

By the diastase which they contain these malt beers supply a nutrient which has a digestive action on the carbohydrate alimentary principles; hence vegetarians ought to be beer-drinkers. Certain liquid malt preparations in the markets (Hoff's, Wyeth's, Nicholson's, etc.) are beers rich in diastase and dextrine. Lastly, there are medicinal beers charged with hops, scurvy-grass, horse-radish, pine-buds, Peruvian bark, and called "tonic," "antiscorbutic" beers, preparations very little used, at least in France.

The third group of alcoholic beverages comprises distilled spirits and aromatized liquors. The consumption of these liquors is everywhere on the increase. In some years it has been enormous, and there is no reason as yet to predicate a decreasing ratio. In France the quantity of pure alcohol consumed in 1850 was 585,200 hectolitres; the past year it has been nearly four times that amount, or almost 2,000,000 hectolitres.

All the efforts put forth by the various governments to stay the increase in the use of distilled liquors have thus far failed. Increased taxation of spirits, severe penalties against drunkenness, diminution in the number of grog-shops, none of these things have availed. The temperance societies themselves, notwithstanding the augmentation of their membership, and notwithstanding the rigorous exclusion of every kind of alcoholic beverage, have done but little to retard the progress of intemperance. I am assured, however, that this statement is not strictly true as applied to some parts of the United States.

We see in this almost universal spread of drunkenness one of the saddest facts connected with the age in which we live.

The alcohols due to fermentation constitute a natural chemical series, of which the formulæ go on increasing from ethyl alcohol to amyl alcohol, thus:—

Ethyl alcohol, C_2H_6O; propyl alcohol, C_3H_8O; butyl alcohol, $C_4H_{10}O$; amyl alcohol, $C_5H_{12}O$.

In the work undertaken by Audigé and myself 'On the Toxic Power of the Alcohols,'* we showed that the degree of toxicity of these bodies followed in almost a mathematical ratio their atomic formula, and the following tables which I place before you sum up the results which we obtained in our first experiments which pertained to acute alcoholism (see next page).

These results have been entirely confirmed by another series of researches, which lasted more than three years, and which pertained to chronic alcoholism, the subjects of the experiments being hogs. All these results may be summed up in this one sentence,—*the higher in the series the alcohol, the more toxic it is.*

All the spirits in common use contain variable proportions of the different alcohols of the series; but while

* Dujardin-Beaumetz and Audigé, 'Experimental Researches on the Toxic Power of the Alcohols.' Paris, 1886.

wine spirit possesses but feeble quantities of propyl, butyl, amyl alcohols, as Ordonneau has shown, potato and grain spirit contain these higher alcohols in excess, and they can only be removed by successive rectifications.

Table A.—Degree of Toxicity of the Primordial Alcohols.

Group of alcohols.	Designation of the alcohols and their derivatives.	Medium toxic doses per kilogram of weight.	
		In the pure state.	In the state of dilution.
		Grams.	Grams.
Alcohols of fermentation.	Ethylic alcohol (C_2H_6O).	8 00	7·75
	Propylic alcohol (C_3H_8O).	2·90	3 75
	Butylic alcohol. ($C_4H_{10}O$).	2·00	1·85
	Amylic alcohol ($C_5H_{12}O$).	1·70	1·50
Alcohols not of fermentation.	Chemically pure methyl alcohol (CH_4O).	—	7·00
	Ordinary wood spirit.	—	5·75
	Œnanthylic alcohol ($C_7H_{16}O$).	8	
	Cetylic alcohol ($C_{16}H_{36}O$).	7·50	
Iso-alcohols . .	Iso-propylic alcohol (C_5H_8O).	—	3·70 to 3·80
Poly-atomic alcohols . . .	Glycerin ($C_3H_8O_3$).	—	8·50 to 9·00
Derivatives of alcohols.	Acetic aldehyde (C_2H_4O).	—	1·00 to 2·00
	Acetic ether ($C_2H_3O_2C_2H_5$).	—	4·00
	Acetone (C_3H_6O).	—	5·00

Table B.—Degree of Toxicity of the Alcohols of Commerce.

Ethylic alcohol and the alcohols of commerce.	Medium toxic dose, which, per kilogram of the weight of the dog, will kill within 24 or 36 hours.	
	Crude spirit.	Rectified.
	Grams.	Grams.
Ethylic alcohol (dilute)	7·75	
Fine wine spirit of Montpellier . .	7·50	
Brandy made from perry (by distillation)	7·35	
Cider brandy, and that obtained by distilling the marc of grapes . . .	7·30	
Alcohol obtained from grain . . .	6·95	7·15
Beet spirit	6·90	7·15
Potato spirit (whiskey from distillation of potatoes)	6·85	7·10
Potato whiskey, ten times rectified .	—	7·35

Ordonneau, in an interesting work on the composition of distilled liquors, has brought to light this interesting fact, that the nature of the spirit produced in a fermenting solution depends on the ferment employed. If the ferment is impure, there are generated iso alcohols, while with a pure ferment you obtain true alcohols. Despite the identity of formula which exist between iso-alcohols and the alcohols properly so called, the toxicity of the former is much greater than that of the latter.

Manufacturers of spirits have of late found that certain amylaceous substances, and especially rice and maize, under the action of a pure ferment, such as that high malt yeast which we use in making galazyme, give origin to ethyl alcohol of almost absolute purity, not even needing rectification, so minute are the proportions of the more toxic alcohols (potato, butyl spirit, etc.).

Pure or absolute alcohol is only of interest chemically. Rectified spirit is alcohol with 16 per cent. of water, sp. gr. ·838. Proof spirit consists of an admixture, in nearly equal proportions, of alcohol and water, and the distilled liquors sold for ordinary consumption are intended to be of about this strength.

The following table shows the richness in alcohol of different commercial spirits:—

	Alcohol.	
	By weight.	By measure.
Commercial cognac contains .	—	50 to 54
Rum contains	—	72 to 77
Gin contains	—	50
Whiskey contains.	—	59
Rectified beet spirit contains .	—	94

Since the phylloxera has made such ravages with our vines, France, which, in its vine-growing departments, as Charentes, used to produce the best brandy in the world, has suffered such a falling off in the production of this spirit that one must to-day be a millionaire to be able to afford good brandy for his table; nor are we even sure of obtaining good brandy by paying twenty francs per litre for it.

But the brandy made from wine has been replaced by beet and grain whiskey, to the great detriment of the consumer. In 1875 France produced 348,723 hectolitres of brandy; in 1879 the quantity was only 4929 hectolitres, and 13,073 in 1882. These figures show pitiably when placed by the side of the 2,000,000 hectolitres of alcohol which we consume in France.

By the side of these spirits we must place the "liquors" of the retail shops and "*cafés*." The quality of these "liquors" depends on the kind of alcohol employed and the substance with which they are aromatized. Unfortunately, the flavouring ingredients introduced generally only serve to disguise the bad taste and bad quality of the alcohol used, and this is what happens in the case of low-priced liquors, and in particular of absinthe. As for the pretended stomachic and aperient substances with which the liquors of our drinking-saloons are "doctored," they have no healthy stimulant effect on the digestion, and all the bitter extracts, gentian, quassia, aloes, absinthe, etc., which, added to the whiskey or rum, constitute the basis of popular "bitters," have no favourable action whatever on the secretion of gastric juice, but rather retard and arrest it, as Tschelzoff, one of Professor Botkin's clinical chiefs, has recently shown.* Those that think that they have derived benefit from them, in all likelihood have confounded the cramps of the stomach, which they may have experienced under the irritant action of these liquors, with the sensation of hunger.

I have finished this long enumeration of alcoholic beverages, and I shall conclude by saying a few words about the physiological action and digestibility of alcohol.

Alcohol is of itself an irritant, and when applied to mucous membranes it develops a sensation of heat and burning, which is the greater the more concentrated the alcohol. When introduced into the stomach, besides the symptoms of irritation, it occasions an exaggeration in the acidity of the gastric juice. The experiments of Charles Richet on Marcellin are very demonstrative of this fact.

In the normal state the acidity of Marcellin's gastric juice was represented by 1·3 gram of hydrochloric acid per litre. During digestion the acidity rose to 1·7 gram; but as soon as an alcoholic stimulant was introduced the acidity went up to 2·7 grams, and even 4 grams per litre.

This is a capital point in the physiology of alcohol as far as its influence on digestion is concerned, and this property is utilized to a certain extent in all countries, and especially in Normandy, where it is a common custom to "make a hole," as they call it, in the middle of a meal by drinking a small glass of brandy. In this way the acidity of the gastric juice is augmented, and the

* Tschelzoff, "On the Influence of Bitters on the Digestion and Assimilation of Albuminoid Matters" (*Centralblatt für die Medicinischen Wissenschaften*, 1886, No. 24).

stomachal digestion is increased. From this fact there arises an important indication,—to give to patients affected with dyspepsia from want of secretion of gastric juice a small glass of liquor after their meals.

But it will not do to prolong this action of the alcohols, for little by little the pepsin-glands become worn out and cease their functions, to give place to the increased secretion of the mucous glands. All our alcoholic dyspeptics go through about the same history. There is, first of all, gastric irritation with pyrosis, resulting from the exaggerated acidity of the gastric juice, then these symptoms give place to gastrorrhœa, characterized by the pituitous vomiting and dyspepsia of drunkards.

Alcohol, when ingested, is absorbed by all parts of the digestive tube, but especially by the intestines. It is taken up by the radicles of the portal vein, and passes into the hepatic circulation, where its presence determines portal periphlebitis, the origin of the cirrhosis of drunkards. Then it enters the general circulation, to be eliminated by the lungs and kidneys, whether in the state of unchanged alcohol or in that of acetic acid and aldehyde.

Many hypotheses have been put forth as to the physiological action of the alcohols. It is one of the most interesting of medico-physiological questions, of which I can only sum up here the leading points.

All these hypotheses may be reduced to two. The first is the theory maintained since 1860 by Lallemand, Duroy, and Perrin, which affirms that alcohol is neither transformed nor destroyed in the organism, and that the total quantity being eliminated unchanged, it cannot be considered a food. The other theory is that supported by my regretted master, Bouchardat, who claims that alcohol undergoes combustion and transformation in the economy, and therefore acts the part of a food. This is the view which I hold, and which I have defended to the best of my ability the past two years before the Academy.

You put together, I have said, in the circulating blood two chemical bodies, the one alcohol, having a strong affinity for oxygen, the other hæmoglobin, ready to yield up its oxygen under the most feeble influence, that of an inert gas, for instance, and you pretend that no exchange takes place between these bodies. Exchanges do take place, and I have demonstrated with my pupil, Jaillet, the transformation *in vitro* of alcohol into acetic acid under the influence of hæmoglobin. I believe then fully in the combustion of a part of the alcohol ingested, and this combustion takes place at the expense of the oxygen of the hæmoglobin of the blood-corpuscles.

This view, moreover, finds confirmation in the experiments of Bandot, Schalinas, Anstie and Lauder Brunton, of Lussana, and Albertoni, all of whom have no doubt as to the combustion of a portion of the alcohol ingested.

So, then, to sum up my view as to the physiological action of alcohol, I should say that when introduced into the economy in non-toxic dose, a certain part of the alcohol is oxidized and is transformed into acetic acid, then into alkaline acetates, then into carbonates. Alcohol is then a food, but a waste-restraining food, which, instead of energizing the combustions, slows them by robbing the blood-corpuscles of a certain quantity of oxygen. It is this action on the blood-corpuscles which explains to us the antithermic power of the alcohols, an action which attains its maximum of intensity when toxic doses of alcohol are administered. In such toxic cases the alcohol is no longer burned, but destroys the globules and dissolves the oxyhæmoglobin. Ordinarily not all the oxygen ingested undergoes combustion. A part unchanged acts directly on the cerebro-spinal axis, and there determines phenomena of intoxication, of sleep, and of vaso-motor modifications, varying according to the quantity of alcohol ingested.

These three properties--alimentary, antithermic, and tonic—have made alcohol one of the most powerful agents of the antithermic treatment of disease, and I shall not here take your time in enumerating the numerous applications of alcoholic stimulants to medicine. I cannot do better than refer you for a vigorous handling of this whole subject to the thesis of fellowship of my former pupil, Professor Grancher, 'On the Tonic Medication,' a thesis published in 1875. This finishes what I have to say about an agent which has a prominent place in hygienic therapeutics.

All the beverages considered in this lecture are taken at meal-time or between meals (the principal consumption is at meal-time), and the greater or less abundance ingested has a decided influence on the volume of the digestive tube. Daucel, basing himself on the fact that in veterinary practice one may augment or diminish at pleasure the dimensions of the horse's stomach by augmenting or diminishing the quantity of water which the animal is allowed to drink, has also shown that it is the same with man; hence he would limit to half a pint the quantity of liquid which a corpulent person ought to take with his meal. Schweninger has gone further, and has suppressed all drinks from the dietary of obese patients, and he recommends that such persons shall not drink till two hours after meals. In the next lecture, when I come to the treatment of obesity, I shall take up this point again.

This abstinence from liquids, which has been described under the name of *the dry diet cure*, and which Fonssagrives calls *xerophagia*, has been also applied to the treatment of dilatation of the stomach. Hippocrates, Petronius, Asclepiades, and Müller had always pointed out the advantages of a dry diet in the case of serous effusions, and when there was an indication to dry up certain exaggerated secretions. This regimen has been revived in our time by Chomel in the treatment of what he improperly calls *the dyspepsia of liquids*, and by Huchard in combating dilatation of the stomach. In cases of gastrectasia, in fact, the allowance of liquids ingested augments the stomachal dilatation; hence there is every reason for restricting the quantity of drinks.

EDIBLE FUNGI.

In the Students' Society for Natural Sciences at Upsala, Herr C. T. Mörner has contributed a careful analysis of the following edible fungi, viz.:—*Agaricus campestris*, *Lycoperdon Bovista*, *A. procerus*, *Morchella esculenta*, *Boletus edulis*, *B. scaber*, *Lactarius deliciosus*, *Hydnum repandum*, *L. torminosus*, *H. imbricatum*, *Cantharellus cibarius*, *B. luteus*, *Sparassis crispa*, and *Polyporus ovinus*. The above order represents the relative proportion of *digestible* albuminoids, varying from 22·3 per cent. of the dried substance in the first, to 3·1 per cent. in the last. But, in addition to this, there is a large quantity of *indigestible* albuminoids, amounting to as much as 16·7 per cent. in *Lycoperdon Bovista*, and 11·8 per cent. in *Morchella esculenta*, and in many cases exceeding the amount of digestible nitrogenous constituents. Other nitrogenous constituents not of an albuminoid character —ammonium salts, amido-acids etc.—are also invariably present, though usually in smaller quantities, the nitrogen in them representing from 0·21 to 2·49 per cent. of the total dry weight of the fungus. The total result of these investigations is materially to reduce below the amount hitherto supposed the proportion of digestible constituents in edible fungi, and consequently their value as articles of food.

The writer further states that a hen's egg corresponds, in nutritive value, to 0·28 kgr. of *Agaricus campestris*, 0·73 of *Lactarius deliciosus*, 1·30 of *Cantharellus cibarius*, and 2·05 kgr. of *Polyporus ovinus*; 1 kgr. of beef contains as much nutriment as 9·3 kgr. of *Agaricus campestris*, 15·2 of *Morchella esculenta*, 24·2 of *Lactarius deliciosus*, 41·6 of *Cantharellus cibarius*, and 67·0 of *Polyporus ovinus*. The daily requirements of the body in digestible albuminoids (130 gr.) would be furnished by 5·7 kgr. of *Agaricus campestris*, 6·9 of *A. procerus*, 9·9 of *Boletus edulis*, 14·7 of *Lactarius deliciosus*, 26·3 of *Cantharellus cibarius*, and 41·6 of *Polyporus ovinus*.

The Pharmaceutical Journal.

SATURDAY, JANUARY 15, 1887.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

COW'S MILK FOR INFANTS.

AN extremely interesting paper was published last April in the *Medicinische Wochenschrift*, of Munich, upon the nutrition of infants with cow's milk. The subject had been previously brought before the Medical Society in Munich by Professor SOXHLET, who, taking his stand upon LISTER'S observations, held that so long as the milk of the cow remains in the udder it continues to be free from the organisms which determine the ready decomposition of milk after it has been drawn from the cow. Reasoning by analogy, and bearing in mind the conditions of the direct supply of pure milk from the breast to the stomach of a child, as compared with the manner in which cow's milk is obtained in the first instance from the cow, then how it is brought to market, and the treatment it meets with in the kitchen or the nursery, it will be obvious that there are several essential differences between the natural and the artificial feeding of infants. In the former case the child is supplied with milk free from germs; in the latter case with milk which is comparatively charged with ferments, and sometimes is even in a state of decomposition. Although the material differences between human milk and cow's milk consist chiefly in the smaller amount of casein in human milk and some other relations between the salts and the character of the albuminoid constituents that are not yet cleared up, there is still ample room for the inquiry as to the reason for the superiority of natural feeding to the artificial. This is the question which Professor SOXHLET has undertaken to investigate, and he has commenced to answer it by asking the further question whether human milk would bear so favourable a contrast to cow's milk if it were subjected to the same conditions of infection as cow's milk when brought into the market and given to a child out of a bottle. As a striking illustration of the difference between natural and artificial feeding he instances the fact that calves fed out of pails are during the first weeks frequently subject to diarrhœa, and that there is no better remedy for this complaint than to let the calves suck the cow. It is this aspect of the subject to which Professor SOXHLET especially directs attention as indicating precisely the point which constitutes the difference between natural and artificial feeding. According to him it is not so much a matter of importance what food is given to an infant as how that food is given and how far contaminated with ferments. In regard to the fodder of the cow, he dismisses the common idea that dry fodder only is proper for cows that are to supply milk for infants, and he regards as equally ill-founded the notion that infants are affected by anything out of the way given to the cows furnishing their milk. But however the influence of feeding is exercised, the net result is chiefly an increase in the quantity of milk and an alteration in the amount of water without any great relative change in the proportion of any one constituent. Careful experiments that have been made by Professor SOXHLET, have, moreover, shown that the tendency of milk to decompose is not dependent upon the nature of the fodder given to the cows; but at the same time it was found that in stalls where fermenting and decomposing fodder were used for the cows there is much greater opportunity for infecting the milk than when dry fodder is used, and it is upon this ground that the use of fermenting grains or such material would be undesirable for feeding cows that were to produce milk for infants. In the course of the experiments on this point it was found that when carefully collected, even in stalls that were not very clean, milk would keep from 40 to 60 hours without curdling, and even still longer when kept cool. Hence the conclusion come to was that the common experience that milk does not under ordinary conditions keep more than 24 hours without turning sour is due to the introduction of germs and ferments in various ways.

In offering a definite suggestion in order to overcome the inconveniences that have hitherto attended the artificial feeding of infants, Professor SOXHLET lays down the fundamental principle that the superiority of natural feeding consists essentially in the fact that it ensures the supply of milk free from germs, while, on the contrary, in feeding an infant with cow's milk the influence of the presence of ferments and injurious organisms is exercised, and the milk is thus frequently in a condition of incipient decomposition. By destroying or sufficiently attenuating these organisms the dissimilarity of natural and artificial feeding will be to a great extent, if not entirely, done away with. Since the complete sterilization of milk would be difficult, it is desirable, for the practical adaptability of any method for this purpose, to be content with carrying the destruction of the lactic ferment, which is well known to possess considerable power of resistance, to such an extent that milk can be kept at the average atmospheric temperature for three or four weeks without turning sour. Sterilization to this degree may be effected when the milk is heated in closed flasks for the space of 35 to 40 minutes to the

temperature of boiling water. In order to conform to the conditions of natural feeding, each single portion of milk intended for a meal is to be treated in this way to protect it from infection. This method of treatment has lately been systematically carried out by Professor SOXHLET and practically applied in his own family without involving any difficulty. Though, as he says, the single case does not prove much, he points out that although the supply of milk for the child was obtained from a tolerably unclean cow stall in the town, where distillery refuse and very sour beer grains were used, as well as hay, for feeding the cows, there was not a single occasion on which the child experienced the least disturbance of the digestive organs, whether the milk were mixed with water alone or with a 10 per cent. solution of milk-sugar, cane-sugar, grape-sugar, or malt extract and lime-water. The arrangements for sterilizing milk in this way are very simple, consisting of a series of ten bottles like soda-water bottles of about six fluid ounces capacity and capable of being exposed to heat without cracking. These are fitted into an open stand like a cruet-frame, and when filled with milk are placed altogether in a metal pot of water for heating. The mouths of the bottles are furnished with caoutchouc corks, through each of which passes a small piece of glass rod for closing the aperture. Each bottle has also the usual feeding-bottle fitting made of vulcanized tube. With brushes and other provisions for cleaning the bottles and tubes the whole apparatus is complete. The directions given for preparing milk are first to operate upon it as soon as possible after it has been taken from the cow, and then after diluting it or making any desired additions, to fill as many of the bottles as will suffice for one day's supply or rather more, leaving room for a small vacant space at the neck after the cork is forced in. The bottles are then placed in the stand, and immersed in the pan of water so as to be covered up to the neck. Heat is then applied until the water boils, and when the milk and air in the bottles have expanded sufficiently, the glass rods are forced into the holes in these corks so as to close the bottles completely. The water is then kept boiling rapidly for about 35 or 40 minutes, and the stand with the bottles in it is then lifted out to cool. Milk that has been treated in this way will keep at the ordinary temperature of a room from three to four weeks without curdling, and when in a cool place from four to five weeks. At the same time it is free from the inconvenient formation of skin on the surface, by which the feeding tubes become stopped up and made dirty. It is advisable to keep milk prepared in this way as cool as possible, and when a bottle is required for use it should be placed in a small pot of warm water until it has the requisite temperature of the body. Until this is the case the bottle should not be opened, and then the cork is to be rapidly removed and replaced by the feeding tube. Any portion of the contents of a bottle that is not consumed at once should not be used afterwards. The most scrupulous care must also be taken in the cleaning of the bottles, corks, tubes and everything belonging to the apparatus.

At a meeting of the Pharmaceutical Society of St. Petersburg last November, Dr. MARTENSON brought forward the subject of milk conservation, and in referring to the benefits that had resulted from the establishment of an official control of the milk supply upon scientific principles, he expressed the opinion that the comparatively small chemical differences of composition between human milk and the milk of cows were probably not sufficient to account alone for the differences observed in feeding infants with these two kinds of milk. At least the observations of Dr. BIEL in reference to the albuminoid material of kumys and kefir did not appear to him to admit of the idea that there was any specific difference between the casein of human milk and that of cow's milk. Having from this view of the subject had his attention drawn to Professor SOXHLET's paper, experiments were very soon after its appearance carried out at the Child's Hospital of Prince OLDENBURG to try the efficacy of sterilization. The results have been so successful that it is now the constant practice to keep two sets of apparatus at work. According to the observations of Dr. D. MEYER, the chief physician of the therapeutical department of the hospital, the sterilized milk was found to have the effect of rendering the evacuations perfectly normal even in cases where intestinal catarrh was in an advanced stage. Dr. MARTENSON also confirmed the statement that milk could be kept quite fresh and good for upwards of three months at the ordinary temperature of a sitting room after having been sterilized as Dr. SOXHLET directs. With the exception of a slight taste of caoutchouc derived from the stopper, he found that milk which had been kept in this way was indistinguishable from good fresh milk.

THE SALE AND DISPENSING OF POISONS BY COMPANIES.

THE opinion expressed by the jury in reference to the case of poisoning at Cheltenham cannot be looked upon as conveying a harsh or unreasonable view of the circumstances, and while it admitted of a merciful verdict being given, it ought to have the effect of calling serious attention to the gross violation of the spirit of the Pharmacy Act, by means of which the Legislature sought to provide for the safety of the public in the dispensing of medicine. If the safeguards by which the ordinary exercise of a pharmacist's business is surrounded, in the interests of the public, are not to be extended in their application to those exceptionally privileged bodies, who are held not to be liable to the law affecting individuals, this obvious anomaly ought at least to be accompanied by their

employment of a properly qualified person to carry out the work of dispensing medicines. It was mainly on this ground that in the final judgment given on the Appeal to the House of Lords in the case of the London and Provincial Supply Association it was held from the point of view of regard for the public safety to meet the requirements of the case if the persons actually concerned in conducting the business were qualified. Indeed, the Lord Chancellor then remarked that if this were not the case he thought the argument would have been extremely strong against a corporation being permitted to carry on the business of a chemist and druggist. Lord BLACKBURN, in like manner, said that he held distinctly there could be no sale, whether a corporation be the ultimate vendor or not, unless a person, a natural person, manages the sale, and that person, if unqualified, would, in his mind, clearly become liable to the penalty under the Pharmacy Act.

It is well to recall to mind those expressions of opinion, after the lapse of some years, for the purpose of showing that notwithstanding the decision of the judges to regard the case of corporations as lying outside the purview of the existing law as it was framed, there was a very strong leaning to that common sense view of the question which at an earlier stage of the litigation had made such a deep inpression upon the mind of Lord Chief Justice COCKBURN. It is not inappropriate to do so now that the sale of dangerous, if not poisonous, medicinal preparations is being carried out with such frequency as has been from time to time illustrated in our columns, and of which there is another instance this week.

Next Wednesday, the 19th inst., the Chemists' Annual Ball will be held as usual at Willis's Rooms. This will be the twenty-first occasion on which there has been a repetition of this popular reunion, and although various associations have now grown up that may possess more of the advantage of youthful influences in their direction, the Chemists' Ball has always been such a decided success hitherto that it may be anticipated in this year of its majority it will outshine previous experience. That such will be the case is probable from the fact that the Committee still comprises the names of several members who have long been indefatigable in their endeavours on behalf of the Chemists' Ball, and that its labours have lately been reinforced by the accession of Mr. J. W. Bowen as the Honorary Secretary.

* * *

By a recent modification of the New York State Penal Law it has been made a misdemeanour to sell, give or dispose of any poison or poisonous substance (except upon a prescription), unless a label be attached bearing the name and address of the person supplying it and the word "poison" in plain characters; or to sell, give, dispose of, or offer for sale, any "sulphate or other preparation of opium or morphine" (*sic*), except "paregoric and those preparations containing two grains or less of opium or morphine to the ounce," unless there be attached a scarlet label bearing in plain white letters the name of the article and the name and address of the person supplying it.

* * *

In the December number of the *Pharmaceutische Zeitschrift für Russland*, Mr. Theodor Waage gives a method of preparing quinine pills which is well deserving of notice. Quinine hydrochlorate is mixed with hydrochloric acid in the proportion of about six drops to five grams of the salt. The acid is to be added very cautiously drop by drop, and incorporated with the quinine salt. One drop too much would make the pill mass smeary, but when properly prepared, it admits of being worked very easily. The advantages of the pills made in this way are, that, in the first place, they are so small that they can be swallowed with ease, even when containing as much as 0·25 gram, nearly 4 grains of quinine salt, being only one half the size of pills made with mucilage. Moreover, the pills have an elegant brilliant white appearance that renders them agreeable to patients. They soon become hard without losing their ready solubility, and as they do not become soft by exposure to moist air, they are very suitable for the supply of travellers in tropical countries.

* * *

A curious effect of iodoform upon silver is reported by Dr. Poncet, who had his attention directed to it by a patient, to whom he had been applying iodoform dressings, telling him that all soups and other diet for which she used a silver spoon had a very disagreeable taste and that the spoon itself had a garlicky odour. Upon investigating the subject Dr. Poncet found that silver that has been in contact with iodoform, or which is even touched by the fingers after they have been in contact with iodoform, acquires a nauseous odour, resembling that of garlic, which becomes more perceptible upon rubbing the silver. A drop of saliva from a patient fully under the influence of iodoform is said to be sufficient to impart this odour to silver, or the mere exposure of iodoform and silver in the neighbourhood of one another. The odour is not that of iodoform, but is thought to be due to a decomposition product.

* * *

It is announced that Professor Armstrong is about to commence a course of twenty lectures on the "Chemistry of Nitrogen and its Compounds, with Special Reference to the Recent Investigations of the Alkaloids, Albumenoids, etc.," which will be delivered at the Central Institution of the City and Guilds of London Institute, Exhibition Road, on succeeding Mondays and Wednesdays at 5 p.m. The fee for the course will be one guinea.

* * *

A meeting of the Liverpool Chemists' Association will be held on Thursday evening next, January 20, when a paper on "Salol, its Uses in Pharmacy and as an Antiseptic," by Mr. Norman Tate, will be read.

* * *

The next meeting of the School of Pharmacy Students' Association will take place on Thursday, January 20, when Mr. E. White will read a note on "Commercial Jalapin and Jalap Resin," and Mr. L. W. Hawkins will make a Report on Inorganic Chemistry.

Transactions of the Pharmaceutical Society.

NORTH BRITISH BRANCH.

A meeting of members and associates in business, resident in Scotland, was held in the Society's House, 36, York Place, Edinburgh, on Wednesday, January 12, at 12 noon.

On the motion of Mr. Nesbit, seconded by Mr. Baildon, the chair was taken by Mr. James Mackenzie, Edinburgh.

A letter of apology was received from Mr. Daniel Frazer, Glasgow.

The minutes of last meeting were read and approved.

The Chairman then called upon the Assistant-Secretary to read the report of the Committee appointed at the meeting held on November 24.

REPORT.

"The Committee appointed to carry out the decision arrived at by the meeting held on November 24 last have now to submit the following report:—

"A meeting of the Committee was held at 36, York Place, Edinburgh, on Wednesday, December 8, and arrangements were then made for the issue of nomination and voting papers for the election of the Executive of the North British Branch. It was remitted to Messrs. Baildon and Mackenzie to superintend the carrying out of details.

"On December 10, 292 nomination papers were issued, and on December 28 Messrs. Baildon and Mackenzie examined the nomination papers returned and the replies received from those nominated. It was found that 56 members and associates in business had been nominated, of whom the following 29 were willing to act if elected:—

1. AINSLIE, WILLIAM, 58, George Street, Edinburgh.
2. BOA, PETER, 119, George Street, Edinburgh.
3. CLARK, WILLIAM INGLIS, 104, South Canongate, Edinburgh.
4. COATES, EDWIN, 21, Duke Street, Edinburgh.
5. DUNCAN, WILLIAM, 13, East Princes Street, Rothesay.
6. FAIRGRIEVE, THOMAS, 46, Clerk Street, Edinburgh.
7. FISHER, JOHN HUTCHISON, 66, High Street, Dunfermline.
8. FRASER, JONATHAN INNES, 13, Dundas Street, Edinburgh.
9. FRAZER, DANIEL, 127, Buchanan Street, Glasgow.
10. GIBSON, ADAM, Leven, Fife.
11. GILMOUR, WILLIAM, 11, Elm Row, Edinburgh.
12. HENDRY, ROBERT LOVE, 27A, Earl Grey Street, Edinburgh.
13. HENRY, CLAUDE FRANCIS, 1, Brandon Terrace, Edinburgh.
14. HARDIE, JAMES MILLER, 68, High Street, Dundee.
15. KERMATH, WILLIAM RAMSAY, 78, Market Street, St. Andrews.
16. KINNINMONT, ALEXANDER, 69, South Portland Street. Glasgow.
17. LAIRD, GEORGE HARDIE, 40, Queensferry Street, Edinburgh.
18. MABEN, THOMAS, 5, Oliver Place, Hawick.
19. MACKAY, GEORGE DUNCAN, Canning Street, Edinburgh.
20. MACKENZIE, JAMES, 45, Forrest Road, Edinburgh.
21. NESBIT, JOHN, 162, High Street, Portobello.
22. NOBLE,, ALEXANDER, 139, Princes Street, Edinburgh.
23. PATERSON, JAMES, 133, Gallowgate, Aberdeen.
24. PINKERTON, WILLIAM, 17, Greenside Place, Edinburgh.
25. ROBERTSON, WILLIAM, 94, High Street, Elgin.
26. STORIE, ROBERT, 94, High Street, Dalkeith.
27. STORRAR, DAVID, 228, High Street, Kirkcaldy.
28. STRACHAN, ALEXANDER, 138, Rosemount Place, Aberdeen.
29. WATT, JAMES, Sen., High Street, Haddington.

"A voting list was accordingly drawn up, and on December 29 292 voting papers were issued.

"The Committee again met to-day at 10.45 a.m., and proceeded to examine the voting papers. The result was found to be as follows:—

Voting papers issued	292
" " returned	143
" " informal	3

leaving 140 papers to be recorded.

"The following gentlemen have a majority of votes:—

1. AINSLIE, WILLIAM, 58, George Street, Edinburgh.
2. BOA, PETER, 119, George Street, Edinburgh.
3. CLARK, WILLIAM INGLIS, 104, South Canongate, Edinburgh.
4. FRAZER, DANIEL, 127, Buchanan Street, Glasgow.
5. GIBSON, ADAM, Leven, Fife.
6. GILMOUR, WILLIAM, 11, Elm Row, Edinburgh.
7. HARDIE, JAMES MILLER, 68, High Street, Dundee.
8. KERMATH, WILLIAM RAMSAY, 78, Market Street, St. Andrews.
9. KINNINMONT, ALEXANDER, 69, South Portland Street, Glasgow.
10. MABEN, THOMAS, 5, Oliver Place, Hawick.
11. MACKAY, GEORGE DUNCAN, Canning Street, Edinburgh.
12. MACKENZIE, JAMES, 45, Forrest Road, Edinburgh.
13. NESBIT, JOHN, 162, High Street, Portobello.
14. NOBLE, ALEXANDER, 139, Princes Street, Edinburgh.
15. STORRAR, DAVID, 228, High Street, Kirkcaldy.
16. STRACHAN, ALEXANDER, 138, Rosemount Place, Aberdeen.
17. WATT, JAMES, Sen., High Street, Haddington.

"The voting papers and all other documents connected with the election are submitted herewith.

"Signed in name of Committee,

"JAMES MACKENZIE,

"*Convener.*"

It was moved by Mr. Kinninmont, Glasgow, seconded by Mr. Ainslie, and unanimously resolved:—

"That the report of the Committee be adopted."

Mr. Mackenzie then stated that it would have been observed that the Council had decided not to make any alteration on the resolutions adopted at the Council meeting on November 3. He thought it right to mention that he had received a courteous intimation to that effect.

The meeting was then closed.

The above gentlemen, together with the President of the Society (MICHAEL CARTEIGHE), the Vice-President of the Society (THOMAS PRESTON GOSTLING), HENRY BELLYSE BAILDON, of Edinburgh, and JOHN BORLAND, of Kilmarnock, as *ex officio* members, will therefore form the Executive.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly meeting of the Council was held on the 5th instant, at the Society's rooms, No. 11, Harcourt Street, Dublin, at three o'clock.

The President (Mr. William N. Allen) in the chair.

The other members present were, the Vice-President (Mr. Draper), Dr. Evans, Mr. Ray, Dr. Collins, Mr. Beggs, Mr. Hodgson, Mr. Simpson, Mr. Brunker, Dr. Montgomery, Mr. Wells, and Professor Tichborne.

Mr. Ferrall, the Registrar, read the minutes of the last meeting, which were signed.

The President said that before the business for the day commenced, he wished to mention that he had received from Dr. Tweedy his recommendations in reference to the Preliminary examinations. That day a communica-

tion had been received from the Privy Council, stating that in future the reports of Dr. Duffey, the Visitor of the Examinations, would be made annually, and also approving of the new rules of the examiners. These matters would not come before the Council until the next meeting; but he thought it well that members should know the facts that he had mentioned.

The Vice-President: So that the wish of Dr. Duffey to make annual reports has been acceded to rather than the wish of the Council that they should be made quarterly.

A letter was received from Mr. Joseph Edmondson, stating that he believed a great many members of the Society preferred the *Chemist and Druggist* to the *Pharmaceutical Journal*, and asking that the Council should take steps to ascertain which journal the majority of the members preferred. The writer mentioned that the Society would save by adopting the *Chemist and Druggist* as their organ. Another letter from Mr. Edmondson, of a previous date, requested that the *Pharmaceutical Journal* should no longer be sent to him, as it was not his intention to renew his subscription to the Society.

The President: The second letter shows the animus of the gentleman. He is not going to renew his subscription, and therefore, I think, is scarcely qualified to give an opinion as to what journal ought to be supplied to the members.

Dr. Evans: I thought this matter was decided long ago.

The Vice-President: I move that Mr. Edmondson's letter be marked "read."

Mr. Hodgson seconded the motion. From the first he had been opposed to giving these periodicals to the members, because it looked like a bribe to them to join the Society. Those who wanted them should be left to get them for themselves, and it should not be necessary to be a member of the Society in order to get any periodical. He was overruled, however, and a proposition was made to the proprietors of the *Pharmaceutical Journal*, who responded to it in a most liberal manner, and made a very substantial reduction in the charge for their periodical. Under such circumstances it would be very ungracious for the Society to withdraw from the arrangement. At the same time his opinion about the arrangement had never changed, and he still thought that the £20 a year was thrown away.

The Vice-President said they should not forget that in the case of the English Pharmaceutical Society the privilege of membership was accompanied with a copy of the Journal. That Journal reported their proceedings; and other things being the same, it seemed reasonable that that Society also should give its members copies of the Journal. He was not sure, however, that their worthy Treasurer was not half right; and if he were sure that the withdrawal of the Journal would not diminish the number of the Society's members, he would be entirely with him.

Mr. Hodgson: Things are not equal. The Pharmaceutical Society of Great Britain has a large income and we have not.

The motion that the letter be marked "read" was unanimously passed.

A letter was read from the Agent-General of South Australia, stating that anybody could there act as a chemist without any previous examination whatever.

The President: That letter may be marked "read." The information will be inserted in the Calendar.

A letter was read from the Secretary of the High Commissioner for Canada, stating that he would at any time supply to licentiates of the Society, who wished to emigrate to that country, any information in his power.

The President: He can give no information. The law as to the status of licentiates from this country is different in different parts of the Dominion.

The letter was ordered to be entered on the minutes.

A letter from Colonel Caulfield stated that he had been directed by Sir Michael Hicks-Beach, Chief Secretary for Ireland, to acknowledge the receipt of the letter of the Registrar of the Society requesting an interview for a deputation, as suggested by the President of the Council, and asking for information as to the nature of the matters it was desired to bring under the Chief Secretary's notice. Another letter from Colonel Caulfield, dated December 14, stated that as to the request that the Chief Secretary should receive a deputation from the Society on the subject of the suggested amendments in the Sale of Poisons (Ireland) Act, 1870, and the Pharmacy Act, 1875, the writer had been directed to say that owing to the pressure of most important affairs Sir Michael Hicks-Beach was unable to deal with the subject, especially as it would appear that any necessary changes in the law could be proposed in Parliament by a private member.

The President: The present state of Ireland, you see, affects pharmacy; we cannot get any attention paid to us. I do not know whether it would be an advisable thing to look up any private member.

Dr. Evans asked that the letter written in reply to Sir Michael Hicks-Beach's first communication, asking the nature of the matters that it was desired to bring under his notice, should be read.

Mr. Ferrall read the letter, which was dated December 11, 1886, and which stated that the amendments now required by the Council were the same as those which were suggested by their deputation, which had an interview with Mr. Trevelyan in 1884.

The letters were entered on the minutes,

A letter was received from Mr. Harry Carter Draper, containing suggestions respecting a new chemical bench, a model of which was placed on the table. The bench proposed would be ten feet long, by four feet six inches broad, and three feet high. It would not cost more than one of the existing benches, while it would do three times as much work. It would be divided by glass partitions into six compartments.

Dr. Evans asked why it was thought necessary to get this bench.

The Vice-President said the Examinations Committee had recommended that all the candidates should be in the room for examination at the same time. In order to carry out that the additional accommodation afforded by this bench was absolutely necessary.

Mr. Brunker suggested that the letter and model should be referred to the Committee.

The Vice-President mentioned that the existing benches would be retained.

Mr. Brunker moved that the letter of Mr. Draper and the model be referred to the Examinations Improvement Committee for consideration.

The Vice-President seconded the motion, which was agreed to.

A report was received from the Certificates Committee and adopted.

Professor Tichborne moved that Mr. George Dimond, of Maryborough, be admitted a member of the Society.

Mr. Simpson seconded the motion and it was unanimously agreed to.

A report of the Law Committee was received and action taken thereon.

Financial business having been disposed of, the Council adjourned.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The fifth general meeting of the thirty-eighth session was held at the Royal Institution, on Thursday evening, January 6. The President, Mr. A. C. Abraham, F.C.S., in the chair.

The minutes of the previous meeting were read and confirmed, and the following donations announced:—

The *Pharmaceutical Journal*, from the Society; the *Canadian Pharmaceutical Journal*, from the Editor; the *Pharmaceutical Record of New York*, from the publishers; the *British and Colonial Druggist*, from the publishers; 'Drugs and Medicines of North America' vol. ii., No. 2, from Mr. A. H. Mason, Montreal, and the *Journal of the Liverpool Polytechnic Society*, from the Society.

Mr. Harold Wyatt, Jun, Derby Road, Bootle, was elected a member.

There being no miscellaneous communications, the President called upon Mr. E. Davies, F.C.S, F.I.C., to read his paper on "Saccharine" with remarks on "Organic Chemistry Nomenclature."

Mr. Davies in a very interesting paper, described the various steps in the manufacture of saccharine from toluene, a hydrocarbon of the benzene series obtained from coal tar. He stated that it is first converted, by treating with sulphuric acid, into toluene sulphonic acid, and this when treated with phosphorus pentachloride, yields a chloro-derivative, which is now converted into an amido-derivative, and, finally, by oxidation into benzoyl-sulphonic-imide, or saccharine. In his remarks on "Organic Chemistry Nomenclature," Mr. Davies explained very clearly, with the aid of diagrams, the meanings of the terms, ortho-, para- and meta- as applied to the di-derivatives of benzene.

At the close, a discussion took place, and a vote of thanks, proposed by Mr. A. C. Abraham and seconded by Mr. A. H. Samuel, was heartily accorded to Mr. Davies, and the meeting then terminated.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

A special general meeting of the above Society was held at the Lecture Room, Norfolk Row, on Wednesday evening, January 12. The meeting was called "to consider the recent ruling at Sheffield Town Hall, under the Sale of Food and Drugs Act.' The chair was occupied by the President (Mr. Newsholme), and there was a large attendance, the room being almost filled.

The President proposed the first resolution :—

"That this meeting—specially convened—views with alarm the recent decision of the Sheffield Stipendiary Magistrate 'that a preparation containing any opium and any alcohol whatever may be legally sold as tincture of opium.' And this meeting is of opinion that if this be upheld as legal and is acted upon, it is likely to dangerously interfere with uniformity and with the public safety. It would further affirm that the only tincture of opium acknowledged generally by the trade is that of the British Pharmacopœia."

The motion was seconded by Mr. Cubley, and carried unanimously.

Mr. Ward, F.C.S., proposed—

"That this meeting expresses also its astonishment at the judgment recently given with respect to paregoric, 'that any preparation of a sooothing nature may be sold under that name.' It holds that the fact of two or more dissimilar preparations having the same name is so dangerous to public health that it is desirable the Pharmacopœia Committee should adopt as a synonym of the compound tincture of camphor of the British Pharmacopœia that which is commonly known as paregoric, paregoric elixir, and elixir paregoric."

This was seconded by Mr. Appleton, and carried unanimously.

Mr. Preston proposed the third resolution, which was as follows :—

"That this meeting desires to point out its determination strictly to conform to the British Pharmacopœia as binding upon it, in accordance with the order in Her Majesty's Privy Council made respecting thereto."

This was seconded by Mr. Ellinor, and carried almost unanimously.

Mr. Furness proposed, Mr. Jervis seconded, and it was unanimously carried—

"That the resolutions be transmitted to the local papers, the *Pharmaceutical Journal*, the *Lancet*, and other trade or professional journals and interested bodies, as the Council may advise."

Mr. Cubley proposed, Mr. Appleton seconded, and it was unanimously carried—

"That the attention of the Council of the Pharmaceutical Society of Great Britain be called to the recent Sheffield magisterial decision. Also to section 15 of the Pharmacy Act, and requiring the Council's action under such section."

A vote of thanks to the Chairman concluded the meeting.

Proceedings of Societies in London.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting was held on Thursday, January 6, Mr. E. G. Baker, Vice-President, in the chair.

The following paper, by Miss E. A. Munro, who was unable to be present, was read by the Secretary:—

NITRIFICATION.

BY MISS EMILY A. MUNRO.

The subject of nitrification is one of considerable importance and interest, and one which has from time to time been made the subject of a great deal of experimental investigation.

Having during this summer assisted Dr. Munro in carrying out some experiments connected with his researches in this direction, I thought I might bring the results before the members of this Association, and perhaps some might feel an interest sufficient to continue the investigation.

In order to understand the experiments which I shall presently describe, it will be necessary to explain what is meant by the term "nitrification," and to revert to the work which has already been accomplished.

When any organic matter containing nitrogen (such for instance as farm-yard manure) undergoes the process of decomposition, ammonia is formed; this ammonia is readily absorbed by the soil, is there gradually oxidized, and in the presence of salifiable bases supplied by the soil converted into nitrites and nitrates, the oxygen necessary for the reaction being obtained from the air.

The following equation explains the result of the change that takes place:—

$$2NH_3 + O_8 + CaO = Ca(NO_3)_2 + 3H_2O.$$

This conversion of the ammonia into nitrites and nitrates is called "nitrification."

Now when we remember that nitrates form a necessary food of all plants; also that river, well, and spring waters liable to contamination by sewage, or decaying vegetable matter, are gradually, but surely, purified by nitrification of the poisonous elements; and lastly that the presence of nitrates in waters, in large or small quantity, is a well-known and valuable indication to the analyst of their purity or impurity, the importance of ascertaining the exact conditions of nitrification, how it is effected, and the circumstances which are favourable or otherwise to it will be at once recognized.

Until recently it was supposed that mere contact of the decomposing organic matter with the oxygen of the atmosphere in presence of a base was sufficient to oxidize the ammonia, but the researches of Messrs. Schloesing and Muntz, in the first instance, and afterwards of Mr. Warington, appear to prove beyond a doubt that nitrification is due to the presence of a microscopic bacterium or ferment, abounding in the soil.

The results of the experiments which support this new theory are—

Firstly—That nitrification will only take place at a temperature suitable to the life and development of living organisms.

Secondly—That chloroform or other poison being intro-

duced into a solution capable of nitrification, prevents the process.

Thirdly—That the presence of nutriment suitable to the lower organisms is an absolute necessity. Thus phosphoric acid is an essential to all life, but Mr. Warington in two of his experiments purposely omitted the addition of a phosphate to the ordinary nitrifying solution, while to a third it was added; the two solutions without a phosphate did not nitrify at all, but the one containing the phosphate nitrified in a month.

Fourthly—Nitrification is effectually prevented by heating solutions containing the seed to boiling point.

Lastly—A mere trace of seed (that is, soil or solution containing nitrifying power) will set up the process in a previously sterilized solution. Dr. Munro records an instance of this kind, where a sterilized solution was actually contaminated by introducing into it a pipette which had simply been washed with distilled, instead of boiling water, after having used it in a solution in full process of nitrification.

Messrs. Schloesing and Muntz have succeeded in isolating the organism producing nitrification, by systematic culture in a fluid medium.

It appears to be a micrococcus, and they have given it the name of *Micrococcus nitrificans*.

Mr. Warington, by a number of carefully conducted experiments with soil, taken from depths of two or three inches from the surface of the ground, to eight or nine feet below, has proved almost conclusively that this organism does not exist much below the surface; nitrification not taking place in solutions seeded with soil from a depth of two or three feet and in many instances not below fifteen inches.

Bearing in mind the foregoing facts, it will be seen that there is almost overwhelming evidence in support of the "ferment theory," and the investigations which are at present being carried on aim more to arrive at an exact knowledge of the conditions which favour or retard nitrification and also to demonstrate the nitrifying process of various natural waters.

Previous to the year 1883 all experiments were made through the medium of artificial solutions, that is solutions generally made up on the following plan:—Distilled water, to which was added ammonia in the form of ammonium chloride, a base, such as carbonate of lime, and organic matter in the form of an alkaline tartrate, together with a little alkaline phosphate and magnesia.

The solutions were sterilized by boiling before the addition of the seed, which consisted of a little arable soil, or a few drops of a nitrifying solution.

In November, 1883, however, Dr. Munro commenced a series of experiments with natural waters.

Now it is well known that the ammonia in polluted well or river water is after a time converted first into nitrites, and finally into nitrates, and his object was to find out whether waters oxidize NH_3 through contact with the air (according to the old theory); or because of their proximity to the soil containing the ferment; or because they themselves are impregnated with the organisms obtained from the soil.

The experiments were made by adding ammonium chloride in known quantities to waters under various conditions, and the results proved that waters possessed the power of readily nitrifying large quantities of the added ammonia. The thought then suggested itself to Dr. Munro that they would form better media for the study of nitrification than the artificial solutions, which generally become turbid after a short time from the growth of various bacteria. Another advantage possessed by waters is that they contain in solution the salifiable base and mineral and organic matter sufficient for the nutriment of the organism, in such a form as not to impair the transparency of the liquid. But it must be borne in mind that most waters already contain nitrate in small quantity, and this must be accurately estimated before each experiment. For this purpose, Mr. Warington's improved indigo process for the determination of nitrates is the quickest and most reliable.

The first of Dr. Munro's experiments with water were made in the manner following:—Three dark glass bottles were partly filled with 500 c.c. each of water from the river Avon, and 25 c.c. of standard ammonium chloride = 20·6 milligrams nitrogen was added to each bottle.

To the first bottle (*a*) nothing was added but the ammonium chloride.

To the second bottle (*b*) a crystal of Rochelle salt was added.

To the third bottle (*c*) was added a crystal of Rochelle salt and a centigram of soil.

They were then corked, and placed in a dark bureau in a warm room.

The ammonium chloride was added to all three bottles (*a*) to supply the ammonia to be oxidized, which in the ordinary process of nitrification in nature would be produced by decay of organic matter. Rochelle salt was added to (*b*) to supply organic carbon in case there should not be enough in the water itself. Soil was put into the third bottle (*c*) as seed known to contain the nitrifying ferment. On being opened and tested after some time all these solutions were found to have nitrified, but the water (*a*) to which nothing was added but ammonium chloride did so in a much shorter period of time than the other two.

The progress of nitrification in experimental solutions is observed in the following way:—

The solution having been set in a warm dark place, there is a period of incubation, of longer or shorter duration according to the strength of the nitrifying seed. During this time no change is observable.

In about twenty-six days, or sometimes much less, nitrite begins to form; this is qualitatively tested for by adding to about 1 c.c. of the solution in a test tube a few drops of pure dilute sulphuric acid, and then about four drops of the exceedingly delicate reagent, metaphenylene diamine, which shows the smallest trace of nitrite by producing a pale yellow tinge.

If the solution exhibits the presence of nitrite it is examined about every two days with metaphenylene-diamine, and as the nitrite increases the colour deepens, and is described as pale yellow, pale amber, deep amber, nearly red.

The simultaneous decrease of the ammonia as it becomes converted into nitrite is ascertained by adding Nessler reagent to 1 or 2 c.c. of the solution; this in the first testings gives an orange precipitate, then a yellow colour, till finally when all the ammonia is oxidized the addition of Nessler reagent will produce no colour.

Up to the time when the solution shows the deepest colour with metaphenylene-diamine it is said to be "in the ascending stage of nitrite formation;" but now, on continuing to test, the colour daily decreases till at last, if the fermentation be a nitric one, metaphenylene-diamine will fail to produce any colour. This second period is called the "descending stage," and is due to the fact that the nitrite is being further oxidized into nitrate.

The amount of nitrate produced is quantitatively estimated by the indigo process; and should the nitrifying solution be a natural water the amount it originally contained must be deducted from the result.

Dr. Munro now made a number of experiments with waters, such as trying the effect of sterilizing by boiling after the addition of ammonium chloride, adding to one solution chloroform, and to another phenol. All these refused to nitrify. This result, of course, strengthens the ferment theory.

Filtration of water through two Swedish filters into cleansed and sterilized flasks, although apparently weakening the power of the ferment, did not stop the process.

Boiled water seeded with unboiled well or river water nitrified readily.

An experiment with unboiled well water, to which

was added sterilized ammonium chloride, nitrified to nitrite in about fifty-four days, but there was no conversion into nitrate, even after the lapse of two years.

From this it will be seen that sometimes there is a purely nitrous fermentation, and this is generally the case where the organism is weak.

Another fact worthy of observation is that in all the earlier experiments it was considered necessary to add to the nitrifying solution organic carbon in some form or other, such, for instance, as Rochelle salt. But in the first three experimental water solutions which I have described, Dr. Munro was surprised to find that the flask to which no Rochelle salt had been added was the first to nitrify completely, and his subsequent investigations prove that the addition of fermentable organic carbon to solutions, instead of accelerating nitrification retards it by developing bacterial growths other than the nitrifying organism, which tend to produce denitrification.

I now come to the experiments made this summer, in which I assisted Dr. Munro. The object was to find out how far natural waters are impregnated with the ferment; and for this purpose solutions were made up with various waters from the neighbourhood of Bristol. They comprised—

(*a*) A well 56 feet deep in coal measures; water very pure.

(*b*) Well about 40 feet deep in coal measures; badly polluted with recent sewage.

(*c*) Well 70 feet deep in coal measures; this water contained much nitrate, showing oxidized sewage.

(*d*) Water from a level; collected at the outflow.

(*e*) Water of the Bristol Waterworks Company, collected at the mains.

(*f*) Rain water from excavated bricked cistern, water raised by indoor pump.

All these waters I partially analysed to ascertain their condition before nitrification; and in setting up the experiments every possible precaution was taken against accidental contamination.

The flasks of about 350 c.c. capacity were carefully cleaned, first with pure sulphuric acid, then washed with distilled water; they were sterilized by boiling in them distilled water, the necks being plugged with cotton wool through which the steam could pass. After boiling for a short time the distilled water was thrown away, and 5 c.c. of standard ammonium chloride = 5 mm. NH_3 put into each flask, the cotton wool plug inserted, and the ammonium chloride boiled for a few minutes. The mouths of the flasks were then covered with paper caps and they were allowed to cool.

The waters for the experiments were collected by taking these sterilized flasks straight to the supplies, carefully removing the plugs, and either allowing the water to flow directly into the flasks from the pump or tap, or pouring it in, from a sterilized beaker, in the case of open wells.

The necks were then replugged, the paper covers tied on, and the flasks set in a dark place, with the temperature kept to about 80–85° F.

After allowing a sufficient time to elapse for nitrification to commence, the flasks were opened and tested, for ammonia, with Nessler reagent, and for the presence of nitrite with metaphenylene-diamine in the manner I have already described.

Now unfortunately, the temperature of the place where these waters had been set for incubation was one day accidentally raised from 85° F. to 100° F., and all these samples were in consequence sterilized by being overheated, therefore when I opened and tested them, I found that none had nitrified except one which had been in rather a different position and so escaped. I immediately set up duplicate experiments, very carefully regulating the temperature during the incubating period, and these samples all nitrified. This accident, although very annoying at the time, certainly strengthens the evidence in favour of the ferment theory.

The results of these and similar experiments made by Dr. Munro at Downton may thus be summarized.

All natural waters appear to possess nitrifying power, but not all in the same degree; polluted waters stand first. Thus the polluted well water (*b*) ran the complete course of nitrification in the shortest time. Next come surface waters. Lastly water from pure wells which are protected from contamination by the soil possesses the least power.

These results are what we should naturally expect from the fact that the organism is found only near the surface of the soil. The question as to whether very deep wells contain the organism is still an open one, but facts seem to point to the conclusion that they do.

Several practical results are the outcome of these investigations but I will only tax your patience by mentioning one or two which Mr. Warington calls attention to in his report.

It is obvious that as poisons destroy the nitrifying organism, the addition of waste and alkaline liquids to streams near chemical or other works is very undesirable, preventing their purification by the means which nature has provided. Farmers should apply liquid manure to the land in a greatly diluted state, because if too concentrated there is too great an increase of alkalinity, which will prevent nitrification.

After some remarks by the Chairman, Messrs. Millard, Daintree and Bird, a vote of thanks was passed to Miss Munro.

The Reporter on Materia Medica, Mr. E. H. Farr, then explained that his notes for a Report had been anticipated for the most part in "The Month," and consequently he read instead the following—

Note on Liquor Strychninæ, B.P.

BY E. H. FARR.

During the last week of the past year I had placed in my hands a sample of liquor strychninæ, B.P., which had been sent out in the ordinary course of business, and which on keeping had deposited crystals. As two previous complaints of a similar nature had reached us, I was requested to investigate the matter, which, from the powerful nature of the preparation, was of serious importance not only to ourselves, but to pharmacists in general.

The bottle returned had originally held about 48 fluid ounces, but contained only a trifle over 20 fluid ounces when placed in my hands. It contained about a gram of well-formed crystals in addition to the liquid contents.

These crystals after being washed were tested and found to be hydrochlorate of strychnine, as would have been expected. They were then dried and preserved, and are now exhibited.

As the weight of crystals formed no clue to the difficulty, the solution from which they had crystallized was next examined, and was found to contain but 0·815 per cent. of strychnine, whereas it should have contained "about 1 per cent," being thus deficient in strength to the extent of nearly 20 per cent.

It being suspected that the low temperature was the cause of crystallization, a number of experiments were made with a view to ascertain if this were really the case; also how it might be avoided.

With this object in view, four separate pints of solution were made as described below, and they were exposed in a cold place on the afternoon of December 30, and during the following nights until the present date.

1. Made strictly according to B.P., 1885.
2. Same strength, but containing no alcohol.
3. Strictly in accordance with B.P., 1867.
4. Same strength, but without alcohol.

Up to January 1 no crystals appeared in No. 1, but by Monday, January 3, a small crop had formed.

In No. 3 no crystals have formed, so it thus appears that the liquor strychniæ of the old B.P. was a permanent solution.

The two aqueous solutions froze, but on thawing, the alkaloidal salt redissolved spontaneously, the temperature not being raised appreciably above 0° C.

The crystals in No. 1 did not dissolve under similar conditions, so it would seem that water is a better solvent for the salt than is the B.P. mixture containing 25 per cent. sp. v. rect. The exact solubilities, however, have not been ascertained in the present case owing to pressure of other work.

Two other solutions were prepared with the B.P. proportions of alkaloid and acid, but with smaller proportions of spirit, the one containing 20 per cent., the other 15 per cent. of rectified spirit. Up to the present they show no signs of crystallization, though exposed along with the others since January 3, but as the temperature has not been so low it would require further experiment before it could be stated that they would not crystallize.

The object of the present short note is to draw the attention of pharmacists to the fact that liq. strychninæ, B.P., 1885, will, if exposed to too low a temperature, deposit crystals of hydrochlorate of strychnine, and to enjoin on them the necessity of keeping stock of that solution in such a place that it may not be subjected to such conditions.

The above experiments were conducted at the request of Messrs. Wright, Layman and Umney, who have kindly allowed me to publish the results.

The miscellaneous business was opened by Mr. A. Edwards, who criticized an article on quinine pills, by Mr. Clay W. Holmes, which appeared in this Journal (p. 454). Mr. Edwards was of opinion that although syrup and gum arabic formed a very nice mass with sulphate of quinine, the pills hardened so much as to become almost insoluble. He recommended the quinine sulphate to be first mixed with powdered tragacanth in the proportion of 144 parts of the former to 1 of the latter, and then made into a mass with a mixture of 1 part glycerine to 2 parts syrup. For small quantities he found glycerine and tragacanth alone to answer very well. He also objected to the use of tartaric acid for making the pills more compact, on the ground that no substance which might act chemically was admissible as an excipient.

The discussion was continued by Messrs. Jackson, White, Cripps and Bird, after which the meeting adjourned.

Parliamentary and Law Proceedings.

The Fatal Mistake in Dispensing by a "County Drug Company."

The adjourned inquest (see before, p. 562) on the body of Frank Downes Dodwell, aged two years and four months, was resumed on Monday by Mr. Coroner Coren in the Board Room of the Cheltenham Union Workhouse.

Mr. Dighton, recalled, identified the prescription (produced) as the last one he wrote for the deceased.

Richard Thomas Watson, chemist and druggist, High Street, stated that he received the prescription (the last one written by Mr. Dighton) from the father of deceased, and he dispensed it accurately. There was nothing of a poisonous nature mentioned in the prescription.

Mrs. Dodwell, deceased's mother, recalled, stated that she remembered her husband bringing the mixture and powders from Mr. Watson's, and deceased had one dose of the mixture, but none of the powders.

Frank Charles Dodwell, father of deceased, recalled, stated that when he went to the Drug Company's Stores to get the prescription of December 20 made up, and whilst waiting for the powders, Mr. Stuart, manager, came in with his skates and went behind the counter. He spoke to the porter about the best way to get down to Capper's Pond, and the porter told him. A conversation took place between Mr. Stuart and those behind the dispensing counter about skating, but he did not know whether Dudgeon joined in it or not.

Mr. Henry Jessop, surgeon, stated that on December 27 he made a *post-mortem* examination of deceased. The body was that of a healthy, well-devoloped male child, and there were no marks of violence. He found the mucous membrane of the larynx congested, and the lungs were also congested. The heart was healthy, as were also the liver, kidneys and other viscera. The membranes and substance of the brain were a good deal congested, and the ventricles filled with serum. He removed the stomach, which was slightly congested, and contained a small quantity of fluid. This, together with the brain and a kidney, he placed in an earthernware jar, sealed it, and handed it to Sergeant Woolford to transmit to the county analyst. The pupils of the eyes were much contracted.

The Coroner: You have heard the evidence given by the father and mother of the deceased child, and by Mr. Dighton as to the symptoms which they saw in the child, and by the county analyst as to his analysis. Are those symptoms consistent with poisoning by opium?—Yes.

The Coroner: You have heard Mr. Embrey state that the powders contained more than 1 grain of opium each. Would 1 grain of opium be sufficient to cause the death of a child of the age and physique of deceased?—It would be more than enough to cause death in a child of that age and physique.

The Coroner: What, in your opinion, was the cause of death?—Opium poisoning.

Mr. Jessop, in answer to the Coroner, further stated that there was nothing in the prescription given by Mr. Dighton calculated to mislead any person in making it up.

Cross-examined by Mr. Heath: The symptoms which he found on making the *post-mortem* were not similar to those he should have found if deceased had died from croup. If the child had died from croup he would not have found the pupils of the eyes contracted, and the lungs would have been much more congested. This was the only difference.

Mr. Dighton has stated that when he saw the child on the 22nd, after it had taken the opium, it was conscious, and the pupils of the eyes dilated and freely acted to light. Was not the child then overcoming the effects of the opium?—Partially it might, but often relapses occur.

Was it not wholly recovered?—No.

Assuming that it had been still suffering from the effects of the opium, would the second prescription, which is identical with the first, which was given for croup, assist it to get over the opium?—Yes. The prescription was given to cause nausea and vomiting, and the treatment would have been proper in case of opium poisoning, the object being to produce vomiting in each case.

A discussion followed between Mr. Heath, Mr. Jessop, and Mr. Dighton respecting the treatment of persons suffering from opium poisoning, as laid down in Dr. Sidney Ringer's book on Therapeutics.

In answer to the Coroner, Mr. Jessop stated that it sometimes occurs that children suffering from opium poisoning get better, and then have a relapse, and die. It was not an extraordinary—although somewhat unusual—circumstance that the child should have lived twenty-one hours. The average period of life in such cases was about twelve hours. In cases of death from opium poisoning the time varied from one to fifty-six hours after the poison was administered.

Sergeant Woolford proved conveying the stomach, etc., to the county analyst.

Mr. Jessop recalled, stated that there was a case on record in which four grains of compound ipecacuanha powder killed a child of four and a half years. That would be less than half a grain of opium.

James Dudgeon was next called, and was cautioned by the Coroner that he was not bound to answer any

questions. He stated that he lived at 21, Bath Parade, and was 23 years of age. He was employed at the County Drug Company's shop in High Street. He had been employed there nine months as dispenser. He served his apprenticeship to Messrs. Duncan, Flockhart, Powell and Co., of Edinburgh and Leith. He was with them five years as an apprentice, and two and a half years as an assistant at Leith. (A testimonial from Messrs. Duncan and Co. was read, stating Mr. Dudgeon to be "an accurate and quick dispenser," and to have had "a good practical training.") He had dispensed, while at the Drug Company's shop, about fifty prescriptions a day. He had never had any question arise as to his dispensing before. He did not recollect having ever seen the prescription (produced) before, until it was shown to him by a policeman on December 28, but he had no doubt that he dispensed the prescription, and made up the powders prescribed by it. The witness here read the prescription, and acknowledged that it was a prescription for making up simple ipecacuanha powders.

The Coroner: Did you make up the powders according to the prescription?—I have no recollection of what I made up in those powders.

Witness continuing:—The simple ipecacuanha powder is kept in a separate bottle. The compound ipecacuanha powder, which contains opium, is kept in another separate bottle, and we make up the compound powders from that bottle. The one bottle stands at one end of the dispensary and the other at the other. The bottle containing the simple ipecacuanha powder is labelled "Pulv. ipecac." and the compound ipecacuanha powder is labelled "Pulv. ipecac. comp. Poison." The compound powder bottle is darker and heavier than the one containing the simple powder. The bottle containing the simple powder is an 8-ounce bottle, and that containing the powder is a 6-ounce bottle. The bottles are altogether differently shaped. "Ipecac. co." is not considered a dangerous poison, but it is kept with bottles containing dangerous poisons.

Can you tell me from which bottle you made up the prescription?—I have no recollection which bottle I used.

Witness continuing: I should think, from the position which the copy of this prescription holds in the prescription book, that it was made up between five and six in the evening. I was engaged all day in making up prescriptions and tinctures. I had nothing stronger than water to drink on that day. When I made up that prescription I believe Mr. Stuart was talking about skating in a different part of the shop. I was the distance of this room from him, and took no part in the conversation. (The distance referred to would be about twenty yards.) There was no joking or larking going on in the shop, and everything was going on as usual. If I made the mistake, and mixed up the wrong powder, I am sorry, but it must have been from misreading the prescription for compound ipecacuanha powder instead of simple ipecacuanha powder. It is a common thing for practitioners to write "Pulv. rad. ipecac." "Rad." means root. There is nothing in the prescription in question which looks like "rad.," but the word "rad." in the prescription very often helps the dispenser in making up the prescription. It would most likely have assisted me, and prevented a mistake. Prescriptions were written with the word "rad." in my former situation, but I cannot say that any have been written so in Cheltenham. I have passed the Preliminary examination of the Pharmaceutical Society, and consider myself qualified to dispense medicines.

What is the legal qualification for dispensing?—No legal qualification is necessary; Mr. Stuart can employ what assistance he thinks proper. To open a chemist's shop a qualification is necessary.

The Coroner asked Mr. Watson if there was no law requiring that before dispensing medicines a person should pass a certain examination.

Mr. Watson: The Preliminary examination is generally regarded as a school examination, but the Minor examination is generally considered necessary to be passed before chemists will employ assistants to dispense poisons.

The Coroner: There is no law to prevent a person dispensing if he has no qualification whatever?

Mr. Watson: A chemist can engage what assistance he thinks proper. He is generally satisfied if the assistant has a good character and has served an apprenticeship with a good chemist.

The Coroner: That was had in this case. It seems to me that if anybody chooses to employ me to dispense medicine, there is nothing in the law to prevent my being so employed.

Mr. Heath: That is the law.

The Coroner: I think it is quite time there was an alteration in the law.

Mr. Heath pointed out that the law made the person who opened a chemist's shop responsible; it was necessary that a chemist should be duly qualified.

The Coroner: The law as regards the sale of poisons is altogether in a shameful state. It wants a thoroughly radical change from top to bottom. The lives of the public are jeopardized by the lax state of the law on this matter.

Mr. Heath: It is only a few years since chemists have been required by law to duly qualify themselves for their business.

The Coroner observed that nine-tenths of the coroners of the country had had occasion to make similar complaints to that he was now making.

The Coroner, in addressing the Jury, said that it was a case of a very serious description. Whatever the verdict might be, they could not escape the fact—at least, so it seemed to him—the poor child had lost its life through opium poisoning. It was a very serious thing for the public that even by a simple mistake life should be lost. The public were at the mercy of the chemists, and it behoved every chemist to use more than ordinary care and caution. The chemists were a body of repectable men, and he had no doubt that as a rule every care was taken. It sometimes happened—happily not very often—that mistakes were made; mistakes of a fatal character, and then it became the duty of a jury and coroner to inquire into the circumstances attending the fatal mistake and its consequences. There were two questions he would have to submit to them. Was the death of the deceased occasioned or accelerated by the powder which was obtained from the Drug Stores and administered to it? If they were of opinion that it was, then the next thing would be—Was Mr. Dudgeon guilty of gross or criminal negligence in making up the prescription? If they thought that he was guilty, then in law he was liable to be indicted for manslaughter, and it would be their duty to return a verdict of manslaughter. They must, however, be satisfied that there was gross and criminal negligence, or Mr. Dudgeon would not be liable. He then read through the whole of the evidence, and in the course of it said that Mr. Dudgeon had acted very wisely, and was in a very much better position than if he had acted in any other way.

The Jury, after deliberating for about a quarter of an hour, returned the following verdict:—"Deceased died from the opium contained in the powder obtained from the Drug Company's Stores, and administered to deceased, but there is not sufficient evidence to show criminal neglect in the making-up of the powder. At the same time the Jury consider the dispenser deserving of great censure in not having exercised greater care and caution in making up the prescription." The Jury also complimented Mr. Dighton for his wise action in the matter.

The Coroner, addressing Mr. Dudgeon, said: You have heard the verdict of the Jury, and I think you have had a merciful Jury to try the case. You have had a

very narrow escape. I should not have complained if the verdict had been one of manslaughter. I will not say they have taken a wrong view of the case, but it is a merciful view. As a young man just beginning life, I recommend you to be more careful in making up prescriptions in the future. I think you deserve the censure the Jury have passed on you. You must remember that the lives of the public are in the hands of those who make up medical prescriptions, and this is a fatal instance of what may occur through incaution. You take care for the future.

The Coroner then observed that he should impound the prescription in question, and the inquiry terminated, having lasted four hours, or, taking the first sitting into account, nine hours altogether.

Poisoning by Chloral Hydrate.

On Monday last an inquiry was held at the Guildhall, Weymouth, by the Coroner, Mr. G. Symonds, touching the death of Sir William Coles Paget Medlycott, Bart., which had taken place on the previous Saturday morning.

From the evidence, it appeared that the deceased, who was under medical treatment, had, on Friday night, after taking an effervescing draught that had been prescribed for him, taken a bottle out of his travelling bag, and having poured about half the contents into a glass, drank the medicine and went to sleep almost directly. About five hours afterwards he woke up, and, notwithstanding a remonstrance from an attendant who was sitting with him, took another similar dose. He soon went to sleep again, breathing heavily, but in about an hour the breathing suddenly ceased, and upon medical assistance being obtained, it was found that he was dead.

Mr. T. B. Groves, F.C.S., pharmacist, stated that he had received two bottles containing medicines from Supt. Vickery on Sunday. In the small bottle were 32 minims of a syrupy opalescent liquid, and the other bottle he simply examined by taste and smell, and thought it contained a preparation of chloral; but not of the British Pharmacopœia. He analysed 20 minims of the smaller bottle, and obtained 2·44 grains of chloral; making allowance for the size of the bottle he should think that in it were 87·84 grains. Allowing for loss of chloral owing to the smallness of the quantity analysed, and other considerations of a scientific nature, he should think it originally contained 100 grains ef chloral. There were no traces of morphia or of bromide of potassium. The presence of traces of tolu proved that the syrup of chloral was not that of the British Pharmacopœia, and that in all probability it formed part of the contents of a larger bottle Sir William brought from Montreal. He should think that one half of the bottle taken in one dose might not cause death, though, in his opinion, the other half taken too soon afterwards would probably cause death to a man in Sir William Medlycott's condition, but this was a medical point and not within his competence.

Dr. Moorhead, on being recalled, said that, in his opinion, death was caused by taking the contents of the small bottle in two doses too quickly in succession, assuming the medicine in the small bottle to be similar to that described by Mr. Groves.

The Jury eventually returned a verdict of "Accidental death occasioned by an overdose of chloral."

The Supply of Chlorodyne.

An application was made to Mr. D'Eyncourt, sitting at the Westminster Police Court, on Wednesday, by a respectably-dressed man, who informed the magistrate that his wife, a woman thirty years of age, was given to taking large quantities of chlorodyne. Applicant stated that the effect of this patent medicine stupefied her, and produced symptoms in many respects similar to intoxication from alcoholic drinks. Ten or fifteen drops was a full dose, but she would take as much as three or four bottles a day. Her mind was being rapidly destroyed, whilst his pocket was being ruined. She spent as much as 6*s.* a day in medicine, and to enable her to do this she had pawned the bedding, his clothes, and other things. In reply to the magistrate applicant said he was a gentleman's coachman, and he was sorry to say his wife had even pledged his master's carriage rug for medicine.

Mr. D'Eyncourt: I should advise you to give notice to the chemists in the neighbourhood not to serve your wife with chlorodyne.

Applicant: I have done so, but she now obtains the narcotic medicines from a co-operative store. I am sure it will kill her if some restraint is not placed upon her. Cannot you give me an order to have her confined in some institution for a time? She is always in a stupefied condition, and her persistency in taking the medicine is bringing me to ruin.

Mr. D'Eyncourt: No. I cannot give such an order. I am, however, sorry that I do not see my way to assist you.

Review.

Outlines of Quantitative Analysis. By A. Humboldt Sexton, Professor of Chemistry in the College of Science and Arts, Glasgow.*

This little book has been written to supply a want which has been felt by the author and others for many years, viz., "a text-book of Quantitative Analysis sufficiently short and simple to put into the hands of students who have but a limited time to devote to the study of practical chemistry," and it is in our opinion well fitted for the purpose for which it was designed. It is strictly confined to its own subject, making no attempt to explain the general principles of chemistry, or the subject of qualitative analysis, but adapted simply for use in the laboratory as a guide in performing quantitative operations. The student is assumed to have already obtained a knowledge of theoretical chemistry and the methods of qualitative analysis, and is first initiated into the use of the balance; he is then instructed to perform some of the simpler gravimetric operations, such as the estimation of moisture, ash, etc., and the taking of specific gravities, passing on to the gravimetric estimations of the principal bases and acids when these occur in a condition which does not necessitate any preliminary treatment.

After a fairly representative set of these exercises comes a course of simple volumetric analysis, embracing the graduation of flasks and pipettes, the correction and accurate reading of burettes, preparation of standard solutions, and titration of acids, alkalies, chlorides, free iodine, iron by $K_2Cr_2O_7$ and by $SnCl_2$, copper by KCy and by $Na_2S_2O_3$, zinc by Na_2S, and phosphates by uranium acetate.

Then follow gravimetric determinations of two or more substances which require previous separation, and finally miscellaneous examples of the application of these processes to the actual analysis of various substances, such as ordinary chemicals, metallic alloys and ores, glass, porcelain, coal, bleaching powder, sugar, etc., etc., Finally instructions are given for the determination of carbon, hydrogen, nitrogen, chlorine and sulphur, in organic bodies, and an appendix includes tables of atomic weights and analytical factors of the commoner elements, specific gravities of solutions of sulphuric and hydrochloric acids and of ammonia, tension of aqueous vapour, etc.

Setting aside a clumsy style of grammatical construction, the book is well arranged and the directions are clear and simple; moreover attention is paid to little details of manipulation, and the student who conscientiously follows the instructions here given ought to become a neat and accurate worker. There is only one point we can find fault with in these manipulations, and

* London: Charles Griffin and Co. 1887. Small 8vo. Pp. i.-xii., 1-132.

that is, that in the estimation of ferrous salts by potassium bichromate the solution is directed to be poured from the flask, in which it is prepared into an open dish for titration, whereas it can be done just as easily and with much less danger of atmospheric oxidation in the same flask. In each case the details of the operation are preceded by a short explanation of the principles on which the method is based, so that the student may have an intelligent appreciation of the reasons for, and result of, each part of the process; the special precautions necessary in any particular operation are also pointed out. Illustrations are given of the best forms and combinations of apparatus to be used, when the process requires any such to be fitted up.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

The Benevolent Fund.

Sir,—In common I suppose with many others I have read in a recent issue of the Journal your interesting *résumé* of the events of the past year which relate more particularly to pharmacists.

It is not my intention, even were I conscious of the necessary ability, to comment upon any of the events thus summarized; but there is one point which is of such general interest and importance that perhaps, as a young member of the Society, I may be excused for making it the subject of a communication. I refer to the paragraph relating to the Benevolent Fund.

I must confess I was surprised to find that the income of the Fund, at least that part of it which is derived from subscriptions, had again suffered a decrease. The amount received annually in donations and legacies necessarily varies greatly, and is, in addition, so very precarious a source of income, that any diminution in the sum total accruing from subscriptions is a matter for serious consideration. The causes of this deficiency, variously attributed to apathy, want of interest, etc., on the part of chemists and druggists generally, have been so frequently discussed that I shall not further allude to them, but simply offer a suggestion as to the means by which the income of the Fund might be permanently increased.

As is probably the case with the majority of those connected with the Society, who at present occupy the position of assistants, I have not hitherto contributed anything personally to the Fund, having always considered this function as the special duty and privilege of those in business; but the idea has occurred to me that if every assistant, or even a considerable number of them, would contribute annually a small amount (say 5*s*.), not only would the income of the Fund be augmented, and its sphere of usefulness consequently increased, but the habit of subscribing thus formed would naturally, in the transition from assistant to principal, be preserved.

I am perfectly aware that, financially speaking, the position of a pharmaceutical assistant is not usually a lucrative one; but still I cannot think that so relatively small a sum as I have mentioned would be a too severe strain upon his resources, especially if we bear in mind the fact that his tastes are usually quiet, and his habits invariably economical.

Anyhow, here is the suggestion, and as, Sir, the new year is popularly supposed to be an excellent time for the making of good resolutions (unfortunately not always productive of corresponding results), I sincerely trust that the resolution I have come to, to be henceforward a subscriber to the Benevolent Fund, may be adopted by a great number of my fellow assistants. Verbal sympathy is valuable and commendable, but for practical purposes it is desirable that sympathy with any object should not be confined to words, and I am convinced that should the suggestion I have here ventured to make meet with general approval the result could not fail to be of permanent benefit to a Fund, the excellent object and functions of which it would be difficult to overstate.

14, *Rue de la Paix, Paris.* T. Edward Barrass.

What is Laudanum?

Sir,—I cannot bring such learning as Mr. Eagle's to the discussion of this question, but I may venture to say that I am unconvinced by his argument that the word laudanum is derived from the Latin *laus*. He proves indeed (what nobody ever questioned) that before philology existed as a science this opinion was generally held, but he proves nothing more. In opposition to the "authorities" he cites I set the following paragraph from 'Skeat's Etymological Dictionary':—

"Laudanum, a preparation of opium. (L., Gk., Pers.). '*Laudanum* or *opiate laudanum*, a medicine so-called from its excellent qualities;' Kersey, ed. 1715. This remark refers to an absurd supposed connection with Latin, *laudare*, to praise; on which Mahn (in Webster) remarks: 'This word cannot be derived from Lat. *laudandum*, to be praised, nor was it invented by Paracelsus, as it previously existed in Provençal.' The *name*, in fact, was an old one; but was transferred from one drug to another. '*Laudanum*, *Ladanum*, or *Labdanum*, a sweet-smelling transparent gum gathered from the leaves of *Cistos Ledon*, a shrub, of which they make pomander; it smells like wine mingled with spices;' Blount's 'Gloss,' ed. 1674. Spelt *ladanum*, Ben Jonson, 'Cynthia's Revels,' v. ii. (Perfumer). Lat. *Ladanum*, *Ledanum*, the resinous substance exuding from the shrub *lada*; Pliny, xxvi., 8, 30, § 47; xii., 17, 37, § 45. Gk. λήδανον, λάδανον, the same. Gk. λῆδον, an oriental shrub, *Cistus Creticus*. Pers. *láden*, the gum-herb *lada*; 'Rich. Pers. Dict.,' p. 1251, col. 2, last line."

Mr. Eagle appears to think that the earlier a writer's date the more trustworthy his opinion on a matter of this sort, but I have always understood that exactly the contrary is true. Now, except as regards Crollius, Mr. Eagle quoted only opinions; and since Crollius used the word in imitation of Paracelsus, whom he supposed to have invented it, the fact (see above) that Paracelsus did not invent it disposes of him.

And why does Mr. Eagle speak so slightingly of Mathiolus? His evidence, though not in itself sufficient to establish the other derivation, certainly tells in favour of it. We know from him that the juice of the *Cistus* was vulgarly called laudanum in Portugal; according to the 'Encyclopædic Dictionary' it is so still. We know, too, the popular opiate of old times in certain respects closely resembled this resinous juice; we have the opinions of the foremost living philologers that the name was transferred from the one substance to the other; and we know that many other names of drugs have been transferred in a similar way. In the face of these facts Mr. Eagle speaks somewhat boldly when he says that "there can be no doubt about the name laudanum being derived from *laus*."

It is not, however, the derivation, but the authority of the word that Mr. Ellinor and myself are anxious to have determined. Is tr. opii, B.P., the true laudanum? and if so, why so? Your correspondents "Cantiana" and "Minor" speak with a fine indifference to others' scruples; an indifference perhaps based upon ignorance. I have no reason to suppose that my acquaintance with the trade has been exceptionally varied, and yet I have been asked at different times for laudanum, for Sydenham's laudanum, and for Battley's laudanum. I have also had tr. opii, B.P., returned to me by a regular laudanum drinker on the ground that it was not laudanum, she having been accustomed to get some non-official preparation of opium under that name. This was in Nottingham, some twenty years ago. Considering, too, recent legal quibbles as to the identity of sulph. præcip. and milk of sulphur, sp. æth. nit., B.P., and sweet spirit of nitre, etc., etc., I cannot agree that the present position of this question respecting so important an article as laudanum is a satisfactory one.

Epworth. C. C. Bell.

J. Kemp.—The literature of the subject is widely scattered, but you will probably find the information you require in a report of a committee adopted by the Society of Public Analysts (*Analyst*, vol. x., [1885], p. 216).

"*Hyères.*"—The name is one adopted for a proprietary preparation, the formula for which we are not acquainted with.

Communications, Letters, etc., have been received from Messrs. Hesse, Woods, Brown, Dott, Reynolds, Barron, Modlen, Theta.

COMPOSITION OF NEUTRAL QUININE CHROMATE.

BY DR. O. HESSE.

According to Dr. de Vrij his new chromate test will serve not only for the purpose of determining with great accuracy the cinchonidine in quinine sulphate, but also for the determination of quinine itself. For the latter purpose it is said to be merely necessary to dissolve 5 grams of quinine sulphate in 500 c.c. of hot water, adding then a solution of 1·2 gram of neutral potassium chromate in a little warm water and after leaving the whole to cool for twelve hours the crystals of quinine chromate that are deposited are collected upon a filter washed with distilled water and weighed after drying in the air. But since quinine chromate is not quite insoluble in water there is to be added to the observed quantity for every 100 c.c. of mother liquor and wash water a further quantity 0·05 gram, in order to ascertain the actual quantity of chromate that the sulphate in question will yield, and upon that basis the calculation of the result is to be carried out in accordance with the formula $(C_{20}H_{24}N_2O_2)_2$, CrO_4H_2, which de Vrij states that he has found to represent the composition of the quinine chromate.

Having from various reasons been forced to entertain a doubt whether the foregoing could be a correct formula, I have undertaken the examination of the salt for the purpose of ascertaining that point. It was prepared from chemically pure quinine sulphate strictly according to the conditions above mentioned, and dried by exposure to the air at a temperature of about 30° C. At 60° C. the salt was found to remain constant in weight, and likewise also in the exsiccator. When, however, it is gradually heated up to 80° or 90° water of crystallization is disengaged and then it again becomes constant in weight though at last the salt may become somewhat dark-coloured, owing to incipient decomposition. At a still higher temperature the salt melts and then runs into a dark green mass.

The following results were obtained on analysis of the salt when dried either in the exsiccator or by exposure to the air:—

0·426 gave at 80° to 90° 0·018 H_2O.
0·410 „ „ „ 0·018 „
0·2873 „ 0·632 CO_2 0·1745 „ and 0·0268 Cr_2O_3.
0·562 gave 0·4532 quinine.

By calculating on these data the formula by which the composition of the salt is to be represented, it will be found to be $(C_{20}H_{24}N_2O_2)_2\,CrO_4H_2 + 2H_2O$, which corresponds with the following percentages:—

	Required.	Observed.	
$2H_2O$	4·48	4·32	4·38
C	59·82	59·99	—
H	6·73	6·88	—
Cr_2O_3	9·51	9·32	—

The molecular weight of neutral quinine chromate is not therefore 766·5, as de Vrij represents it to be, but 802·5. This error will to some extent help to explain how it is that several chemists in following this method of testing have found that they seemed to obtain more quinine than they took to operate upon.

Note.—The error pointed out in the foregoing paper has probably arisen from want of due precaution in weighing the quinine chromate after it has been rendered anhydrous by heating it up to 80° C., the fact being that the dehydrated salt, when exposed to the air for only a very short time, rapidly reabsorbs water, and again attains the same weight which it had before being dried. The consequence of taking the chromate to be an anhydrous salt in the calculation of the results of analysis by this method is to bring out the amount of quinine sulphate as between 4 and 5 per cent. higher than it would be if the correct formula of the chromate were made the basis of the calculation. The mistake that has been made would thus have the effect of rendering Dr. de Vrij's new method of testing a device for concealing the presence of about 5 per cent. of the impurity sought for. This is the amount held to be admissible by the British Pharmacopœia, and is about the amount of cinchonidine sulphate present in "ordinarily good" commercial quinine sulphate. Another serious objection to this method is the very considerable addition that is to be made to the ascertained weight of the quinine chromate in order to allow for the portion remaining in solution. This addition, as recommended by Dr. de Vrij, amounts to no less than 5 per cent. of the total quantity of quinine sulphate operated upon, and is a quantity precisely equal to the average amount of the impurity to be tested for. —Ed. Pharm. Journ.

KERNER'S QUININE TEST,*

With Special Reference to the Form in which it is applied in the French Codex.

BY E. JUNGFLEISCH.

The recent discussions upon the purity of quinine sulphate of commerce have induced me to lay before the Pharmaceutical Society of Paris sundry observations that I have already mentioned in a cursory manner in a report read to the Academy of Medicine. The point to which I shall refer especially is the test prescribed by the official pharmacopœia as a slightly modified application of the principle involved in Kerner's test. As it stands in the Codex of 1884 it certainly leaves much to be desired, but it does not merit all the censure that has been bestowed upon it. Though a delicate test, and in some respects even too delicate, it is nevertheless susceptible of being made use of by every pharmacist. It has, moreover, a characteristic which I should like to believe is ephemeral, but which may for the time be allowed to cover all its defects: among the tests which admit of the detection of the alkaloids most usually mixed with quinine sulphate it is still the least imperfect, the most simple, and the most expeditious.

Of all the criticisms that have been passed on this test the most telling is that relating to the preparation of the saturated solution of quinine sulphate at 15° C., charged also with the more soluble salts of alkaloids other than quinine.

The Codex directs that the quinine sulphate to be assayed shall be heated with water, but it does not specify the temperature. This criticism is well founded; it points out an omission that needs to be made good, and for that reason the Pharmaceutical Society of Paris has under consideration the provisional fixing, by a kind of convention, of a temperature at which the solution should be made. It may be useful to remark, however, that the decision to take this step would depend chiefly upon the demands to be made as to the purity of the official salt, but that, on the other hand, the fixing of that tempera-

* *Journal de Pharmacie et de Chimie*, [5], xv., 5.

ture would not give the process all the precision which some persons appear to hope. This is a point that deserves to be investigated.

In general I have operated at a temperature of 60° C., which corresponds sufficiently well to the too vague expression in the Codex; but in principle I see no inconvenience in adopting any higher temperature, even that of boiling water, which has the advantage of being easily applied and kept constant. I even propose to show that the boiling temperature should be adopted, and also that the other conditions of the test should be rendered more stringent if it be desired to require the complete purity of the official quinine sulphate, while, on the contrary, if it be admissible to tolerate in that salt a small proportion of foreign alkaloids, the tolerance will be so much the less in proportion as the temperature adopted is higher. The misconception of these conditions lies at the root of most of the discussions raised on the subject, and of the objections urged against the method of assaying in question.

If evidence of the purity of the salt is to be obtained, it is clear that in order to test it the whole of the foreign salts that are to be detected must be made to pass into solution. It is therefore necessary to dissolve as much as possible of the crystals, or, in other words, to raise the temperature as much as possible. It has been contended that if the solution is made with heat above the temperature of 35° C., even pure quinine sulphate will not answer the requirements of the Codex test, the reason being that the hot solution remains supersaturated after being cooled to 15° C. But it is easy to prove that the experiments upon which that statement has been based were made with very impure quinine sulphate. Moreover, the suggested explanation is no more admissible than the statement of the alleged fact, for a saline solution cooled, as in this case, in contact with a large quantity of crystals of the salt in solution, would not remain supersaturated.

When, in short, the Codex test is applied to really pure quinine sulphate by heating on a water-bath to 100° C. in making the solution, the liquid obtained will remain limpid after the addition of ammonia just as well as when the temperature has been raised only to a much lower degree. But that is not all, and when in that case, operating either with or without heat, the ammonia (0·96 specific gravity) is gradually added to the 5 c.c. of the properly cooled solution, it will be found that in order to dissolve the precipitate at first formed it is not requisite to use the 7 c.c. of the reagent ordered by the Codex, but that a much less quantity, about 5·5 c.c., will be found sufficient for restoring the clearness of the liquid.

This very simple experiment furnishes a conclusive answer to the objection above mentioned, and it justifies my second proposition, that if the official salt is required to be completely pure the Codex test must be modified, not only by carrying the temperature to 100° C., but also by limiting to nearly about 5·5 c.c. the volume of ammonia solution of 0·96 that is to be added for the purpose of rendering the liquid clear after precipitation.

It is sufficient to read the article in which the Codex treats of quinine sulphate to recognize that its editors have taken a different point of view. They have only demanded for this salt a relative purity. This is evident from the indications given for ascertaining "the presence of an inadmissible proportion of alkaloids other than quinine." But if the authors of the official pharmacopœia hesitated to insist upon the complete purification of an industrial product, in regard to which certain consumers had themselves acquired usages difficult to abandon suddenly, they nevertheless very clearly showed, by the nature and the number of the tests prescribed, their intention to induce French pharmacists to exercise increased vigilance in this particular. But however that may be, a test admitting of a certain degree of tolerance is the point of more special interest at the present moment.

The quinine sulphate of commerce retains foreign bases in two ways. First, the surfaces of the crystals are moistened with a certain quantity of mother liquor which imperfect draining has not removed, and that has afterwards dried upon them. Second, the crystals formed in a liquor, charged with cinchonidine sulphate, for example, have entangled some of the latter salt, and sometimes a considerable proportion of it.* In treating quinine sulphate to be tested as Mr. Kerner directs in one of the forms of his test, with cold water, the water readily becomes charged with the soluble salts left by the mother liquor on the surfaces of the crystals, but it does not come sufficiently into contact with the cinchonidine sulphate entangled among those crystals, and that is consequently protected from the action of the solvent by the sparingly soluble quinine sulphate amongst which it is intimately mixed up. When the mixture is heated gradually the proportion of quinine sulphate dissolved goes on increasing, and a larger quantity of the cinchonidine sulphate passes into solution in such a manner that, from the circumstance of the two salts being mixed in the crystals, the quantities dissolved of each are correlative. The volume of water used being insufficient for dissolving even at 100° C. the whole of the quinine sulphate, a very notable part of the impurities will also remain undissolved, and not come within the scope of the subsequent operations. By cooling the solution to 15° C. almost the whole of the quinine sulphate crystallizes out, taking with it some of the cinchonidine salt; but the greater part of this latter salt remains in solution. The quantity of cinchonidine salt transferred to the solution is thus increased in proportion as the heating is augmented. It can easily be ascertained that this is what happens, by making several tests with the same sample of impure quinine sulphate, and applying different temperatures for the solution. It will thus be found that the volume of ammonia necessary for redissolving the bases liberated will be increased in proportion as the temperature applied is higher. This may also be ascertained by comparing the weights of the dry residues left on evaporating equal volumes of the solutions obtained when different degrees of heat are applied in the testing operation. M. Marty has in this way shown that the quantity of the residue is greater in proportion as the heating is greater.

* The tendency of quinine sulphate and cinchonidine sulphate to crystallize together is very marked. When quinine sulphate mixed with a few hundredths of cinchonidine sulphate is dissolved in boiling water, and even when the volume of the solvent is many times more than would be sufficient in the cold to dissolve the whole of the cinchonidine salt if it were in a separate state, the latter salt will partially crystallize with the quinine sulphate during the cooling of the solution.

In short, the delicacy of the test is so much greater as the solution is made at a higher temperature, and the selection of a particular temperature should be regulated according to the greater or less demand for proof of purity in the official quinine sulphate.

It has also been said that this mode of testing when carried out with heat involves the demand for an exaggerated degree of purity incompatible with the industrial production of quinine sulphate. One of the experiments cited above is sufficient to prove the contrary. It will be remembered in fact that pure quinine sulphate, treated with warm or even boiling water, gives a solution, 5 c.c. of which, when cooled to 15° C. became quite clear on addition of about 5·5 c.c. of ammonia solution (0·96). But the Codex does not require this result to be produced by less than 7 c.c. of ammonia solution; the difference of 1·5 c.c., or more than one-fifth of the whole quantity, being available for the solution of bases other than quinine in the event of their being present. This difference represents therefore the tolerance of the prescribed test.

If it be attempted to appraise that tolerance by expressing the quantity of foreign bases that may be present in quinine sulphate which is shown by the test to be acceptable, the result will be a failure. Hitherto I have supposed, for greater simplicity of exposition, that the impurity is exclusively cinchonidine sulphate. This is at the present time most frequently the case, but, sometimes, other bases also occur in the commercial product, though less frequently. Those bases, being unequally soluble in ammonia, the delicacy of the test in reference to each one of them will be inversely as their solubility, and the tolerance will be variable.

Nor is this all, for in considering only the admixture of cinchonidine, and admitting a fixed temperature, say 60° C. for instance, as being adopted in practice, that is to say, by reducing the problem to the most simple form, it is still impossible to arrive at a perfectly satisfactory conclusion. When 1 gram of quinine sulphate is treated with 10 c.c. of water, the solution is only partial even at 100° C., and the interior parts of the crystals escape the action of the solvent entirely.

Under these conditions it will happen that for a given amount of cinchonidine in a sample of salt tested, if the impurity arises solely from imperfect draining off of the mother liquors and is superficial, the proportion of cinchonidine that will pass into the solution will be greater than if the impurity be due to cinchonidine actually in the crystals. Consequently the delicacy of the test would be greater in the former case than in the latter and the tolerance would be less in that case. Moreover, when it is noted that the crystals vary in size and present a varying surface, that they are not generally homogeneous, that the distribution of the cinchonidine through the interior of them necessarily alters according to the circumstances of the crystallization, etc., it is impossible to avoid recognizing that the tolerance to be appraised will have a considerable range of variation. Therefore, I cannot express by figures having any precision the increase of the tolerance corresponding with the application of the test at temperatures between 15° and 100° C. With cinchonidine sulphate as the sole impurity, and taking 60° C. as the temperature for making the solution, the quantity of foreign substance passing unnoticed appears to vary between 4 or 5 per cent. The magnitude of this amount may perhaps be an argument in favour of raising the temperature to be adopted; but this is a point which I merely mention here as deserving consideration. When the test is applied without heating, as the German Pharmacopœia directs, the tolerance may amount to 12 per cent., or even more than that.

The foregoing remarks must be understood as applying to the quinine sulphate of commerce. The figures obtained by various authorities with mixtures prepared for the purpose are not applicable to the mixed crystallization of the commercial salt.

There are certain other objections of secondary importance which appear to me as being well founded in reference to the method of testing used in question.

I have already pointed out that considerable precision is required in carrying out the details of the operation, and especially in the measurement of the volumes of the liquids used.

I may also add that the temperature of 15° C., at which the solution has to be kept for some time, is not always readily obtainable, especially in summer, without having recourse to some means of artificial refrigeration.

Another small difficulty arises from the physical condition of quinine sulphate, owing to which it mechanically retains the aqueous liquid with which it is mixed, and does not always allow the separation by means of a paper filter of the volume necessary for the treatment with ammonia. The result required may, however, be easily obtained by making use of a filtering apparatus formed of a funnel fitted with a plug of cotton wool, and fitted by a perforated cork into the neck of a tubulated flask, so that the solution may be sucked out from the crystals.

Another point of more importance is the strength of the ammoniacal solution being precisely regulated to the requirements of the test. If, for instance, it were used of a specific gravity of 0·925, considerable errors would result, and the quinine sulphate represented as being acceptable for use under such conditions would in reality be very impure. It is therefore impossible to lay too much stress upon the importance of accuracy in the preparation of the ammonia solution.

The Codex has stated in a note the error that may be caused by the application of the test to an effloresced salt. A pure salt, whether effloresced or not, will never be mistaken for an impure one when the test is applied to it in accordance with the directions of the Pharmacopœia; it may even be remarked that if complete purity had been required in the official salt, the weighing of the quantity taken for testing would have been superfluous, for the solution after recrystallization at 15° C. ought always to give a clear liquid on the addition of ammonia, however much of the salt was operated upon. But since a certain tolerance is allowed for the manufacture the case is altered in this respect. If the sulphate has lost by efflorescence some part of the water which it should contain in the normal condition, one gram of it will represent a proportionally larger quantity of the fully hydrated salt; the impurity passing into solution would thus be increased in quantity and the tolerance diminished. In such a case the best plan is to dry the salt completely at 100° C., and to take a quantity weighing ·8555 gram

instead of one gram, as the Codex recognizes that the salt should contain 14·45 per cent. water of crystallization. At the same time it should not be forgotten that in effloresceing, the crystals undergo a disintegration which renders the material especially fit to be acted upon by water as a solvent, and this will tend to diminish the tolerance.

Recently Kremel has pointed out a possible modification of Kerner's test, based upon the circumstance that the solutions of the sulphates of cinchona alkaloids saturated at a temperature of 15° C. contain different quantities of these salts as follows :—

5 c.c. of solution.	Contain.
Quinine sulphate . .	0·0062 gram of the salt.
Quinidine „ . .	·0464 „ „
Cinchonidine „ . .	·0510 „ „
Cinchonine „ . .	·0925 „ „

Consequently, the same measure of the solutions also contain very different quantities of sulphuric acid, and as the alkaloids in question do not react upon phenophtalein it is possible to titrate the sulphuric acid in a solution of quinine sulphate, with an alkaline solution as well as if it was in a free state. The quantity of sulphuric acid found in a solution of pure quinine sulphate would be very much less than in a solution of an impure sample, and in this way the amount of impurity might be ascertained.

The sources of errors already referred to as being inseparable from the preparation of the solution saturated at 15° C. from the commercial quinine sulphate would obviously exercise the same kind of influence upon results obtained by the method proposed by Kremel as upon those obtained by the method of the Codex. A further error would also be made by taking the quantity of sulphuric acid as being in constant proportion to that of the anhydrous sulphates, even when the bases of those salts were not isomeric, the molecular weight of cinchonidine sulphate being 718 and that of quinidine sulphate 746. Another error would result from the identification, from the point of view of foreign material, of cinchonine sulphate with two molecules of water of crystallization (molecular weight 754), with cinchonidine sulphate containing six molecules of water (molecular weight 794).

Some time ago Dr. Hesse pointed out a method of testing, which differed in principle from that of Kerner as applied in the cold only, in using another solvent for the alkaloids, ether being substituted for ammonia for this purpose. This mode of testing has been slightly modified by Schaefer and recommended by him in the following form :—A gram of the quinine sulphate to be tested is heated with 20 c.c. of distilled water to the boiling point, and, after being allowed to cool, 5 c.c. of the clear filtered liquid is placed in a well-corked tube with 1 c.c. of ether and five drops of ammonia and then well shaken. If after the lapse of twenty-four hours there is no separation of crystals from the ether solution of the alkaloid, the quinine sulphate is considered to be acceptable for use as pure. But even with this modification, the test in question, although possessing some delicacy for detecting cinchonidine, has not this advantage in regard to quinidine, which is somewhat freely soluble in ether. It must not, therefore, be forgotten that although cinchonidine is at the present time the most ordinary impurity of quinine sulphate, the salt prepared from cuprea bark does not contain any cinchonidine, but a very considerable proportion of quinidine.

The testing of quinine sulphate by means of the polarimeter having had and still having many partisans, I venture to state here the reasons for which I consider that this method of testing is a bad one. I shall show that it is very much wanting in delicacy, and besides this, that it may give rise to very considerable errors.

There is no doubt that quinine sulphate possesses a specific rotatory power peculiar to it, which is susceptible of being applied for ascertaining the purity of the salt. This rotatory power being the highest among those of the lævogyrate sulphates of the cinchona alkaloids, being, in fact, a maximum quantity, its application for the purpose presents an especial advantage. If, therefore, the quinine sulphate employed in pharmacy were to be perfectly pure, that method of testing, with more or less delicacy, would be applicable for the purpose in view.

But when it is requisite to allow manufacturers a certain tolerance, and in consequence of this to ascertain whether the salt to be tested is contaminated with foreign substances in proportion above or below a fixed limit, the case is no longer one of the same nature. Some very simple calculations will suffice to show this, and I shall for this purpose make use only of the figures furnished by M. Oudemans, and take for illustration the experiments made under the conditions of dilution for which those figures have been found.

In calculating for a length of column of 2 decimetres the deviation produced by 0·436 gram of the alkaloid sulphate dissolved in 20 c.c. of absolute alcohol the following results are obtained. The deviation is $\alpha_D = -6{\cdot}86°$* for the neutral crystallized quinine sulphate, and for the neutral crystallized cinchonidine sulphate it is $\alpha_D = -5{\cdot}17°$.†

Therefore the deviation produced by any mixture of these two sulphates will lie between these two extreme limits. One hundredth part of the difference between the two figures (1·69°) would be 0·0169, and that would be the influence exercised by the presence of 1 per cent. of cinchonidine sulphate, more or less in quinine sulphate. I believe that this relation between 17 thousandths of a degree and each hundredth part of cinchonidine sulphate more or less in the mixture will render sufficiently appreciable the delicacy of this method of testing. But the method has still another defect of very much greater significance.

If pure quinine sulphate be mixed with one hundredth part of quinidine sulphate, a highly dextrogyrate salt, the deviation calculated for the same conditions would be for $\alpha_D = -6{\cdot}701°$,‡ and that is precisely the result which would be obtained with a mixture of 90·83 quinine sulphate with 9·17 of cinchonidine

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* $$\alpha_D = \frac{\alpha_D l p}{v} = \frac{157{\cdot}4 \times 2 \times 0{\cdot}436}{20} = -6{\cdot}86°.$$

† $$\alpha_D = \frac{\alpha_D l p}{v} = \frac{118{\cdot}7 \times 2 \times 0{\cdot}436}{20} = -5{\cdot}17°.$$

‡ $$\alpha_D = -\frac{\alpha_D l\ 0{\cdot}99 \times 0{\cdot}436}{v} + \frac{\alpha'_D l\ 0{\cdot}01 \times 0{\cdot}436}{v}$$

$$\alpha_D = -\frac{0{\cdot}4316 \times 2 \times 1{\cdot}574}{20} + \frac{0{\cdot}0044 \times 2 \times 211{\cdot}5}{20}$$

$$\alpha_D = -6{\cdot}793 + 0{\cdot}092 = -6{\cdot}701°.$$

sulphate.* In this manner, quinine sulphate containing an admixture of 10·5 per cent. quinidine sulphate would produce a deviation of 5·17, that is to say a deviation precisely equal to that produced by pure cinchonidine sulphate.†

I have here supposed that an alcoholic solution is operated upon, because the memoir of M. Oudemans furnishes directly the data necessary for the calculation of this particular case; but in principle there is no difference when the salt is dissolved in water by the aid of sulphuric acid. The delicacy is, however, a little greater, and the error a little less in the latter case, the relations between the specific rotatory powers of the three acid salts being a little less unfavourable than those obtaining between the neutral salts. Now, for example, when a deviation of −12·13 is observed for pure quinine sulphate, the presence of two per cent. quinidine sulphate in the quinine salt would suffice to reduce the deviation to −11·60, while to produce the same result it would be necessary that the quantity of cinchonidine sulphate mixed with the quinine salt should amount to 11·8 per cent.

Thus then with the alcoholic solution quinine sulphate containing only ten hundredths of impurity might be mistaken for pure cinchonidine sulphate, and with the acidulated aqueous solution the possible error would vary from one to six times as much. This consideration of the case will make it unnecessary to refer to other sources of error.

Before concluding I will add another remark.

It is by design that I have made use of the term tolerance in treating of this subject. If it could be maintained that the presence of a few hundredths of the alkaloids allied to quinine would be incapable of causing any real prejudice to patients, if certain manufacturers pretend that the elimination of these last traces of impurity presents difficulties for them, if various reasons induce us to allow for the present a certain latitude to the manufacturer, it is nevertheless incontestable that there is here only a question of tolerance to be dealt with; the pure quinine sulphate is the official article, the normal article, the imperfectly purified salt being nothing more than a make-shift.‡ The conversion of the impure salt into a pure salt represents nothing more than a small difference in the intrinsic value; the pharmacist really solicitous for the quality of the products he supplies will therefore act wisely in repudiating any kind of tolerance, and demanding from the manufacturer to be supplied with an absolutely pure salt. This is easily to be characterized according to what has already been stated above;§ its special crystallization in a dense form is moreover a primary feature which has maintained up to the present its value, and to which pharmacists should adhere.

I am well aware that it is usual to attach to the light sulphate particular qualities, the value of which I do not remember. Certain makers have even found themselves constrained lately to give the pure salt this light form, and they have succeeded in doing so. The commercial interest attaching to their success in this respect ought to be a real one, since they congratulate themselves upon it; but I do not perceive any advantage that pharmacists would derive from the circumstance that an article which they sell in a state of purity should receive the appearance of the same article in an impure condition.

* $6{\cdot}701 = \frac{(6{\cdot}436 - x)2 \times 157{\cdot}4}{20} + \frac{x \times 2 \times 118{\cdot}7}{20}$ whence the weight of the cinchonidine salt $x = 0{\cdot}04$ or 9·17 per cent. of the mixture.

† $(100 - x)157{\cdot}4 + 211{\cdot}5x = 118{\cdot}57 \times 100$; whence $x = 10{\cdot}5$.

‡ "The official quinine sulphate should not contain any of the other cinchona alkaloids."—Codex, 1884, p. 299.

§ Kerner's test modified applied at 100° C.; 5 c.c. of the solution at 15° C. being rendered clear by less than 6 c.c. of ammonia (0·96 specific gravity), the other characters named in the Codex; maximum rotatory power to the left, etc.

DRUGS AND DIGESTION.*

BY ROBERT G. ECCLES, M.D.

We smile at the incongruous prescriptions of last century, and wonder how either physicians or patients derived any satisfaction or benefit from them. We sneer at the young graduate who, in the confusion that arises from his new evironment, writes orders for gross chemical or physiological incompatibles, and goes from his office pondering upon the degeneracy of medical education. We never stop to question the wisdom of ourselves and others pouring into the stomachs of the sick in the most promiscuous manner, without regard to time or circumstances, drugs that inhibit or check the production of life and health giving peptone. In all chronic diseases the paramount consideration of every scientific medical man regards the patient's nutrition. Where we cannot destroy pathogenic micro-organisms outright, the patient's only hope in the struggle for life lies in the strength of his cells and their consequent power to triumph over their foes. High above every other consideration at such times is digestion. To interfere with or check it in the least, in many cases, is, then, criminal. When our remedies are incompatible with the gastric juice, the time of taking is likely to be of far more importance than the medicine itself. To weaken our patients by the production of artificial malnutrition gives their merciless diseases the advantage over them, where a little more knowledge would have enabled us to aid the vital forces instead of handicapping them. Important, however, as is the knowledge of the effects of drugs upon digestion, it has until the present year (1886) been almost totally neglected. Even in the administration of artificial ferments as aids to digestion the utmost recklessness prevails. Articles utterly valueless, with some of doubtful value, are on the strength of advertisements and samples used to the detriment of the sick. Prescriptions have been shown your essayist in various pharmacies in this city and New York, for the compounding of which large prices were paid. The ingredients were the very best in the country, but the doctor's ignorance had rendered them totally worthless. First-class pepsin, 1 grain of which would digest 1000 grains of albumen in an hour, was in one case compounded with ingredients that rendered it utterly inert, and on actual trial of a repetition of the same it was found unable to digest a single grain in the same time. This physician probably condemned the pepsin for the bad results, as so many others under similar circumstances have done before and since.

Had such prescriptions been written by quacks or unknown practitioners it would not have been a matter for grave comment. Being the work of men who stand high in the profession it necessarily wore a more serious aspect.

Your essayist does not for a moment presume to think that laboratory experiments with flasks, bottles or test-tubes can give exact physiological results. There are cases in which we know that the outcome of the internal use of certain drugs is apparently the very opposite of what might be expected, reasoning exclusively from such data. Let the stomach be the seat of acetic or any other pathological fermentation, and the administration of powerful pepsin inhibitors, in not too large doses, will

* Read before the Brooklyn Pathological Society, Nov. 11, 1886. From the *New York Medical Journal*.

positively aid and hasten digestion. They exhaust their power in destroying a vicious ferment, and thus enable the otherwise inactive gastric juice to assume its function. Any alkali, alkaline carbonate, corrosive sublimate, carbolic acid, creasote, salicylic acid or other powerful antagonist of pepsin will here swing in as an apparent support of Hahnemann's dogma of similars curing similars. As we perceive the causes underlying such seeming contradictions, if we do not rest content with the groundless assumption that the stomach acts in some mysterious non-physical, non-chemical manner, we shall become masters of the situation. Its laws and those of the laboratory are the same, so far as they go together. Our reasoning is at fault when we fail to note the vastly greater complexity involving the one than the other. Whatever inhibits peptonization in the flask will do the same in the stomach, however much other things may mask it or seem even to give reverse results. The lost power has only led to some unforeseen balancing gain. If we continue to wage war on the stomach's store of pepsin because we blundered into what proved a benefit at one or even two trials we shall find that we are deceiving ourselves and damaging our patients. To give pepsin inhibitors when all has been gained that can be by compensation, or when no such compensation is possible, can lead only to ill. And yet this is being done daily and hourly in every civilized community upon the globe.

The study of the retarding effects of drugs upon digestion was first earnestly entered into by Doctor Klikovich, a Russian. The only brief notice of his work English-speaking people have had was given in the London *Lancet* on June 19, 1886. The work embodied in this paper was begun in April (1886), of the present year. On September 4, the *Lancet* again informed its readers that O. Peterson, of St. Petersburg, had published the results of a similar investigation. These brief notices constitute all that is known upon the matter outside the Czar's dominions. The few drugs mentioned show in their results the bad effects of using dried albumen instead of fresh, and the effects of too large quantities of pepsin. Differences which to them seem to have been inappreciable, and that at the commencement of this work were thought impossible of procurement, have by experience been gained. Plan after plan was tried until the best was discovered. Many of the results were tested by from one to six repeated trials. All would have been so tested if another year could have been devoted to the work. Errors will creep in in spite of the utmost vigilance. For the first three months all the experiments were performed at a temperature of 38° to 40° C. (98° to 100° F.), but for the purpose of saving time and expense and getting closer results 49° C. was used. More than half of the old work was confirmed at the new temperature, so that they mutually proved each other. This was a compromise figure between the temperature of the stomach, 40° C., and that found in practice to be the quickest for artificial digestion, 55° C. When 5 grains of albumen were digested with $\frac{1}{10}$ of 1 per cent. of hydrochloric acid in water for one hour, using the same amount of pepsin each time, the following were the amounts undissolved at the temperatures given :—

Degree Centigrade	40°	44°	49°	55°	60°	66°
Albumen undissolved	0·30	0·26	0·20	0·14	0·18	0·36

Other per cents of acid were tried with corresponding results. A glance at the figures shows 55° C. to have the least undissolved albumen left. It would appear from this that the failure of appetite in a patient is not due to the checking of digestion by fever. The products of such digestion, however, no doubt seriously affect the same. There are many kinds of peptone produced in peptic digestion. One of these, called by Meissner "parapeptone" (Reichert's 'Foster's Physiology,' p. 965), is insoluble in neutral solutions. This is the one most abundantly produced at the higher temperature. Once formed its further change into true peptone is impossible without the aid of trypsin. Could it be precipitated in the stomach it would do no harm, since it would be carried through the pyloric orifice into the duodenum, there to complete its metabolism. Not being so precipitated, it finds in the stomach walls a line of neutrality between the alkaline blood and the acid gastric juice, where it can be thrown down to check all osmosis. Like the dog in the manger, it would not form blood itself nor let that do so which could; consequently the patient must suffer. In cases where the fever does not produce such results the doctor is kind enough to order it done on the advice of some advertising quack who patronizes his favourite medical journal. Artificially produced peptones of beef, eggs or milk, prepared at all sorts of temperatures, are poured down the sick man's throat. It is in vain for him to proclaim that his stomach rebels, and that he abhors the stuff—down it must go. It is in vain for him to say that his appetite is worse after it. That is reasoned away as due to the disease, or to his having derived so much benefit from a former dose. There are peptones and peptones, and the quicker medical men know it the better. In all our digestion of albumen there would be a considerable amount of parapeptone produced but for the chloride of sodium taken with our food. During these experiments it was found that peptones produced in the presence of table salt could not be precipitated by neutralization. This was an important discovery, and showed that the use of this article in our food has hitherto been partly misapprehended. To make alkali and acid for peptic and tryptic digestion it would have been as available, and it would seem even much more available, to take it with the water we drink. But we do not relish drinking salt water as we do eating salt meat or salt bread and butter. Wherever we relish salt, there without it parapeptone would be produced to block digestion. Wherever we do not relish it, there it could not avail in that direction. But salt delays digestion, so that an excess must be guarded against as injurious. When the amount of pepsin is made so small that it will require three hours and a half to digest the albumen used, the presence of $\frac{1}{5}$ of 1 per cent. of table salt in the total digestive fluid will delay it to double the time; $\frac{4}{5}$ of 1 per cent. under the same conditions delay to seventeen hours.

Early in this investigation it was deemed advisable to determine whether acids other than lactic and hydrochloric could be used with pepsin to produce peptone. The generally accepted theory being that digestion is a hydrolytic change of the proteids, we should expect to find many other acids capable of producing this result. The following were tried in the varying percentages marked in the first line of the table. The figures opposite the names of the acids represent the amount of albumen remaining undissolved at the end of the trial. The two that were not tried at every strength with the others were considered too doubtful to spend the time upon.

P.c. of acid.	1	0·8	0·6	0·5	0·3	0·1	0·1
	Grms.	Grms.	Grms.	Grms.	Grms.	Grms.	Grms.
Hydrochloric .	0·80	0·55	0·17	0·10	0·00	0 00	0 30
Phosphoric .	0·00	0·05	0·12	0·26	0·71	0·93	2·36
Nitro-muriatic	2·10	1·34	0·31	0·20	0 00	0·21	3 91
Lactic . . .	0·35	1·31	1·89	2·16	3·19	3·90	4·15
Tartaric . . .	0·39	1·29	1·82	1·96	3·08	3·75	3·93
Hydrobromic .	2·96	2·84	2 24	1·48	0 41	0·16	0·39
Nitric . . .	2·27	1·93	1·57	1·41	0 60	0·71	1·89
Citric . . .	1·47	2·22	2·50	2·71	3·73	3·92	4 06
Sulphuric . .	2·31	2·87	2 98	3·16	3·27	3·34	3·74
Hypochloric .	2·65	—	—	3·17	4·79	5·00	—
Acetic . . .	5·00	4·60	3·52	3·19	2·93	3·04	3·11
Hydrocyanic .	- -	—	5·00	5·00	4·87	4·01	—

Hydrochloric acid was afterwards tried with a reduced quantity of pepsin, and found to be most efficient at 0·2 per cent. It takes five times as much phosphoric acid to produce the same result as this small quantity of muriatic, while an increased or decreased quantity of muriatic only hinders. A small amount of phosphoric acid added to 0·2 muriatic improves digestion. This is the secret of

acid phosphate becoming so popular, and of the efficiency of dilute phosphoric acid in dyspepsia. This, however, is not true of other acids, nor of this one above 1 per cent. or below ½ of 1 per cent. The next table gives a list of the acids tried. Here digestion was completed in all, and time made the gauge instead of the amount of undissolved albumen. Fifteen cg. of absolute acid or its equivalent of dilute acid were added to the 50 grams of solution. The first nine failed to come out in ten hours :—

	h.	m.		h.	m.
1. Chromic acid	over 10	0	12. Chrysophanic acid	3	40
2. Picric acid	over 10	0	13. Tannic acid	3	0
3. Molybdic acid	over 10		14. Benzoic acid	2	40
4. Sulphuric acid	over 10	0	15. Oxalic acid	2	40
5. Thymic acid	over 10	0	16. Citric acid	2	40
6. Hydrobrom.	over 10	0	17. Tartaric acid	2	30
7. Salicylic acid	over 10	0	18. Oleic acid	2	20
8. Pyrogallic a.	over 10	0	19. Boric acid	2	15
9. Nitric acid	over 10	0	20. Acetic acid	2	15
10. Hypochloric a.	3	40	21. Lactic acid	2	15
11. Cathartinic acid	3	40	22. Phosphoric acid	2	0
			23. Arsenious acid	2	0
			24. Gallic acid.	2	0

The test experiment in this set was over in two hours, so that the last three caused no delay. The last two owe their non-interference in all likelihood to their insolubility. They were practically absent. Benzoic acid did not inhibit as much as it was expected to, for reasons to be mentioned further on. The nine that caused a delay of over ten hours were tried again after reducing to one-third the former strength. This made them 1 part in 1000 of the solution. The next table gives the new results with the 5 cg. The test time was again two hours :

	h.	m.		h.	m.
1. Chromic acid	over 10	0	6. Hydrobromic a.	3	50
2. Picric acid	over 10	0	7. Salicylic acid	3	20
3. Molybdic acid	over 10	0	8. Nitric acid	3	20
4. Thymic acid.	7	40	9. Carbolic acid	3	10
5. Sulphuric acid	5	10	10. Pyrogallic acid	2	5

As three again went over ten hours, at the next trial they were reduced again, 1 cg. only being used, or 1 part in 5000. The test time by increasing the pepsin double was reduced to one hour. Chromic acid came out in four hours and forty minutes, picric in four hours and a half and molybdic about the same. To make their efforts non-appreciable would require their dilution to not less than 1 part in 40,000. Picric acid in contact with ground albumen over-night causes a very marked shrinkage in the volume, so that it appears as if the larger bulk of it had been digested without pepsin. The following alkaloids and their salts were next tried. The test time was again two hours. Three parts in 1000 were used, or 15 cg. in 50 grams. The first on the list, ferrocyanide of quinine, was completely decomposed at the expense of the acid, and, although 0·4 per cent., or double the usual quantity, was used, its long delay was probably due to this. At the end of the experiment considerable Prussian blue had taken the place of the now dissolved chloride of quinine :—

Alkaloids and their Salts.

	h.	m.
1. Ferrocyanide of quinine	5	30
2. Citrate of iron and strychnine	5	20
3. Citrate of iron and quinine	5	10
4. Sulphate of cinchonidine	4	30
5. Sulphate of cinchonine	4	20
6. Sulphate of quinidine	4	20
7. Sulphate of quinine	4	10
8. Bisulphate of quinine	4	0
9. Sulphate of strychnine	4	0
10. Sulphate of morphine	3	40
11. Tannate of quinine	3	20
12. Salicylate of quinine	3	20
13. Salicylate of cinchonidine	3	10
14. Chloride of quinine	3	5
15. Bromide of quinine	3	0
16. Sulphate of atropine	3	0
17. Hydrochloride of cocaine	2	50
18. Chloride of morphine	2	45
19. Bromide of caffeine	2	40
20. Veratrine	2	40
21. Strychnine	2	30
22. Aconitine	2	20
23. Brucine	2	20
24. Morphine	2	15
25. Acetate of strychnine	2	15
26. Chloride of pilocarpine	2	15
27. Acetate of morphine	2	5
28. Codeine	2	0

The last one, coming out evenly with the test, showed that its presence had not retarded any. It was again tried in double the proportion—*i.e.*, 3 cg. in 50 grams. This time it did not come out for two hours and forty minutes.

In testing the essential oils found in the next table, 15 cg. were first dissolved in 2 grams of alcohol and then added to the digesting fluid. Besides the usual control containing no drug, an extra one was added containing the same amount of alcohol as was used to dissolve the oil. This came out in two hours and ten minutes. The delay time of 2 grams of alcohol was therefore ten minutes.

Essential Oils.

	h.	m.		h.	m
1. Cinnamon	over 10	0	22. Wormwood	3	10
2. Pimento	over 10	0	23. Erigeron.	3	10
3. Lemon grass	over 10	0	24. Cajeput	3	10
4. Bitter almond	over 10	0	25. Rosemary	3	10
5. Clove	9	50	26. Nutmeg	3	0
6. Bay	8	40	27. Rose geranium	3	0
7. Bergamot	8	40	28. Orange	3	0
8. Sassafras	8	20	29. Lemon	2	55
9. Wintergreen	5	10	30. Wine (ethereal)	2	50
10. Rose	4	50	31. Amber	2	50
11. Origanum	4	20	32. Neroli (petal)	2	50
12. Citronella	3	30	33. Black pepper	2	50
13. Caraway	3	20	34. Juniper	2	40
14. Coriander	3	20	35. Savin	2	40
15. Spearmint	3	15	36. Cedar	2	40
16. Pennyroyal	3	15	37. Patchouli	2	40
17. Aniseed	3	15	38. Croton	2	20
18. Fennel	3	15	39. Sandalwood	2	10
19. Lavender	3	10	40. Cubeb	2	10
20. Peppermint	3	10	41. Turpentine	2	10
21. Thyme	3	10			

The first four were again tried with one-third the amount of essential oil. Bitter almond then came out in three hours, and the others in five hours. A glance over the table shows that essential oils of similar origin, or derived from the same natural orders of plants, produce as a rule results very nearly alike. This is exemplified by the labiates spearmint, pennyroyal, lavender, peppermint and thyme. The close relationship of cedar, savin and juniper, and also of fennel, coriander and caraway, tells the same story for the families to which they belong. It is also somewhat singular to find the three oils of sandalwood, cubeb and turpentine as closely related here as they are in their physiological indications, although belonging to quite remote orders. Four balsams were, like the essential oils, dissolved in 2 grams of alcohol, aud then added to the digestive fluid with the following results. The Canada balsam dissolved very imperfectly, so that its result is probably short of the true figure :—

Balsams.

	h.	m.		h.	m.
1. Tolu	5	30	3. Canada	2	55
2. Peru	4	20	4. Copaiba	2	40

(*To be continued.*)

GAMBOGE OF BURMAH.*

BY R. A. MACK,

Agricultural Department, Rangoon.

Although various varieties of gamboge-bearing trees have for many years past been known to exist in different parts of the province, notably in the Tenasserim division, it was not until comparatively recently that the subject was brought specially under the notice of the local Government. Writing more than thirty years ago, Mr. Simmonds, in his work entitled 'Commercial Products of the Vegetable Kingdom,' says: "The *Garcinia elliptica* of Tavoy and Moulmein affords gamboge and approaches very closely in its character to Graham's *Hebrodendron*;" and he adds that it affords "a fine pigment." Dr. Mason also, in his work on Burmah, remarks that "the best gamboge is produced by *Garcinia elliptica*, but an inferior article is produced by *G. cornea*, *G. anomala*, *G. cowa*, *G. kydia*, *G. succifolia*, *G. xanthochymus*, and *G.* (*Hebrodendron*) *morella*. *Garcinia Cambogia* yields a pleasant fruit and a gamboge quite insoluble in water, and it is the complete solubility of the best gamboge that distinguishes it from inferior sorts, but it is probable that, when fully investigated, these insoluble gamboges will be found of service in the arts."

In 1875 Mr. Wittall, of the Forest Department, drew attention to three different species of trees, belonging to the genus *Garcinia*, growing in the districts of southern Tenasserim. These were known to the natives as *Tawmengoot*, *Parawah*, and *Parajay*. The two last named Mr. Wittall did not consider of much account. The *Parawah* yields an exudation of a white colour, which changes to a reddish yellow on exposure to the atmosphere, and is scarcely at all soluble in water, but yields to alcohol. The *Parajay* yields a rather copious exudation which when dissolved in spirit of turpentine affords a beautiful permanent yellow varnish for metallic surfaces, and on this account has been called the gamboge tree as well as the yellow varnish tree; but its exudation does not form an emulsion with water, and, for this and other reasons, Mr. Wittall considered it had no claim to be considered a real gamboge tree. The *Tawmengoot* was, in Mr. Wittall's opinion, the gamboge tree of the south Tenasserim forests. He says, "The gum resin is larger in quantity and darker and of a more glossy colour than the others: neither wet nor dry is it so sticky, and so readily does it form an emulsion with water that the exudation on the outer bark is completely washed away by the rains." This tree he believed to be the same as that which Dr. Mason calls *Thanataw* (*Garcinia elliptica*) [*G. heterandra*], and he adds that it was supposed to be the same as that which yields the gum resin exported from Siam. But Mr. Hill, Officiating Conservator of Forests, Pegu Circle, thinks the *Tawmengoot* is probably the *G. morella* or *pictoria*, or *gutta*, the true gamboge tree, which does not grow all over Burmah like *G. elliptica*, or *G. cowa*, which latter are common trees throughout the province.

In May, 1884, the Commissioner of Tenasserim drew the attention of District Officers to the trees called *Thaungthaleh* (*C. kydia*) and *Thanataw* (*G. elliptica*) found growing in the tropical forests of Martaban and Tenasserim with the view, if possible, of developing a new industry for the people. Of the former Mr. Hill says: "It yields a yellow substance of a bright colour, but paler than the gamboge of Siam. It is scarcely soluble in water, but dissolves in spirits of turpentine and affords a beautiful, permanent, yellow varnish for metallic surfaces. As the substance is very resinous and will not dissolve in water, it is valueless as a pigment." Of the latter he remarks: "The product known as *Thanataw* is obtained from *G. elliptica* or *heterandra*. It is called a superior gamboge, but in all probability merits the name almost as little as *Thaungthaleh* owing to its only partial solubility in water. It is found throughout the province and is darker in colour than *Thaungthaleh*." A sample of *Thanataw* obtained from Tavoy was found upon analysis to contain:—

Resin	76·5
Gum	23·5

This sample was sent to Calcutta for valuation, where it was declared to be gamboge, but unsalable in an unrefined state. In August of the same year samples of gum produced from two other kinds of trees called *Palagyi* and *Tawmengoot* were also obtained and submitted for analysis. They were found to contain:—

	Palagyi.	Tawmengoot.
Resin	58·82	53·20
Gum	9·54	20·30
Water	32·66	25·60

In his report on these samples Dr. Romanis, the Chemical Examiner, says the yellow kind (*Tawmengoot*), makes a very fair paint, but the other is of no use. If the gum is extracted it makes a spirit varnish, but when warm it melts and gets sticky.

According to the broker's report, to whom the sample of *Thanataw* referred to above was submitted for valuation, gamboge in its refined state sells in the Calcutta Market at from R2 to R2-8 per seer. It arrives there freely from June to August, usually packed in cases of from three to four maunds, and it is chiefly used in French polish and paint. In Burmah the cost of collection alone is estimated by the Deputy Commissioner, Tavoy, at R25 per viss (3·65 lbs.) That is to say, the cost of collection amounts to nearly R7 per lb., while the market value of the product is only R 1·4 per lb., and that too when it is in a refined state. It does not appear why the cost of collection is so great. In Ceylon the process of collection is very simple. There the gamboge is usually collected by cutting a thin slice of the bark of the tree here and there of the size of the palm of the hand. On the flat space thus exposed the gum collects and is scraped off when sufficiently dried. It may be possible perhaps to reduce the cost of collection. Unless it can be reduced very considerably, we cannot hope to introduce the Burmah product into the market. From the inquiries made, then, it would appear that the *Tawmengoot* alone yields good gamboge, and that the only obstacle in the way of the gamboge succeeding as a commercial product is the high cost of collecting it. The products of the other trees mentioned are not promising, because of their comparative insolubility in water.

* From the *Indian Forester*. Reprinted from the *Tropical Agriculturist*, October.

FORMATION OF OLEATES DURING THE PREPARATION OF OINTMENTS.*

BY CHARLES T. GEORGE.

I have long suspected that oleates were formed in the preparation of ointments made with lard or simple cerate, and containing metals or the metallic oxides, and, therefore, always opposed the indiscriminate use of the various petroleum compounds for the making of ointments.

In order to convince myself of the facts, I made experiments with following ointments:—

Mercurial ointment, 50 per cent.
Red oxide of mercury ointment.
Yellow oxide of mercury ointment.
Oxide of zinc ointment.
Nitrate of mercury ointment.
Nutgall ointment.

* From the 'Proceedings of the Pennsylvania Pharmaceutical Association,' 1886.

These ointments I prepared with petrolatum, and according to the United States Pharmacopœia. I made solutions of all the ointments in sulphuric ether, turpentine, and petroleum benzin, as follows :—

Mercurial ointment, 50 per cent., 240 grains.

Petroleum benzin, 2 fluid ounces.

Dissolve and filter, whilst yet warm, evaporate the filtrate until the benzin has almost disappeared, dissolve the remainder in hot alcohol, one and one half fluid ounces, and chloroform, one half fluid ounce, place on ice until the stearic acid separates, and filter. Evaporate the filtrate until the alcohol and chloroform have entirely disappeared. The remainder, resembling the colour and thickness of castor oil, is of necessity an impure oleate of mercury.

The investigation was carried no further, as to the quantity of oleate present or its strength, only as to the loss of mercury, which must be contained in the solution, and as to the fact that it was really present, which can be readily ascertained by taking a bright piece of copper, or a copper penny will do, and covering the surface with a few drops of the liquid, and gradually heating the copper over a spirit lamp, when the mercury is quickly reduced to its metallic form and adheres to the copper surface. The loss of mercury, originally in the ointment, was ascertained by washing the first filter well with benzine and drying, and then to ascertain the weight of the mercury contained therein, which amounted to 80 grains, showing a loss of 40 grains of mercury, which must necessarily be contained in the oleate.

In this manner all the mercurial ointments, made according to the United States Pharmacopœia, were tried, and gave the following results, based on the examination of 240 grains of ointment each :—

Mercurial ointment, 50 per cent., loss 40 grains.

Red oxide of mercury ointment, loss 8 grains.

Yellow oxide of mercury ointment, loss 10 grains.

The examination of the nitrate of mercury was difficult and unsatisfactory, but the resulting oleate proved to contain mercury in perceptible quantity with copper test, as well as with the saponification with caustic soda solution. which precipitated the mercury in a finely divided blue powder. The last was also applied to the other three ointments named above with the same result.

On the other hand, ointments made with petrolatum of the same strength as the others, the metallic mercury as well as the oleates thereof, were all recovered with very small loss, and that, probably, owing to the manipulation, by dissolving the ointments in turpentine, benzin and sulphuric ether, filtering, washing the filter well, and drying, then weighing the tared filter and its contents.

My object in examining the ointment of nut galls was to ascertain whether any of the properties of the galls would be extracted either by the lard or petrolatum. Of course, in making this examination I tried only two methods—the benzin and turpentine solutions.

The resulting solution, made from ointment, according the United States Pharmacopœia, became inky when shaken with a solution of chloride of iron, and violet when shaken with solution caustic potassa.

Whilst the solution of the ointment, made with petrolatum, and treated in the same manner, showed no trace of gallic acid whatever, is evidence that the use of lard, or lard oil and tallows are to be recommended for the preparation of all ointments containing metals or their oxides, or vegetable powders, or extracts of any kind. Petrolatum as a base is to be only recommended for the preparation of such ointments as are used for the purpose of protecting an abraded surface of the skin, or a hacked or chapped or chafed surface, acting rather in a mechanical manner than for any medicinal virtues they may contain.

I feel sorry that I must come to this conclusion, as it would be a very desirable thing to possess a base for ointments that has the desirable feature of permanence, and not likely to become rancid. In treating upon this subject we must bear in mind that lard and suets contain free fatty acids—suets from 2 to 8 per cent., lard from 8 to 15 per cent., which can easily be determined by the following rule :—

Make tincture of turmeric as follows :—

One ounce turmeric, 4 fluid ounces of alcohol, percolate, add sufficient alcohol to make percolate measure 4 fluid ounces.

Solution of potassa, having a specific gravity of 1·005, sufficient quantity.

Melt the lard or tallow in a suitable vessel and add 10 c.c. of it to 2 fluid ounces of alcohol contained in a glass bottle holding about 4 ounces, and shake well, then add 1 c.c. of tincture of turmeric and shake. Now add gradually, from a graduated pipette, the solution of potassa, shaking from time to time until the saturating point is reached, note how many c.c. were required for saturating the fat, and divide the number by two, which will give the percentage of free fatty acids.

Upon this may depend the larger or smaller quantity of oleates formed in the various ointments mentioned.

This I have not yet determined—whether the formation of an oleate in a mercurial ointment is dependent on the free acid already present, or whether it is formed by a slow or gradual decomposition, and, therefore, whether it is best to use lard or fat of any kind containing the free acid, or whether it should be first deprived of the free acids, which can be easily accomplished by washing with alcohol and a weak solution of bicarbonate of sodium.

All these are thoughts for future investigation, which I did not have the time to pursue to my satisfaction, but which I propose to continue during the present year.

BACTERIA IN DRINKING WATER.

Mr. Meade Bolton has contributed an important paper on this subject to Koch and Pflüger's *Zeitschrift für Hygiene*. He finds that in ordinary spring water certain bacteria are always present and are capable of multiplying in it. Among these may be specially mentioned *Micrococcus aquatilis*, occurring as cocci collected into small irregular heaps, and *Bacillus erythrosporus*, distinguished by its spores having a reddish-brown sheen, and the presence of a greenish pigment without any deliquescence of the gelatine in which it was cultivated. Both these bacteria multiply with extraordinary rapidity in water, the quality of the water and the amount of organic and inorganic substances contained in it appearing to have no effect on the reproduction of the microbe, which is, however, materially promoted by a rise of temperature. It took place considerably quicker at 35° than at 20°. These bacteria are not pathogenic.

On the other hand, the author found that pathogenic bacteria, when introduced into spring water, never multiply, but disappear after a time varying in length according to the species and the temperature, and according as to whether the species produces resting-spores or not. The spores of *Bacillus anthracis* had not lost their vitality in a year and a day; those of typhus fever were still active after a month but not after ten and a-half months. The quality of the water appears to have no influence in prolonging the life of pathogenic bacteria.

The general conclusions drawn by the author are that the quantity of bacteria present in spring water is no guide whatever in determining the wholesomeness or otherwise of the water for drinking purposes, since they are most entirely harmless, and that it is impossible by chemical analysis to determine the presence of bacteria in larger or smaller numbers. The presence of the specific pathogenic bacteria can only be determined by direct microchemical observation.

The Pharmaceutical Journal.

SATURDAY, JANUARY 22, 1887.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

ARE TRADE STANDARDS FOR MEDICINAL PREPARATIONS DESIRABLE?

THE proceedings at the special general meeting of the Sheffield Pharmaceutical and Chemical Society, which took place on the 12th inst., and were reported in this Journal last week, raise some questions of some considerable importance in regard to the position that should be maintained by pharmacists as to the quality of the drugs and medicinal preparations supplied by them, and the relation they should hold to other vendors of analogous articles. The view expressed in the latter portion of the first resolution, to the effect that the British Pharmacopœia is the standard by which pharmacists should consider themselves to be bound in the preparation of medicinal articles, is one with which we cordially agree as being the only one consistent with such a due regard for their professional functions as can be relied upon by them for maintaining a position of superiority in relation to other classes of traders. But we are not by any means equally disposed to agree with the other proposition conveying the idea that the British Pharmacopœia should be made the legal standard applicable to all cases, and upheld in relation to traders who do not belong to the pharmaceutical body. The sentiment by which this proposition has been suggested is no doubt good and laudable, but we think its application is a mistaken one. In any case it has received a rude rebuff at the hands of the stipendiary magistrate before whom the cases of prosecution under the Food and Drugs Act were heard lately at Sheffield, and he has held that, as a case in point, any preparation containing any opium and any alcohol whatever may be legally sold as tincture of opium. This decision is evidently inspired by the spirit of free trade that has probably taken too firm a hold of public opinion nowadays to be combated directly. The magistrate in these cases refused to accept the British Pharmacopœia as an authority for the regulation of ordinary transactions of trade, and we cannot think that he was altogether in the wrong in doing so, though the form in which he expressed his views was perhaps a somewhat exaggerated one. It is no doubt extremely unpleasant for pharmacists to find themselves forced into an apparent competition with other classes of traders who supply articles nominally of the same kind as they do, and hold themselves out to the public as the purveyors of drugs and medicinal preparations. Such unprofessional competition has nowadays to be tolerated by other classes as well as pharmacists. We do not believe that a remedy is to be sought for this evil by legislation or by restrictive regulations of trade of any kind. The general public is now the arbiter as to the source from which supplies of any description are to be procured, and the recommendation of any one in particular must be furnished by the public appreciation of the advantage to be secured by having recourse to it. Applying these views to pharmacists, we think it highly commendable that they should most stringently conform to the guidance of the British Pharmacopœia in respect to all the drugs and medicinal preparations they have to do with, not out of fear of the law, but from a professional regard for their responsibilities and with the motive of maintaining their professional credit. It should not be a matter of any importance to them what the oilman, or the grocer, or the stores might sell under the name of any medicinal preparations, but they should seek to establish such a repute with the public for the quality of their drugs and preparations as to command custom by reason of the confidence felt that the articles purchased of them could be relied upon because they were supplied by a pharmacist.

It is from this point of view that we are inclined to think that the excitement which has been created at Sheffield by the decisions of the stipendiary magistrate has gone a little beyond the mark. If the public can be induced to think that at a pharmacist's articles of unquestionable quality are sure to be obtained, while at establishments of a different order there can be no such certainty, the best and only really trustworthy protection of pharmaceutical interests will have been established and a great advance made towards the repression of unprofessional competition. It is to the attainment of this end that the efforts of the Pharmaceutical Society as a body have always been directed, and if they had been more generally supported in this direction by the members of the class that would thus be benefited much greater progress might have been made towards a better state of things. Among the arguments put forward in the resolutions passed at the Sheffield meeting that which relates to the possible danger accruing to the public from the sale of medicinal preparations having the name of preparations in the British Pharmacopœia, but differing more or less from them, is, in our opinion, scarcely one that can well be urged by pharmacists for the purpose of making the British Pharmacopœia the sole legal standard regulating trade in such articles. Nor do we think it is expedient that they should take this position and seek to establish such a compulsory standard for all persons. The public is entitled to exercise a choice as to what it will purchase,

and where it will obtain even medicinal preparations. The protection of the public safety as a general duty is not the particular province of the pharmacist, but of the Government. It is, however, quite within the province of the pharmacist to uphold the character of his preparations, and by every means in his power to impress upon the public the fact that if standard and correct medicinal preparations are required, his is the establishment where they may be obtained. We doubt very much whether the Order in Council referred to in one of the resolutions has really any binding application at all, even to pharmacists. It would appear to be altogether obsolete, and merely of historical interest. Nor do we think there is, or should be, any occasion for such an influence. For the conformity with the prescriptions of the Pharmacopœia which the pharmacist observes is instigated by a different motive than that of obedience to the law in order to avoid its penalties. The motive which induces him to observe its directions is regard for the maintenance of his professional character, and it is upon that basis that he should place himself in distinct contrast to other classes of traders with whom he has really nothing in common so far as the exercise of his business is concerned. It is upon that basis alone that he can look for remuneration of his services upon a different scale than that obtaining for the mere trader.

THE TESTING OF QUININE SULPHATE.

In calling the attention of our readers to an article by M. Jungfleisch on the modification of Kerner's test for the purity of quinine sulphate which has been adopted in the French Codex, we do so because of the very intense interest that has been excited in France by the letter lately addressed to the Academy of Medicine in Paris in reference to this subject. The very exaggerated statements then made have since been corrected by M. Jungfleisch, and he has applied himself to the elucidation of the defects of the method of testing ordered in the Codex. As regards the main points of this elucidation, showing that Kerner's original test cannot be relied upon for detecting the presence of cinchonidine in quinine sulphate, and that in order to render it efficacious in that respect it is necessary that the sample to be tested should be heated with water to the boiling point, and in some instances even to dissolve it completely at that temperature, we may mention that they are in precise accord with the demonstrations given before the Pharmaceutical Society of Great Britain at an evening meeting in February, 1877, and published in this Journal at that time. But, notwithstanding this circumstance, the test given in the Codex of 1884 only improved the directions for applying Kerner's test so far as to direct that the tube in which the mixture of quinine sulphate and water is to be shaken should be heated by immersing it in warm water (*eau chaude*). This vague direction has been a prolific source of error and miscarriage, and it is now found to be necessary to make up for the defect by a provisional direction that some particular temperature should be applied in making the test. As M. Jungfleisch points out, the proper temperature to apply in order to obtain trustworthy results is that of boiling water, and we would also suggest that in order to obtain the best possible results the proportion of water used in testing quinine sulphate should be nearly enough for its complete solution at the boiling point, so that the most favourable conditions for the separation of a relatively large quantity of a very sparingly soluble salt from a relatively small quantity of a comparatively very soluble salt may be realized to the fullest extent. We may also add that the substitution of ether as a solvent for the alkaloid remaining in solution when Kerner's test is applied to quinine sulphate was also recommended on the occasion above referred to, and the mode of carrying out the test in this way was described in the *Pharmaceutical Journal* of the 17th of February, 1877, p. 672. It is satisfactory to find that these necessary improvements of this test have at length been recognized and acted upon.

We are glad to be able to report that the Twenty-First Annual Chemists' Ball, which was held at Willis's Rooms on Wednesday evening, passed off with considerable success. The company present numbered about two hundred, an attendance which, if it fell a little below that on some previous similar occasions, was not without some compensating advantages in being well within the capacity of the establishment, and therefore consistent with the general comfort and enjoyment. The toast of the evening, "Success to the Chemists' Ball," was proposed by Mr. Michael Carteighe, President of the Pharmaceutical Society, who presided at the supper, and it was as usual heartily received. All the arrangements were well carried out under the supervision of the Stewards, and Mr. Bowen may well be congratulated upon the result that has attended his first essay as Honorary Secretary to the Chemists' Ball.

* * *

Dr. L. Scholvien, of Berlin, reports that in the examination of [German] chloroform he has repeatedly met with samples that gave a distinct reaction with silver solution, which he now finds to be referable to a contamination with arsenic (*Apot. Zeit.*, Jan. 8, p. 14). The source of the arsenic is somewhat difficult to determine. It would not seem impossible that the action of chloride of lime containing arsenic on the alcohol might give rise to organic arsenical compounds, which would pass over in the distillation; but on the other hand, upon distillation of the defective chloroform the arsenic is concentrated in the residue. It is, of course, also possible that the contamination may have been due to the use in the manufacture of sulphuric acid containing arsenic.

* * *

At a meeting of the Chemists' Assistants' Association to be held on Wednesday next, the 26th inst., a paper on "The Pharmacognosy and Chemistry of Calabar Beans," by Mr. P. MacEwan, will be read.

* * *

We have been requested to say that the course of lectures by Professor Armstrong on the "Chemistry of Nitrogen and its Compounds," to which reference was made last week, will commence on Monday next, the 24th inst., and not on the 27th inst., as has been announced erroneously by advertisement.

Transactions of the Pharmaceutical Society.

NORTH BRITISH BRANCH.

A meeting of the Executive of the North British Branch was held in the Society's House, 36, York Place, Edinburgh, on Wednesday, January 19, at 12 noon.

Present—Messrs. Ainslie, Baildon, Clark, Gilmour, Mackenzie and Noble, Edinburgh; and Messrs. Gibson, Leven; Hardie, Dundee; Kermath, St. Andrews; Kininmont, Glasgow; Maben, Hawick; Nesbit, Portobello; and Watt, Haddington.

Letters of apology were received from Messrs. Boa and Mackay, Edinburgh; and Messrs. Frazer, Glasgow; Storrar, Kirkaldy; and Strachan, Aberdeen.

On the motion of Mr. Gilmour, the chair was taken by Mr. Watt, Haddington.

The Chairman stated that the first business was the election of a Chairman of the Executive, and he moved that Mr. Baildon be elected to fill the office. This was seconded by Mr. Nesbit, and unanimously agreed to.

Mr. Baildon having taken the chair, it was moved by Mr. Gilmour, seconded by Mr. Mackenzie, and unanimously resolved that Mr. Watt, Haddington, be elected Vice-Chairman.

After discussion, it was unanimously agreed that the resident members of the Executive be appointed a General Purposes Committee, to deal with matters of detail and any business emergency in the interval between meetings of the Executive.

The meeting was then closed.

Provincial Transactions.

NORTH OF ENGLAND PHARMACEUTICAL ASSOCIATION.

A special general meeting of the members of the above Association was held in the rooms, St. Nicholas Chambers, Newcastle-on-Tyne, on Thursday, January 6, at 8 p.m., to discuss a motion referring to the curriculum proposed by the Council of the Pharmaceutical Society. The President, Mr. N. H. Martin, was in the chair.

Letters of apology were read from several members from outlying towns and villages, expressing regret at their inability to be present and their entire approval of the motion as published on the circular calling the meeting.

The President commenced by stating that on receiving the notice calling this meeting it would have occurred to most of the members that it was quite unnecessary for them, as an Association, to discuss this question, because they were already committed to the support of systematic training as an essential preliminary to the examinations of the Pharmaceutical Society. Most of them were aware that when the Association was started the proposed alteration in the Bye-laws of the Society, including the curriculum, had passed the Council and the members of the Pharmaceutical Society, and the Association was indebted to the idea (an erroneous one as events have proved) that the Privy Council would confirm such alteration for the support which it received and for the wonderful success attained during the first year. Unfortunately the Privy Council did not confirm the Bye-laws, and the second year promised to be much less successful, as might have been expected from past experience in this and every other town where attempts had been made to provide systematic education for pharmaceutical students. He need not go over all the ground of the relation of education to examination, or deeply into the reasons why education left entirely to voluntary effort had failed. There was an almost universal consensus of opinion that such was the case, and they found it echoed by such representative bodies as the British Pharmaceutical Conference and the Chemists' Assistants' Association. Most of them would be aware that at the November meeting of the Council of the Pharmaceutical Society Mr. Schacht had proposed that the Law and Parliamentary Committee be requested to draft a Bill to be introduced into Parliament to give the Society the powers with respect to education and examination which it had not got under the present law, and that such motion passed the Council almost unanimously. Seeing that account of what the Society was doing it seemed a desirable thing to bring the question prominently before the members of the Association. There were two courses open. The one was, as an Association to remain quiescent and to let the matter be in the hands of the Council of the Pharmaceutical Society, any individual giving what support he liked to the scheme; the other plan was to pass a resolution which would affirm the conviction of the Association as to the necessity there was for compulsory education. The latter would doubtless be helpful to the Council of the Pharmaceutical Society in its work, and it appeared to him to be the truly logical and consistent course to adopt. He had, therefore, to propose—

> "That no scheme for remedying the defects of the present system of examination in pharmacy can be satisfactory or achieve its object, unless it provides for the compulsory training and education of candidates, under some such conditions as those that have been already laid down by the Council of the Pharmaceutical Society."

Mr. C. B. Ford seconded the motion and said he was sure the members would all agree with the remarks which had been made by the President. If the Bye-laws had been confirmed and there were a prospect that the curriculum would become law at an early date, no one doubted but that an immense impetus would be given to the demand for education.

Mr. Watson and Mr. Wright also supported the motion, the latter referring to the value of systematic and prolonged training as a means of fitting men to perform the responsible duties of the pharmaceutical calling as well as to qualify them for the examination room.

Mr. Clague said he had not paid sufficient attention to the question to be prepared to oppose the motion, but he was sorry he could not see his way clear to support it. It appeared to him the curriculum as proposed by the Council of the Pharmaceutical Society did not sufficiently take into account the earnest and capable apprentice who might make a good use of his time and acquire the knowledge necessary without attending any classes. He thought such young men should not be compelled to submit to the curriculum.

Mr. Adams agreed with the last speaker, but said he would support the motion if any one could guarantee that the Pharmaceutical Society would recognize local schools of pharmacy in carrying out the curriculum.

Mr. Proctor said he came to the meeting to hear the remarks of others and without any intention of contributing to them. He was sorry he could not support the motion, which he considered too vague in its terms. Asked by the President if he had any amendment or counter-proposition to put before the members, he replied that he had not.

The President, in reply to Mr. Clague, stated it was perfectly true that the compulsory clauses would be binding on the good student who might not need it as an incentive to study, but he thought such a young man would be the first to welcome the curriculum. It must be remembered, however, that laws were not made for exceptions or for individuals, but for the good of the whole body, and as it had been proved to demonstration that the voluntary system as applied to the education

and training of young men for the pharmaceutical calling had failed, pharmacists were justified, nay, it was incumbent upon them to seek to place education upon a more satisfactory footing, and this the proposed curriculum would do. In reply to Mr. Adams, he said it was in no sense the fault of the Pharmaceutical Society that the means of educating chemists in the provinces were so deficient; that was due to local indifference to the subject. The President was quite sure, however, that where there was a school of pharmacy properly organized and working under pharmaceutical supervision, which could show that it had the means and was capable of fulfilling the conditions of the curriculum, that school would be recognized. It was entirely a mistake to suppose that the Council of the Pharmaceutical Society thought only of the School at Bloomsbury Square. There was nothing in the whole history of the Society, or which would be found in the utterance of any responsible member of the Council, to warrant such an idea.

The motion was then put to the meeting and carried *nem. con.*

TORQUAY CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting was held on January 11, Mr. T. Ness occupying the chair. The minutes of the last meeting having been read by the Secretary, Mr. W. Smith, and confirmed, Mr. W. Bathe, Vice-President, read an interesting paper on "The Practice and Study of Pharmacy: Past and Present." The subject was treated in a comprehensive manner, commencing with the earliest records of pharmacy and materia medica in the ancient days of Egypt, Arabia, Greece and India, special attention being paid to the old alchemists and their mystical "philosopher's stone;" passing reference was given to the Scripture allusions to pharmacy and medicines, the rise and progress of pharmaceutical and remedial knowledge from its chaotic condition in England in the sixteenth century was traced, the extraordinary character of many of the numerous "Simples and Compounds" then in use and recognized in early Pharmacopœias being noticed. It was shown that England suffers in comparison with France and Germany in regard to the legal recognition of pharmacy; also the interesting fact that the rise and progress of pharmacy sympathized very considerably with the great rise and spread of literature in the Elizabethan era. Allusion was made to the so-called "upstart chemists" of the period (about 1680), who, after severance from the old apothecaries, became the party of progress in pharmaceutical concerns, notwithstanding much opposition. Attention was then directed to the era of modern pharmacy, inaugurated by the founders of the Pharmaceutical Society, special mention being made of Jacob Bell and other "leading lights." In conclusion, a comparison was drawn between the present aspect of pharmacy and that of the remote and nearer past, especially with reference to the latter, showing that the many appliances and requirements of modern pharmacy had rendered its practice far easier than formerly as regards physical labour. Also, that although the professional status of pharmacists had improved, their pecuniary interests had unfortunately not done so. Pharmaceutical study was referred to in various parts of the paper, and towards the close students were forcibly recommended to commence assiduous study early in their career, and to exercise a spirit of individual self-help without depending upon the aids of "crammers" or "courses of study." The paper was interspersed with several humorous allusions and poetical quotations, and manifested a considerable amount of care and research on the part of its author.

A discussion followed, in which Messrs. Ness, Morris, Curtis and others took part.

A vote of thanks to Mr. Bathe terminated the proceedings.

CHEMISTS AND DRUGGISTS' TRADE ASSOCIATION OF GREAT BRITAIN.

A special meeting of the Executive Committee of this Association was held on Friday, January 14, 1887, at 12.45 p.m., to consider the extremely critical financial condition of the Association, and to decide on the steps to be taken to place the Association in a sound financial position.

Mr. W. G. Cross (Shrewsbury), President, in the chair.

Present:—Messrs. Barclay (Birmingham), Chapman (Scarborough), Churchill (Birmingham), Harrison (Sunderland), Hart (Manchester), Holdsworth (Birmingham), Jervis (Sheffield), O. Jones (Llanrwst), W. Jones (Birmingham), Parker (Nottingham), and the Solicitor to the Association.

Letters of apology were received from the following members, regretting their inability to attend, viz.:—Messrs. Arblaster (Birmingham), Andrews (London), Bell (Hull), Crook (Eastbourne), Hampson (London), Laird (Edinburgh), Mackenzie (Edinburgh), Paterson (Aberdeen), Symes (Liverpool), and Walker (Nottingham).

The minutes of the previous meeting of the Executive Committee were read and confirmed.

The Chairman said he was sorry to say that it was again his lot to draw their attention to the absence of a familiar figure at that table, he referred to the late Mr. Henry Davis, of Leamington, who for the past two or three years was a representative upon that Committee. They all knew how assiduous he was to his duties, and the intelligent and able manner in which he took part in their discussions. He desired to propose the following resolution:—

"That this Committee, on behalf of the Association, beg to express their deep regret at the loss they have sustained by the death of Mr. Henry Davis, who was a firm supporter and friend of the Association; they likewise desire to accord their sympathy with his bereaved family."

Mr. Harrison seconded the proposition, remarking that he could endorse all the Chairman had said as to the value of the services rendered to the Association by the deceased gentleman.

The resolution was unanimously carried.

The report of the Sub-Committee appointed by the Law and Parliamentary Committee was then read.

The report stated that the Committee had instructed the Solicitor to advise a member against whom proceedings had been commenced for the alleged sale by his assistant of laudanum when tincture of rhubarb was asked for. That the Assistant Secretary had successfully prosecuted in the Police Court two offenders under the 17th section of the Pharmacy Act, when fines of 5*s.* and 10*s.* were respectively inflicted, and that in each case the Pharmaceutical Society had subsequently obtained a judgment in the County Court for £10 and costs under the 15th section of the Act. That the Committee had ordered the defence of a member, residing at Sheffield, against whom proceedings were commenced under the Sale of Food and Drugs Act for having improperly dispensed a prescription containing citrate of iron and quinine. Professor Attfield had analysed the sealed portion left with the vendor by the inspector and pronounced it to be the compound as ordered in the prescription. The local authorities, however, withdrew the summons, and also another summons down for hearing on the same day, in which ·850 spirit of nitre had been sold.

Mr. Barclay said the Committee had not been able to do as much as they should have liked to have done. That was owing largely to the want of the sinews of war. He begged to move:—

"That the report of the Sub-Committee now read be received, adopted, and entered on the minutes."

Mr. Jones (Llanrwst) seconded the motion, which was carried unanimously.

The Secretary said that on October 18 last, he had an interview with Mr. Bright at Somerset House on the Patent Medicine Stamp question, and that he left in that gentleman's hands a print of a memorandum prepared by the officers of the Association in interpretation of the statutes dealing with the subject, with a request that he would submit the same to the Board of Inland Revenue, that it might be issued to the trade on the joint authority of the Association and the Commissioners. He was pleased to inform the Committee that the following communication had been received from Somerset House, with the accompanying memorandum as approved by the Board:—

"Inland Revenue, Somerset House,
"London, W.C.,
"*November* 29, 1886.

"Dear Sir,—I have, in conjunction with my colleague, Mr. Bright, very carefully considered the draft, which you left at this office last month, of the Memorandum to be issued by your Association in regard to the Medicine Stamp Duties, and I now send you a copy of the revised draft as approved by the Commissioners.

"You will please understand that it is a condition of the Commissioners' approval that the printed extracts from the Acts of Parliament be subjoined to the Memorandum which is explanatory of those Acts.

"I should be much obliged if you would send me a few copies of the Memorandum when ready for issue.

"Yours faithfully
(Signed) "J. N. CRAFER.

"W. H. Haydon, Esq."

"MEMORANDUM FROM THE CHEMISTS AND DRUGGISTS' TRADE ASSOCIATION OF GREAT BRITAIN.

"*Medicine Stamp Duty Acts.*

"On the 12th April last, a deputation from the Chemists and Druggists' Trade Association of Great Britain, on the subject of the administration of the above Acts, was received by the Board of Inland Revenue. The discussion which then took place was fully reported in the Trade Journals of the 22nd April, 1886, from which it will be seen that it was arranged that a Memorandum should be drawn up by the Association, and submitted to the Inland Revenue Authorities in explanation of the provisions and administration of the above-mentioned Acts (printed extracts from which are subjoined). This Memorandum has accordingly been prepared and approved by those authorities.

"In circulating it, the Executive Committee of the Association desire to point out that it is not intended to be a precise or exhaustive disquisition on the law—it is issued as a general guide only, for there is now no necessity to do more than direct the attention of the trade to the general provisions of the Statutes as at present administered. The opinion of the Department can be obtained by any Chemist and Druggist in each particular instance of doubt or difficulty, by addressing a letter of inquiry to The Honourable the Commissioners of Inland Revenue, Somerset House, London.

"In many cases the labels *per se* do not render the preparations to which they relate liable to Medicine Stamp Duty, but nevertheless, the preparations are made so liable by the publication of other printed or written matter. It should therefore be clearly borne in mind that when labels are sent to Somerset House for the opinion of the authorities they must be accompanied by all the printed or manuscript matter (including handbills, advertisements, etc.) which relates to the particular preparation in question. The labels, etc., should be sent in duplicate.

"The Commissioners decline to advise on variations of the same label and thereby to assist persons in framing labels, so as to avoid the charge of the duty.

"It will be seen from the Acts that, broadly speaking, there are four separate and distinct grounds on which liability to Stamp Duty may attach to a medicine which is not mentioned by name in the Schedule to the Act 52 Geo. III., cap. 150, viz.:—

(1) A claim, whether well founded or not, to any secret or art in the preparation.
(2) A claim, whether well founded or not, to any proprietary right in the preparation.
(3) The sale of the preparation, either present or past, under the authority of Letters Patent.
(4) The use at any time of any handbill, label, or advertisement holding out the preparation as a nostrum, proprietary medicine, or specific, or recommending it as beneficial for the prevention, cure, or relief of any distemper, malady, or ailment affecting the human body.

"With respect to the statutory exemptions, the terms of those applicable to pure and unmixed drugs and articles of confectionery not vended as medicines are clear and unmistakable, and as to the exemption in 3 and 4 Will. IV., c. 97, s. 20, it follows from the decision of the Court of Appeal in the case of the Attorney-General *v.* Lamplough (L. R. 3, Exch. Div. 214) that effervescent preparations similar in composition to Lamplough's Pyretic Saline are exempt from duty.

"In practice the Commissioners hold that liability does not attach in respect of preparations to be burned and the fumes inhaled or smoked, though they may be recommended for the cure or relief of disorders. Such preparations are not regarded as "used or applied externally or internally."

"Toilet articles are not liable unless recommended as preventing, curing, or relieving any ailment or disorder, but many of these preparations are liable as being recommended for the prevention or cure of chilblains, toothache, neuralgia, etc.

"In designing a label for any medicinal preparation on which it is desired not to pay stamp duty, care must be taken to avoid any expression or phraseology which can be construed as representing:—

(1) That the preparation of the medicine is a secret, or that the medicine is a specialty of any person, or that it is made in conformity with any special recipe. For instance, such fancy names as "The City of Liverpool Cough Lozenges," "St. Mark's Linctus," "Mephisto Corn Paint," etc., must be avoided.
(2) That it is the preparation of any particular person, or that anyone has a proprietary right in its manufacture or sale, for example, "Smith's Liver Pill," "Neuralgic Tincture, prepared only by Jones."
(3) That it will prevent, cure, or give relief in any disorder.

"It should be remembered that not only should all such expressions be avoided on the label itself, but also in all references to the medicine, whether on the label, wrapper, or cover, or in any printed or manuscript matter whatever, including newspapers, handbills, posters, showcards, advertisements, almanacks, lists, etc.

"It is well established that where any such expressions have been so used at any time before sale the medicine is thereby rendered liable to stamp duty, even though the actual label on the package is entirely innocent.

"The Revenue authorities have always recognized the necessity that exists for giving to a preparation such a designation or name as shall distinguish it from other medicines, and they do not attribute any further meaning to such words as cough mixture, liver pills, lip salve, teething powders, corn paint, etc., etc.

"MEDICINE DUTY.

"*Stamp Duty.*

"44 *Geo. III., c.* 98, *Schedule B.*—For and upon every packet, box, bottle, pot, phial, or other inclosure containing any drugs, herbs, pills, waters, essences, tinctures, powders, or other preparation or composition whatsoever used or applied or to be used or applied externally or internally as medicines or medicaments for the prevention,

cure, or relief of any disorder or complaint incident to or in anywise affecting the human body, which shall be uttered or vended in Great Britain, where such packet, box, bottle, pot, phial, or other inclosure with its contents shall not exceed the price or value of one shilling £0 0 1½

	s.	d.		s.	d.			
Shall exceed	1	0	and not exceed	2	6	0	0	3
,,	2	6	,,	4	0	0	0	6
,,	4	0	,,	10	0	0	1	0
,,	10	0	,,	20	0	0	2	0
,,	20	0	,,	30	0	0	3	0
,,	30	0	,,	50	0	0	10	0
,,	50	0	. . . . .			1	0	0

"*Medicines charged with Stamp Duty.*

"52 *Geo. III.*, *c.* 150.—The various articles specified by name in the schedule, and also all other pills, powders, lozenges, tinctures, potions, cordials, electuaries, plasters, unguents, salves, ointments, drops, lotions, oils, spirits, medicated herbs and waters, chemical and officinal preparations whatsoever, to be used or applied externally or internally as medicines or medicaments, for the prevention, cure, or relief of any disorder or complaint incident to or in anywise affecting the human body, made, prepared, uttered, vended, or exposed to sale, by any person or persons whatsoever.

"Wherein the person making, preparing, uttering, vending, or exposing to sale the same, hath or claims to have any occult secret or art for making or preparing the same;

"Or hath or claims to have any exclusive right or title to the making or preparing the same;

"Or which have at any time heretofore been, now are, or shall hereafter be prepared, uttered, vended, or exposed to sale under the authority of any letters patent under the Great Seal.

"Or which have at any time heretofore been, now are, or shall hereafter be, by any public notice or advertisement, or by any written or printed papers or hand-bills, or by any label or words written or printed, affixed to or delivered with any packet, box, bottle, phial, or other inclosure containing the same, held out or recommended to the public by the makers, vendors or proprietors thereof as nostrums, or proprietary medicines, or as specifics, or as beneficial to the prevention, cure or relief of any distemper, malady, ailment, disorder or complaint incident to or in anywise affecting the human body.

"*Exemptions.*

"52 *Geo. III.*, *c.* 150.—All medicinal drugs whatsoever which shall be uttered or vended entire, without any mixture or composition with any other drug or ingredient whatsoever.

"55 *Geo. III.*, *c.* 184, *s.* 54.—Ginger and peppermint lozenges or any other article of confectionery, unless the person vending the same shall vend the same as medicines, or as beneficial for the prevention, cure or relief of any distemper, malady, ailment or disorder incident to or in anywise affecting the human body.

"3 *and* 4 *Will. IV.*, *c.* 97, *s.* 20.—All artificial mineral waters, and all waters impregnated with soda or mineral alkali, or with carbonic acid gas, and all compositions in a liquid or solid state to be used for the purpose of compounding or making any of the said waters.

"*Directions.*

"42 *Geo. III.*, *c.* 53, *s.* 3.—The duties to be paid by the proprietors, compounder or first vendor, before the preparation is sold or exposed for sale, or delivered out of his custody or possession for sale, either wholesale or retail, either for foreign or home consumption.

"52 *Geo. III.*, *c.* 150, *s.* 2.—The labels are to be so affixed that the packet, box, bottle, pot, or other inclosure cannot be opened and the contents poured out or taken therefrom without tearing the label, so as to prevent its being made use of again.

"*Excise Licence.*

"38 *Vict.*, *c.* 23, *s.* 8.—An Excise licence is required to be taken out yearly in any part of Great Britain by the owners, proprietors, makers and compounders of and persons uttering, vending or exposing for sale, or keeping ready for sale any medicine liable to stamp duty.

The duty on each such licence is . . . . 5*s.*

"*Any person selling an article liable to stamp duty without having a licence incurs a penalty of* £20 *under* 42 *Geo. III.*, *c.* 56, *s.* 9;

"*And any person, whether licensed or not, selling any such article unstamped, incurs a penalty of* £10 *in respect of every offence under* 52 *Geo. III.*, *c.* 150., *s.* 2."

The Secretary was instructed to forward a copy of Mr. Crafer's letter and the Memorandum to the trade journals, with an intimation that a print of the latter would be supplied to any member of the Association on application to the Secretary.

The following report of the Finance Committee which had been printed and circulated among the Executive was then taken as read:—

"*Report of the Finance Committee to be presented to the Executive at their Meeting on January* 14, 1887.

"Since the last meeting of the Executive, your Finance Committee have held two meetings. At the first, held on December 17 last, the Secretary's Cash Statement and all books of account were examined and passed up to November 30, and several accounts were examined and ordered to be paid.

"The second meeting of your Committee, which took place on the 5th instant, was convened to consider the extremely critical financial position of the Association. The Secretary then stated that although the outstanding subscriptions represented on paper £343, yet the expenditure from January to June, 1886, inclusive, was £546, whilst the sum collected in subscriptions and donations during the same period amounted to only £146. Under these circumstances a temporary collapse of the Association appeared imminent, unless prompt steps were taken to avert the same.

"After some considerable discussion, your Committee determined to convene a special meeting of the Executive to consider the best means to be adopted for placing the Association in a sound financial position, either by making a special appeal to the trade for funds to enable the work to be carried on until the close of the present financial year, when an increased subscription might be levied, or by re-organizing the Association forthwith on the basis of an increased subscription.

"Annexed to this report is a statistical abstract of income and expenditure account since the formation of the Association to April 15th last.

"By Order of the Committee.

"W. F. HAYDON,
"*Secretary.*

"*Office of the Association,*
"23, *Burlington Chambers, New Street,*
"*Birmingham, January* 7, 1887."

It was moved by the President, seconded by Mr. Chapman, and unanimously resolved:—

"That the report of the Finance Committee be received, adopted, and entered in the minutes."

The Chairman said the next matter on the agenda was the serious business of the day, viz.,—To decide on the steps to be taken to place the Association in a sound financial position. They were asked to decide upon the steps to be taken to place the Association in a sound financial position. That at once implied they were not in a good financial condition, and he was afraid that those who, like himself, had read the report just adopted, would agree with him that the Secretary was perfectly justified in putting the announcement on the agenda paper in the form he had done. They had taken time by the forelock, and he could not believe for a single moment that an Association such as theirs would

Statistical Abstract of Income and Expenditure Account.

Audit year.	No. of members.	Amount received in subscriptions.	Amount received in donations.	Total income.	Total expenditure.	Income per member.	Expenditure per member.
		£ s. d.	£ s. d.	£ s. d.	£ s. d.	s. d.	s. d.
1876–7 . .	2280	720 0 0	1028 16 6	1748 16 6	1039 16 9	12 1	7 2
1877–8 . .	3940	985 0 0	375 19 6	1360 19 6	1331 8 7	6 10	6 9
*1878–9 . .	4570	1142 10 0	1645 19 6	2788 9 6	2064 14 8	12 2	9 0
1879–80 .	4857	1214 5 0	143 10 0	1357 15 0	1248 12 2	5 7	5 1
1880–1 . .	4345	1086 5 0	71 16 6	1158 1 6	1024 2 10	5 3	4 8
1881–2 . .	2765	691 5 0	179 7 0	870 12 0	1041 3 8	6 3	7 6
1882–3 . .	2743	685 15 0	63 4 6	748 19 6	876 19 9	5 5	6 4
1883–4 . .	2632	658 0 0	68 13 0	726 13 0	750 4 11	5 6	5 8
†1884–5 . .	2449	612 5 0	513 14 0	1125 19 0	850 0 4	9 2	6 11
1885–6 . .	2317	579 5 0	285 7 0	864 12 0	1060 13 4	7 5	9 1
Average of ten years .	3350	837 9 0	437 12 9	1275 1 9	1127 11 8	7 6	6 9

entirely disappear when they came to consider the large amount of work that had been done, and done with so much discretion; that they had uniformly adopted the principle of defending the weak and upholding the right of their business or profession under all conceivable circumstances in all cases where there had been a good and sufficient reason. Surely there was no chemist who would refuse to contribute the small subscription he was asked to furnish the Association with. It was the unfortunate apathy which pervaded the ranks of chemists and druggists that had brought them to their present deplorable position, and it was only when some occasional circumstance caused the members to make a spasmodic effort that the organization rose to the level of perfect solvency. Unfortunately, he himself had to confess to one mistake in connection with the Association. He now saw quite clearly that a 5*s.* subscription was totally inadequate to meet the needs of an Association such as theirs; they had defended several of their members and had trampled upon persecutions to a greater extent than most chemists and druggists had any conception of. So long as it was known that an Association like that existed to defend the legitimate interests of the trade, so long had their enemies been chary of attacking them, and doubtless had it not been for the existence of the Society many more cases where defence was required would have cropped up. They had prosecuted forty-four illegal traders under the Pharmacy Act, and they had done what was better than defend or prosecute, namely, advised 4763 members of the trade since their office was established. They had held no less than 221 formally convened meetings and the money they had expended in doing all this work had been very moderate indeed. He therefore hoped that that meeting would in some practical way devise a means of conveying the importance of the Association to the rank and file of the chemists and druggists in the country, and he hoped and believed that the position they found themselves in at the present time would before their next Annual Meeting be reversed.

In answer to a question, the Secretary said that at the present time there was £52 5*s.* 11*d.* in hand, but the actual outstanding accounts, not including accruing liabilities, such as rent and official salaries, amounted to £123 2*s.* 10*d.*, leaving a balance against the Association of £70 16*s.* 11*d.* The outstanding subscriptions would, of course, more than meet this deficiency, but at present those assets merely existed on paper, and were not available cash.

Mr. Holdsworth (Treasurer) said there were several accounts owing, and he should not be at all disposed to sign cheques, seeing that the Association had no assets

* Apothecaries Co. *v.* Shepperley.
† Poisons Bill in House of Lords.

He thought, therefore, it behoved the Executive to deal with the matter very promptly. Something must be done in order to make the Association to go on through the year, and to pay off its liabilities.

Mr. Barclay said he felt sure that there was strength and force enough in the Association and the Executive to carry them over their present difficulties. They had gone through a great many difficulties, and he thought if they all put their shoulders to the wheel they would be able to face those which existed at present. As the Treasurer stated, the funds were practically *nil.*

The Secretary: There is a balance really against you.

Mr. Barclay: That is worse than *nil.* They had five or six months before them yet before they would be able to ask for a renewal of their subscriptions. So far as they could calculate they would require something like £500 or £600 to carry on the work of the Association up to June, when the subscriptions were again due. As far as he could see they had two or three alternatives. One was to send the hat round again, as had been done so frequently, and endeavour to get something like £500 before the Annual Meeting. They certainly knew that previously the response to such appeals had been anything but satisfactory, unless there had been some scare among the members of the trade, or the interests of the trade were seriously and immediately jeopardized. Another alternative would be to call a special meeting of the whole trade, place before it the financial condition of the Association, ask for an increased subscription, and date back the financial year to commence in January instead of in June. That would of course be asking for two subscriptions for the one year. Further, he thought it would be necessary to raise the subscription to at least 10*s.*, and then in many instances people would send 10*s.*, whereas they would not trouble about the 5*s.* The only other alternative was to wind up the affair as nicely as possible, to say the trade had not supported them, and that they must in consequence dissolve the Association. He would move:—

> "That the Secretary be requested to visit London and the principal towns, and endeavour to raise funds to carry on the work of the Association to the end of the month of June next, and that resolutions be moved at the next Annual Meeting of the Association to raise the amount of the annual subscription from 5*s.* to 10*s.*, and to make such alterations in the Rules of the Association as the Urgency Committee shall recommend after an inquiry into the working and organization of the Association as will tend to increase the membership and reduce the expenditure."

Mr. Churchill seconded the resolution.

Mr. Jervis said he had always argued that it was not possible to carry on the Association with so small an annual subscription as 5*s.*; for that paltry amount the organization had taken upon itself an immense amount of responsibility. It was absolutely imperative if they were to succeed that they should raise the subscription.

Mr. Harrison said he thought endeavouring to collect two subscriptions in one year would be a dangerous procedure, whilst there were many objections to going round with the hat. The chemists as a rule had got into such a sense of security that they seemed no longer to see the necessity of the Association, and until they had some burning question coming to the front they would not, he was afraid, become alive to the mistake they were making. If the 10*s.* subscription had the effect of reducing the membership to 2000 it would be better than having 4000 at 5*s.*, as the field of their operation would be less and their expenditure consequently not so great.

Mr. Jones (Llanrwst) said he agreed with the suggestions of Mr. Barclay. He urged the importance of local secretaries exerting themselves, in the immediate neighbourhoods where they were located, to obtain new subscriptions and collect arrears. He also expressed the opinion that if they were called upon to contribute an annual subscription of a guinea to the Pharmaceutical Society, surely they could afford half-a-guinea subscription to the Chemists and Druggists' Association.

Mr. Parker thought that if some of the members of the Executive organized meetings in the principal centres of the country, and explained fully the work done by the Association, together with its present financial position, that there would be a satisfactory response. He also believed in a personal canvass being made as a means of getting subscriptions.

Mr. Chapman said there were 8000 or 9000 chemists in Great Britain, and out of that number there were only practically about 2000 subscribers to the Association. He thought the bulk of the chemists should be asked whether the Association should be continued or not.

The resolution was then put to the meeting and carried unanimously.

The meeting then considered the Shop Hours Regulation Bill, and decided to take no action upon it at present.

Mr. Holdsworth said what action was he to take in regard to signing cheques on behalf of the Association? There was scarcely any money in the bank, and there were obligations outstanding. He was not prepared to advance any money, and was not prepared to give any guarantee to the bank for any overdraft that they might allow in case they had to ask for it. He did not suppose the Executive would expect him to do that; therefore he wished them to look carefully at the matter and decide what steps should be taken.

The Chairman said he was sure that every member of the Executive felt they could not possibly ask Mr. Holdsworth to make a personal guarantee in the matter. They were sufficiently obliged to him for the work he had done, without asking him to take any personal responsibility.

Mr. Barclay said he thought Mr. Holdsworth should hold his hands for a time—there was nothing pressing except office expenses—until the Secretary had made an effort to get in some money. If the effort proved barren, then the Finance Committee at the back of Mr. Holdsworth would have to take means to wind up the Association.

Mr. Hart: I think we cannot do better than leave it in the hands of the Finance Committee to act as they think proper.

The Chairman: Well, if the Secretary's efforts do not succeed we must wind up the Association.

Mr. Holdsworth said he should sign no cheque unless there was money in hand to meet it.

The Chairman: I think that is the more healthy course to pursue.

Proceedings of Societies in London.

ROYAL INSTITUTION OF GREAT BRITAIN.

Suspended Crystallization.*

BY PROFESSOR JOHN MILLAR THOMSON, F.C.S.

The phenomena attending the ordinary solution of metallic salts in water have been so often and ably brought before the consideration of this audience, that I have determined to confine myself this evening to certain considerations relating to the formation of and deposition from so-called supersaturated solutions of these salts. At the same time it is necessary for me to remind you of one or two points connected with the ordinary solution of a salt in water, which I may enumerate as follows.

The solubility of a salt in water depends:—

(*a*) On the mass of salt presented to the water for solution, and the state of aggregation in which that mass may be at the time of solution.

(*b*) The temperature at which the solution of the salt is carried out; rise in temperature generally producing an increase in the solubility of the salt, although there are certain exceptions to this rule.

(*c*) Each salt has its own definite rate or amount of solubility; some being extremely soluble, as calcium chloride or sodium acetate; others having a very low amount of solubility, as calcium sulphate.

(*d*) On the cooling of a hot solution containing large quantities of salt, a deposition of the salt takes place, which deposition is known under the term "crystallization."

Certain salts, however, which generally present abnormal phenomena in their solution show no tendency to be deposited from their solutions on cooling, provided such solutions are kept covered from the access of the outside air. Such solutions are said to have become supersaturated.

This branch of the subject is the one which will engage our attention.

It may be divided into two classes. (1) That which occurs in the presence of the undissolved salt; and (2) That which occurs in the absence of the undissolved salt; this latter class being the one we shall examine.

Glauber's salt (sulphate of soda) affords a very good example of this. If the crystallized sulphate be added to boiling water in a flask, as long as it is dissolved the water will take up nearly twice its weight of salt. If this solution be now allowed to cool in an open vessel, an abundant deposition of crystals will take place, as the water when cold will only dissolve about one-third of its weight of crystallized sulphate. But if the flask be tightly corked or stoppered with cotton wool whilst the solution is boiling, it may be kept for several days without crystallizing, although moved about from place to place. On withdrawing the plug, however, the air on entering the flask will produce a slight disturbance of the surface of the fluid, and from that point beautiful prismatic crystals shoot though the solution until the whole has become perfectly solid.

It is not necessary in preparing such solutions that the flask be closed completely with a stopper, as we find that plugging the neck with cotton wool exercises the same effect in preserving the solution, and that the air which enters the flask during the cooling becomes thoroughly deprived of its crystallizing influence, evidently undergoing a filtering process. A very good instance of the inability of filtered air to start crystallization is afforded by a solution of alum saturated at 194° F., and allowed to cool in a flask stoppered with cotton wool in the manner previously described. On withdrawing the plug of cotton wool the crystallization, which in this case takes a much longer time to commence than with the sulphate of soda, will be seen beginning at various points on the surface of the liquid, and will spread slowly from

* Read, Friday, May 14, 1886.

these, octahedral crystals of alum half an inch or more in length being built up in a few seconds.

It is evident from these two experiments that the cause of this sudden crystallization is to be sought for in the peculiar action of the air when it comes in contact with the solution; but that it is not due to the action of the air alone is shown by the fact that the air in the flask plugged with cotton wool must enter during the cooling, and that therefore the action of the cotton by filtering the air in some way deprives it of its active property.

But it will be found that there are other means of destroying this activity without filtering the air through cotton wool. Thus, if the solution of sodium sulphate containing two-thirds of its weight of crystallized salt be allowed to cool in a flask closed by a cork, furnished with two tubes plugged with cotton wool; on removal of the cotton plugs, air may be blown from the lungs through the longer tube without causing the crystallization, apparently from the fact that the air has been deprived of the nucleus which induces the crystallization by passage through the lungs. On blowing air, however, from a bellows, after a few strokes the solution will be found to solidify almost instantaneously.

The earliest ideas concerning this sudden solidification were naturally those which supposed that the mere entrance of air into the flask upon opening it started the crystallization. The late Dr. Graham, and Professor Thomas Thomson, held this view; and the former of these chemists carried out a considerable series of investigations on the action of different gases in determining the crystallization. These ideas were followed by the statement of Ziz, that not only air but also solids were capable of acting as nuclei when dry, but that when wet, or boiled with the solution, or placed in it when hot, and allowed to cool at the same time with it, they lose their effect. The activity of air, however, as in itself a nucleus, has been subsequently shown by Löwel to be incorrect; but at the same time he admits that solid bodies after exposure to air become active.

In 1851 two chemists, Selmi and Goskynski, introduced the explanation that dry air is active by virtue of its getting rid of the water at the surface, thus producing small crystals which continue the action. This seems to be a repetition of the theory propounded by Gay-Lussac, who held that the air absorbed at the surface precipitated a portion of the salt in the same way that one salt precipitates another, and that this deposition continued the crystallizing action. By an elaborate series of investigations, conducted in 1866, and also during later years, the French savants, MM. Gernez and Violette, came to the conclusion that there is only one nucleus for a supersaturated solution, and that is a crystal of the body itself; also indicating in certain experiments that substances which possess the same crystalline form and chemical structure may be found active to supersaturated solutions of each other. They have conclusively shown at the same time that heated or washed air, or bodies of different constitution but chemically clean, remain perfectly inactive as regards their supersaturated solutions.

That disruption of the solution may take place without causing crystallization when the body added is perfectly clean may be easily shown by carefully removing the cotton plug from a solution of sodium sulphate containing only two-thirds its weight of crystals. On introducing a perfectly clean platinum wire no crystallization is induced, but on removing the wire and touching it with a substance which has not previously been rendered chemically clean, and on again introducing it in the flask, the moment it touches the liquid crystallization is at once induced.

This question of the nuclear action of substances upon these solutions has received considerable attention from English chemists, most notably from Mr. Tomlinson, Professor Liversidge, and Professor Grenfell, all of whom have conducted elaborate researches on the subject, leading, however, to different conclusions with each investigator. The arguments held by Tomlinson are strongly in support of some physical cause for the phenomenon, and that the result may be brought about by the action of substances possessing no chemical relations to the solutions experimented on. Professor Liversidge, on the other hand, has tried the action of several substances with the most careful precautions, that their addition to the solutions should be effected without contamination from, or access of, the external air to the flask during the experiments. The result of his inquiries, so far as the substances he has experimented with are concerned, confirms those of Gernez, and limits the number of bodies capable of acting as nuclei within very narrow limits. In fact, he concludes that the only body capable of causing the crystallization of such solutions is a crystal of the substance itself, of exactly the same composition as it possesses when in a state of supersaturation. Thus Glauber's salt, which exists in a supersaturated solution, combined with ten parts of water, will only crystallize by the addition of a crystal of the substance also containing ten parts of water, and is perfectly inactive to crystals of the same salt which contain seven proportions of water, or those which are anhydrous.

As it is almost impossible to conceive that our atmosphere is laden with minute particles of the many different metallic salts which we are acquainted with, some hesitation in accepting such a limited explanation may be excusable; but when we consider that it has been shown by Dr. Angus Smith and others that the air, especially in the vicinity of large manufacturing towns, is filled with small particles, more especially of Glauber's salt, we are not surprised that solutions of this body at least crystallize at once on the removal of the filtering medium. And the probability of the explanation may be further strengthened by the fact that these solutions when opened in the still air of country places may retain their liquid condition for considerable lengths of time.

At the same time the limit fixed by Professor Liversidge may appear a somewhat narrow one, and experiments, made some time ago and published in the *Journal of the Chemical Society of London* (May 1879, and September 1882), have confirmed a few experiments first indicated by Gernez, and go a considerable length in showing that bodies possessing not only the same crystalline form but an identical chemical structure are active nuclei in causing the crystallization of supersaturated solutions.

In these experiments two methods for the addition of the nuclei intended to excite crystallization were adopted. The first of these consisted of a flask and bulb tube, the supersaturated solution of the salt to be experimented on being placed in the flask, whilst the small bulb was filled with a solution of the body intended to act as nucleus. The solution in the bulb having been thoroughly boiled, the tube is stoppered with cotton wool and then introduced through the centre of a second cotton plug into the neck of the flask. The contents of the flask are now heated, the contents of the bulb receiving a second warming from the steam rising from the solution in the flask. The flasks so prepared are then allowed to stand till perfectly cold before performing an experiment. When it was desired to perform an experiment the solution of the body intended as nucleus contained in the bulb tube is first crystallized by touching with a platinum wire, or preferably by introducing a crystal of the salt contained in the bulb. Crystallization having thus taken place in the bulb, and the crystal added having become enclosed in the fresh deposit, the bulb is lowered into the liquid contained in the flask and allowed to remain there for some time to show that the disturbance produced by its introduction into the fluid does not excite crystallization. The bulb is finally lightly broken under the fluid and the result observed. Bulbs also containing

water, pieces of washed glass, etc., may be broken under the supersaturated solutions, to show that the disruption produced on breaking does not excite crystallization.

A second method which may be employed for the introduction of nuclei is that introduced by Professor Liversidge.* This consists of a siphon tube, in which crystallization is induced in the first limb and allowed gradually to pass over the bend and down to the point of the second limb.

(*To be continued.*)

Parliamentary and Law Proceedings.

THE COUNCIL OF THE PHARMACEUTICAL SOCIETY OF GREAT BRITAIN *v.* HUDSPITH.

At the Durham County Court, on the 17th inst., before his Honour Judge Meynell, the Council of the Pharmaceutical Society of Great Britain sued T. Hudspith, of 7, High Street, Langley Moor, near Durham, to recover a penalty of £5 for selling or keeping open shop for the sale of poison, and a further penalty of £5 for taking, using, or exhibiting the title of chemist or druggist contrary to the provisions of the Pharmacy Act, 1868.

Mr. T. C. Granger, Barrister, appeared for the Council; defendant appeared in person.

Mr. Granger stated that the defendant made sales of poisons, and in so doing used the label of a registered chemist and druggist carrying on business in Durham, and that he also carried on a business which he described upon his labels as that of "Botanic Druggist." A purchase of laudanum was in December last made at the defendant's shop, and it was submitted that the defendant had under the circumstances incurred a penalty for keeping open shop for the sale of poison, and a further penalty for using the title of druggist.

Richard Addison, examined, proved that on December 16 last he went to the defendant's shop, 7, High Street, Langley Moor, and made several purchases, viz., of two pennyworth of laudanum, a parcel of the defendant's herb beer packets, and two pennyworth of spirit of camphor. The bottle containing the laudanum was labelled with the name of "J. Lambert, Dispensing Chemist and Druggist, 7, High Street, Langley Moor, near Durham." The bottle containing the spirit of camphor was wrapped up in a bill at the foot of which were the words, "Sold by J. Lambert, Managing and Dispensing Chemist, at T. Hudspith's, Medical Botanist." The herb beer packet bore the defendant's name, and the description "Botanic Druggist." On the 14th inst. he handed the laudanum to Mr. Fowler for analysis.

Mr. William Fowler, pharmaceutical chemist, of Sunderland, examined, proved that he had analysed the contents of the bottle and found it to be tincture of opium.

Mr. George Salkeld, examined, proved that he was rate collector for the district which included High Street, Langley Moor; that the defendant was the occupier of the premises, 7, High Street, and that his name was still over the shop door.

The defendant submitted that by arrangement with Mr. Lambert he was allowed to sell poisons, using Mr. Lambert's label thereon; but he admitted that he was proprietor of the business carried on at 7, High Street, Langley Moor.

Mr. J. Lambert, called and examined by the defendant, proved that he was in no way interested in the business, and that what he had done was to give the defendant permission to use his label, if it was in conformity with the law.

His Honour gave judgment for the penalties sued for, and gave costs on the higher scale.

* *Proc. Roy. Soc.*, xx., 497.

Obituary.

Notice has been received of the death of the following:—

On the 30th of September, 1886, Mr. Benjamin Wrigglesworth Gibson, Chemist and Druggist, Barnard Castle, Durham. Aged 68 years.

On the 28th of December, Mr. Ebenezer B. Sutcliffe, Chemist and Druggist, Withington, near Manchester. Aged 51 years.

On the 6th of January, 1887, Mr. James Merrell, Pharmaceutical Chemist, Queen's Terrace, Camden Road, N.W. Aged 62 years. Mr. Merrell had been a Member of the Pharmaceutical Society since 1853.

On the 10th of January, Mr. John Dyer, Chemist and Druggist, Ramsgate. Aged 69 years.

On the 11th of January, Mr. Marshall Beddington, Chemist and Druggist, Robin Hood's Bay, near Whitby. Aged 49 years.

On the 11th of January, Mr. Edward Worsey, Chemist and Druggist, New Road, Woolwich. Aged 62 years.

On the 14th of January, in Paris, Mr. James Alderton, Chemist and Druggist, Finstock, Charlbury, Oxon. Aged 29 years.

On the 15th of January, Mr. Meshach Roberts, Chemist and Druggist, High Street, Bangor. Aged 68 years. Mr. Roberts had been a Member of the Pharmaceutical Society since 1872, and was Local Secretary for Bangor.

On the 16th of January, Mr. George Rumble, Chemist and Druggist, High Street, Lincoln. Aged 66 years.

Review.

HANDBOOK OF VOLUMETRIC ANALYSIS—applied to Liquids, Solids and Gases — adapted for Chemical Research, Pathological Chemistry, Pharmacy, Metallurgy, Manufacturing Chemistry, Photography and Technical Purposes. By FRANCIS SUTTON, F.C.S., F.I.C., etc., etc. Fifth Edition.*

The advantages of a book of this description need no comment, collecting, as it does, into one volume, all the volumetric processes of any value, the original details of which are scattered through the vast mass of chemical literature. Its value is greatly enhanced by the fact that the various methods are carefully tested, and only those capable of giving fairly good results selected for insertion, any weak points or special precautions necessary being also pointed out. Accordingly, since its first publication in 1863, this book has become the standard work on the subject, and has been carefully revised at frequent intervals, as the introduction of new processes and the improvement of old ones has justified a new edition.

The present volume contains many valuable additions and improvements on the last edition (which bears date 1882), but shows signs of having been rather too hurriedly passed through the press, such slips as the substitution of $\frac{N}{10}$ for $\frac{N}{100}$ (page 165), "acid" for "alkali," and *vice versâ* (pages 74–75, citric acid), being rather too frequent. In the case just mentioned, moreover, the tartaric acid being already in the state of acid tartrate of potassium, each c.c. of normal alkali necessary to neutralize it would indicate 0·15 gram, not 0·075 gram of tartaric acid.

There is also a tendency throughout to put 0·76 m.m.

* London: J. and A. Churchill. 1886. Demy 8vo. Pp. i.—xi., 1—491. 16*s*.

instead of 0·76m, or 760 m.m., as the barometric pressure, and another slip of the same kind occurs in the formula for oxalate of bismuth, which is given on page 130 as $Bi_2O_3 3C_2O_4$.

Among the improvements in the new edition is the chapter on indicators, which now includes those azo-colours, etc., which have been found most useful and delicate, with particulars of the special reactions for which each is best suited, as well as those for which either of them has been found unsuitable. Many of the processes have, in consequence, been modified by the use of an indicator giving quicker or more delicate results than the one formerly recommended. There is also a summary of Thompson's researches on the sensitiveness of the various indicators, and the influence on them of the neutral salts formed in the titration. Two or three new methods for the estimation of alkaline hydrates, carbonates and bicarbonates, by the aid of phenacetolin, etc., are introduced and some modifications made in the technical processes for the analysis of soda ash, black ash, etc.

On page 55 occurs an error which was also in the previous edition. A comparison is made between a gravimetric and a volumetric analysis of salt cake, and the result by the latter method, viz., 96·48, is corrected by dividing by the constant factor 0·987. In the text the result has been multiplied instead of divided by this figure, and the result thus made to agree with the other, viz., 95·02, whereas if divided as stated it would amount to 97·75, and show a wide difference. If, as one is led to infer from the text, the figures are the result of actual experiment, they prove the contrary of what was intended.

In the analysis of soaps advantage is taken of the recent papers on the subject by Dr. Wright and C. Thompson, and Muter's copper test is recommended for the estimation of glycerine. The directions for the technical analysis of gas liquors are given in a manner suited to the manufacturer with no special knowledge of chemistry or chemical manipulation, and this necessarily involves a good deal of repetition. Among the many new processes to be found in this portion of the book we may mention the following:—Kjeldal's method for estimation of nitrogen; use of a mixture of KI and KIO_3 with starch as a delicate indicator of acidity; the estimations of sulphocyanides; Sb in presence of Sn; H_3PO_4 with methyl orange and phenolphthalein; iodine in presence of Cl and Br, by means of H_2O_2, and Dupré's modification of Schützenberger's method of estimating free oxygen in waters. On the other hand some of the less satisfactory processes for the estimation of phosphates, iron by cuprous chloride, sulphides by oxidation to sulsulphates, and the methods for estimating indigo, are omitted. An appendix to this portion also contains methods for estimating borates, oils and fats, glycerine, phenol, etc. The following portion of the book, which is devoted to the analysis of urine, potable waters, etc., is pretty much the same as in the previous edition, except that the whole of the article on soils and manures has now been omitted.

The very complete section on gas analysis has been further extended and enriched with several more illustrations of apparatus used in these operations, as well as descriptions of some simpler methods of gas analysis, which, although not so rigidly accurate as those previously described, still admit of approximate results being arrived at with far less expenditure of time and labour.

BOOKS RECEIVED.

THOMSON'S CONSPECTUS, adapted to the British Pharmacopœia of 1885. Edited by NESTOR TIRARD, M.D., F.R.C.P., etc. New Edition. London: Longmans,, Green and Co. 1887. From the Publishers.

THE BOVINE PRESCRIBER, drawn up for the use of Veterinary Practitioners and Students. By JAMES B. and ALBERT GRESSWELL. London: Baillière, Tindall and Cox. 1886. From the Publishers.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE SUPPLY OF POISONS BY OILMEN.

Sir,—As an old member of the Pharmaceutical Socicty, may I trouble you to insert the following incident which occurred a few days ago in this locality?

A middle-aged woman brought into my shop a 2 oz. long white glass vial, asking to be supplied with a cork for the same, as she had been to an oilshop to purchase oil of vitriol. The bottle was three parts full, and the seller not being furnished with corks, had very ingeniously screwed up a piece of paper and stuck it in the neck of the bottle as a substitute. Taking the bottle in hand to fit a cork, I noticed that the bottle was labelled, but not "Oil of Vitriol," not "Poison," not even "Not to be taken," but with a good bold printed label bearing the words "Sweet Spirits of Nitre," with the name and address of a brother chemist living not far from me.

No attempt had been made to defacc the label in any way. After acceding to the request, sticking a bold poison label with the name of the article completely over the other, and duly cautioning the woman, I did not consider I had done my duty until stating thc above facts to you.

I fear that the experience of many chemists, both in London and the country, could reveal instances of similar culpable negligence. The incident itself is so suggestive, that I rcfrain from offering any comment.

97, *Newington Green Road.* B. COCKER.

"WHAT IS LAUDANUM?"

Sir,—The bulky correspondence on the above appears as so much padding to your valuable Journal. Some writers have taken a wrong text, and hold forth very learnedly on "What was Laudanum?" Well, sir, as to this, what matters it? "Let the dead past bury its dcad." I presume every pharmacy in this country has in use a label "Laudanum—Poison," and I believe the said label is now always applied to tinct. opii.

Can we not change the topic and have a discussion on, "What is Epsom Salts?" or some other equally abstruse question!

In passing, I may say that I dispensed a prescription the other day in which one of our best local doctors (usually supplying his own physic, etc.), wrote "Tinct. opii meth. sig. laudanum—Poison."

I think I was justified in correcting the manuscript, and in substituting the proper article. A question arises, can this gentleman legally supply his patients with the methylated tincture, or keep it on his surgery shelf?

IGNORAMUS.

C. L. Reinhardt.—The nitrate is one of the most poisonous of the salts of mercury, and in applying it to animals care should be taken to prevent them licking it off.

Dens.—The subjects of the qualifying examination are practically the samc as in Great Britain, but examination in the colony has to be preceded by an apprenticeship for four years and attendance at a course of lectures. An attempt is being made to provide for the recognition of diplomas between the different Australian colonies. Your question as to the Dental Rcgister should be addressed to the Registrar under the Dentists Act, 299, Oxford Strect, W.

F. C. F.—The directions given by Watts for the preparation of butyric cther are butyric acid, 2 parts, dissolved in an equal weight of strong alcohol, and 1 part of sulphuric acid added. Heat is developed, and butyric ether immediately begins to rise to the surface, but the mixture requires to be heated a short time to 80° C. to complete the conversion.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Armstrong, Brown, Bell, Botham, Reinhardt, Elborne.

"THE MONTH."

Tincture of Strophanthus.

In a communication to the *British Medical Journal*, (Jan. 22, p. 151), Professor Frazer formally adopts the suggestions that have been made for a tincture of strophanthus more dilute than that originally used by him, the strength now chosen being 1 in 20, as first recommended by Mr. Martindale in this Journal (before, p. 503). The method of preparation now given by Professor Frazer is to reduce the seeds, freed from stalks and hairs, to a moderately fine powder, and dry the powder for twelve hours at a temperature of from 100° to 120° F. One ounce or one part of the powder is then packed in a percolator and ether, free from alcohol or water, is added until the powder is saturated and the ether begins to drop, when the percolation is stopped for twenty-four hours, after which it is allowed to go on slowly until 10 fluid ounces, or 10 fluid parts of ether, have been used ; if the last running of the ether is not almost colourless more should be used. The powder is then removed from the percolator and exposed to the air, or heated to 100° F. if necessary, to drive off the ether, any lumps being broken up, and the uniform, nearly white, dry powder is repacked in the percolator, and allowed to macerate in contact with sufficient rectified spirit for forty-eight hours ; after which rectified spirit is passed slowly through until twenty fluid parts of percolate have been obtained. Professor Frazer gives the dose of this tincture as from five to ten minims ; it may also be used in doses of half a minim to two minims frequently repeated. He describes it as nearly colourless, having a very pale yellow tinge, being neutral in reaction, and intensely and rather persistently bitter to the taste. It mixes unchanged with water, and is not precipitated by tannin ; the solution becomes opalescent on the addition of ether. Solution of perchloride of iron also produces a slight haziness and intensifies the colour, which after some hours becomes greenish-yellow.

Bismuth Subiodide.

Bismuth subiodide appears to be coming into use in the United States as a topical application to indolent ulcers and generally as a substitute for iodoform, it being said to be quite as effective and free from the objectionable odour of that compound. It is described by Gmelin as a powder that is precipitated when bismuth iodide, formed by the fusion of the two metals, is boiled with water. But according to Mr. C. Mayo (*Amer. Journ. Pharm.*, Dec., p. 590), it can be prepared by triturating 306 parts of bismuth subnitrate and 165·6 parts of potassium iodide with sufficient hydrochloric acid to form a paste, which becomes yellow and is then thrown into water, where the reaction is completed, a heavy amorphous, adhesive, brick-red powder being precipitated. The product is represented by the formula BiOI, or $BiOI.H_2O$, and is insoluble in water, alcohol, ether and chloroform ; it is decomposed by strong mineral acids and alkalies. Mr. Mayo's process has, however, been criticized by Mr. England (*Amer. Journ. Pharm.*, Jan., p. 9) as yielding a product containing a considerable quantity of oxychloride as an impurity. The alternative process that Mr. England recommends is to dissolve the bismuth subnitrate in nitric acid, dilute with hot water and then to pour this solution, a little at a time, into a solution of the potassium iodide in hot water, agitating after each addition and continuing the agitation until the decomposition is complete. The precipitate is then filtered off, washed with warm water, dried and powdered.

Nickel Bromide.

Nickel bromide has also been employed medicinally as a hypnotic and a sedative. According to Mr. A. Drew (*Amer. Journ. Pharm.*, Dec., p. 592) it may be prepared conveniently by treating granulated nickel with bromine under water, and carefully evaporating the dark green solution, when the salt is obtained in deep green deliquescent crystals, freely soluble in water, but much less soluble in alcohol. The salt is conveniently administered in the form of a syrup, which may be prepared by placing 377 grains of bromine and 137 grains of nickel in a flask containing 12 ounces of water, digesting at a gentle heat until the reaction has ceased, filtering, and then adding 24 ounces of sugar and sufficient water to make 32 fluid ounces. The syrup, which is of a beautiful green colour, contains in each fluid drachm 5 grains of crystallized nickel bromide, which is an average dose.

Saccharin.

Pending the appearance of saccharin in the market as a commercial article the interest in it is continued by the appearance of reports by experimenters who have been able to obtain samples. In one of the most recent, by M. Maumené (*Chem. Repert.*, Jan. 23, p. 10), the sample sent to him by Dr. Fahlenberg as "saccharin" is said not to have been a homogeneous substance, but to have consisted of at least two compounds, varying in their solubility in water and alcohol. He found that the two compounds could also be separated by the formation of a double salt by means of sodium chloride and that they were present in about equal proportions. M. Maumené states further that one of the compounds contained 15·6 per cent. of sulphur, whilst the other contained only 12·98 per cent. (Fahlenberg's formula would require 17·49 per cent.), and that the strong sweet taste was possessed by the former only. A compound such as Fahlenberg's "saccharin" ($C_7H_5NSO_3$) would, M. Maumené says, belong to the same class as taurin ($C_2H_7NSO_3$).

Kamala.

In a recent communication to the German Chemical Society (*Berichte*, xix., 3109) Messrs. A. G. Perkin and W. H. Perkin, Jun., describe a crystalline body separated from kamala. It was obtained by shaking finely powdered kamala with carbon bisulphide, filtering and concentrating the yellow-brown solution up to a certain point upon a water-bath. Upon cooling a yellow-brown gelatinous precipitate separated, which was filtered off and again treated with a little carbon bisulphide to remove resinous impurities, after which it crystallized from toluol or benzol in small flesh-coloured crystals, which upon analysis gave results corresponding closely with the formula $C_{11}H_{10}O_3$. Messrs. Perkin propose for this substance the name "mallotoxin," as being derived from *Mallotus philippinensis*, but before adopting this suggestion it requires to be proved in what it differs from the compound obtained by Dr. Anderson in 1860 (*Edin. New Phil. Journ.*, n.s., i., 300), and named "rottlerin," which has been represented by the formula $C_{20}H_{22}O_6$. A curious point in the history of this compound appears to be that although Dr. Anderson found that a concentrated solution of the soluble portion of kamala in ether left to stand for a few days solidified to a mass of crystals,

which were afterwards purified by recrystallization from ether and analysed, other chemists who attempted to separate from kamala a crystalline compound by means of ether entirely failed. In 1871, however, Mr. Daniel Hanbury observed a number of minute acicular crystals in an ethereal solution of kamala that had been allowed to evaporate spontaneously to a syrupy condition. These crystals were separated by Mr. T. B. Groves, to whom the solution had been entrusted, but during an attempt to purify them the substance underwent change and could then be obtained only in an amorphous condition, which Mr. Groves thought might be due to oxidation through having lost the protection of the mother-liquor (*Pharm. Journ.*, [3], iii., 228). On the other hand the authors of 'Pharmacographia' (2nd edit., p. 575) state that they succeeded in isolating the crystals from commercial "kamalin." It would appear probable that, as suggested by Mr. Hanbury, the age of a specimen of kamala may affect the occurrence in it of the crystalline constituent.

Testing of Quinine Sulphate.

The Commission appointed by the Pharmaceutical Society of Paris to inquire into the method prescribed by the French Codex for testing quinine sulphate has made its report (*Journ. de Pharm.*, [5], xv., 115). As a general result of the experiments carried out for this purpose it has been found that although the test gives excellent indications with pure quinine sulphate, even when the solution is made at a temperature of 15° C., the treatment of an impure salt with water at that temperature does not ensure the solution of more than a part of the cinchonidine sulphate present. The test is therefore defective when applied under that condition. A sample containing upwards of 6·5 per cent. of impurity gave results which only allowed of a suspicion when the solution was prepared at 20° C., but when the solution was made at 60° C. the presence of the cinchonidine salt was recognizable at once. Hence it is recommended that the solution of a salt to be tested should always be made at a temperature of 60° C. Incidentally, it has also been shown by these experiments that by the recrystallization of an impure sample of quinine sulphate containing cinchonidine salt the separation of this impurity can be carried so far that on applying to the product the Codex test with the proposed modification the result obtained does not differ materially from that obtained with absolutely pure quinine sulphate. The quantity of ammonia solution (0·960) required to be added to 5 c.c. of a solution of pure quinine sulphate saturated at 15° C. in order to precipitate and redissolve the alkaloid appears to be rather less than 5 c.c., and the difference of 2 c.c. between this quantity and that ordered in the Codex (7 c.c.) is considered to represent an amount of impurity of from 2 to 3 per cent., or about one half the amount that is considered to be allowable by the British Pharmacopœia.

Quinine Chromate.

M. Gallois calls attention (*Journ. de Pharm.*, [5], xv., 77) to a memoir published in 1862 (*Ibid.*, xli., 341) by André, in which quinine chromate and some other chromates of cinchona alkaloids are described and the application of the chromate for the assay of commercial quinine sulphate is suggested. The neutral quinine salt is there stated to be anhydrous, soluble in 160 parts of boiling water and in 2400 parts at 15° C., not liable to alteration by the action of light or when an aqueous solution is boiled, although in a dry state it is gradually decomposed at 100° C. The corresponding salt of cinchonine could not be obtained and it was found that on mixing solutions of neutral cinchonine sulphate and neutral potassium chromate there was a very great liability to a decomposition, resulting in the formation of an acid salt and liberation of cinchonine. Under the name of quinidine chromate a salt is described that, at that time, may perhaps have been in reality cinchonidine chromate, at least in part. It is said to form orange-red needles, to resemble the cinchonine salt in composition, and to be readily alterable under the influence of light. On mixing a solution of neutral quinidine (?) sulphate with one of neutral potassium chromate the same elimination of alkaloid was noticed as in the case of the cinchonine salt. According to the account given of these reactions by André it would appear that there is some further action upon the alkaloids than would be the case if the acids were merely interchanged between the bases by double decomposition. In any case it will be necessary to ascertain the precise nature of these reactions before the chromate method can be relied upon for testing quinine sulphate.

Gelsemium Alkaloids.

In an elaborate paper Mr. F. A. Thompson describes (*Pharm. Era*, Jan., p. 3) two alkaloids obtained by him from gelsemium root, thus confirming so far Messrs. Ringer and Murrell's hypothesis that the root contained two alkaloids, one of them exercising a paralysing and the other a tetanising influence. The alkaloids were obtained by percolating the finely powdered root mixed with freshly slaked lime with alcohol, shaking the percolate with chloroform, and then treating the chloroform solution with water acidulated with sulphuric acid. The separation of the alkaloids is effected by the addition of hydrochloric acid, the hydrochlorate of one of them, which is crystalline, being insoluble, and that of the other, which is amorphous, being soluble in its own weight of water. The crystalline alkaloid, for which Mr. Thompson proposes to retain the name "gelsemine," gave upon analysis results corresponding with the formula $C_{54}H_{69}N_4O_{12}$, differing, therefore, considerably from that attributed by Mr. Gerrard to the alkaloid analysed by him (*Pharm. Journ.*, [37], xiii., 641). The amorphous alkaloid has not yet been obtained sufficiently pure for analysis.

Alkaloids of Berberis Vulgaris.

A contribution towards clearing up the confusion concerning the *Berberis* alkaloids has been made by Dr. O. Hesse (*Berichte*, xix., 3190). Dr. Hesse states that in the root of *Berberis vulgaris* berberine is accompanied by at least four other alkaloids. Upon treating a mother-liquor of berberine hydrochlorate with soda, a dark coloured precipitate is thrown down, from which ether removes not only oxyacanthine, as stated by Wacker, but at least two other alkaloids, whilst another brown coloured amorphous base remains undissolved. The oxyacanthine may be obtained as sulphate by dissolving the mixture taken up by ether in acetic acid and adding sodium sulphate to the solution. By treating the mother-liquor with sodium nitrate another alkaloid can be separated that has been named "berbamine;" whilst the third alkaloid is thrown down by excess of ammonia. Oxyacanthine presents the peculiarity of having two widely separated melting points; when precipitated by ammonia from an aqueous

solution of the hydrochlorate as sulphate it forms a white flocculent mass, which loses water at 100° C. and melts between 138° and 150° C., but when crystallized from ether it forms anhydrous needles that melt first between 208° and 214° C. It forms well crystallized salts with acids and its composition is represented by the formula $C_{18}H_{19}NO_3$. In the presence of caustic alkali oxyacanthine readily undergoes modification to β-oxyacanthine, which is no longer soluble in ether, and which probably differs in the fixation of the elements of a molecule of water; but on treatment with hydrochloric acid the water appears to be separated again, normal hydrochlorate of oxyacanthine being formed. In this respect the alkaloid presents some resemblance to narcotine. Berbamine is also represented by the formula $C_{18}H_{19}NO_3$.

Choline in Ergot.

Statements have been made from time to time as to the occurrence of trimethylamine among the constituents of ergot; it is, however, generally accepted now that this base does not occur preformed in the fungus, but that when it has been found it has been a decomposition product due to improper methods of extraction. Some light has been thrown upon its possible source by the discovery in *Secale cornutum* of choline. This base has been separated and identified beyond doubt by Dr. L. Brieger, who obtained it pure and free from the least trace of trimethylamine (*Zeits. f. physiol. Chemie*, xi., 185). He is of opinion that any trimethylamine found in ergot will have been only a decomposition product of choline.

Synthetical Oil of Gaultheria.

At the last meeting of the Philadelphia College of Pharmacy (*Amer. Journ. Pharm.*, Jan., p. 8) attention was called by Mr. Charles Bullock to a synthetical oil of gaultheria which has been introduced into commerce in the United States. It was described as being colourless, and having an odour closely resembling that of the oil from the plant, a specific gravity of 1·176 and a boiling point at 398° F. When shaken with water the artificial oil gives the same reaction on the addition of chloride of iron as the natural oil; but they may be distinguished by the fact that when a few drops are shaken with water in a tube the artificial oil forms a "tinted" mixture and does not separate for some time, whilst the natural oil separates almost immediately in clear drops. The suspension of the artificial oil is said to be favoured by the presence of a small quantity of what appears to be methyl ether, which may be washed out, after which the artificial oil settles more quickly. It may be remembered that a sample of artificially prepared salicylate of methyl was the subject of a note by Mr. John Williams read at an evening meeting of the Pharmaceutical Society just eleven years ago (*Pharm, Journ.*, [3], v., 624).

Digitalin.

Whilst working out the toxicology of digitalin, M. Lafon has made the observation (*Archives de Pharm.*, Jan., p. 32) that this glucoside is not acted upon by diastase, pepsin, gastric juice, pancreatic juice, bile, beer yeast, emulsin or the putrefactive ferment. It is not, therefore, sensibly modified in the digestive canal; but it undergoes a profound alteration in the circulation, which is probably due to an oxidation process. It was also found that the detection of digitalin is not prevented by the action of alkalies, or that of sulphuric, phosphoric or hydrochloric acid; nitric acid, on the other hand, appears to decompose it.

Pepsin and Propepsin.

According to Dr. Podwissotzky (*Pfluger's Archiv*, xxix., 62) the gastric mucous membrane of neither herbivorous nor carnivorous animals yields much pepsin to glycerine if treated immediately after the death of the animal. But if it be kept in a warm place for twenty-four hours, and be then free from putrefaction, it will yield a much larger quantity. It has been stated that glycerine takes up from the membrane nothing except pepsine, but Dr. Podwissotzky finds that it dissolves also a certain amount of pepsine precursor, or "propepsine." After the mucous membrane has been exhausted with glycerine it will yield a further quantity of pepsine to hydrochloric acid, or a mixture of hydrochloric acid and glycerine; it is therefore inferred that it originally contains two forms of "propepsine," one soluble in glycerine and the other insoluble. As bearing upon the conditions under which "propepsine" is converted into pepsine it is interesting to learn that oxygen appears to favour the change, since more pepsine is formed in a gastric mucous membrane exposed to oxygen than in one exposed to atmospheric air; hydrogen and carbonic acid, on the other hand, do not appear to exercise any influence on the change. According to another observation made by Von Herzer on a patient having a fistulous opening into the stomach (*Med. Press and Circ.*, Jan. 12, p, 33) little pepsine is present in a fasting stomach in the morning, but there is plenty of "propepsine."

Pancreatic Extract.

In an interesting paper upon the action of the digestive ferments upon fodder (*Zeit. f. physiol. Chemie*, xi., 209), Herr Stutzer incidentally gives a process for the preparation of a very active pancreatic extract. It consists in chopping up finely a bullock's pancreas, previously freed from fat, triturating it with sand and exposing it to the air for twenty-four to thirty-six hours. It is next rubbed up with lime water and glycerine (sp. gr. 1·23), in the proportion of two litres of each for every kilogram of minced pancreas and allowed to macerate from four to six days with occasional stirring, next pressed and the liquor run rapidly through a loose filtering medium. An extract prepared in this way gave maximum results upon the addition of three times its volume of water containing sodium chloride equal to 0·25 per cent. of the weight of the extract.

Horseflesh and Beef.

Being called upon to determine whether it is practicable to distinguish by any ordinary method of examination between horseflesh and beef, Dr. James Bell, of the Inland Revenue Laboratory, instituted a series of experiments to test methods that have been recommended, especially those which are relied upon by the Inspector of Slaughter Houses in Paris. These depend upon purely physical and anatomical characters, such as the colour, odour, consistence and "cut" of the flesh, the occurrence of fat and the appearance of the muscular bundles; but Dr. Bell came to the conclusion that they fail to reveal such sharply defined differences as would allow of either kind of fiesh being positively identified and distinguished from the other. But in some comparative experiments with the respective fats it was found (*Chem. News*, Jan. 14, p. 15) that the fat of horseflesh from any part melts at 70° F., forming a clear oil, whilst the melting points of beef fat varied between 110° and 116° F. There was also a differ-

ence noticed in the specific gravities, that of horse fat at 100° F. varying between 908·4 and 908·8, whilst that of beef fat, taken at 120° F., and calculated back to the same temperature varied between 903·6 and 904. The fat of horseflesh, like that of beef or mutton, was found to be free from any of the soluble fatty acids.

Water Infection.

The volunteer reports on the London Water Supply, presented by Messrs. Crookes, Odling and Tidy, continue to contain interesting information as to the probable extent to which water may become contaminated with the *Bacillus anthracis*. The previous experiments reported upon were made with water intended for supply for domestic use, but those referred to in their report for last month were made with running water taken from the Thames or the Cherwell. Twenty samples, purposely infected with the organism, were within half an hour of their infection added to tubes of sterilized culture fluid and submitted to incubation. In eighteen of these tubes no growth of the bacillus whatever took place, whilst in the other nine the pathogenic growth seemed more or less attenuated by the various other growths accompanying it. The reporters consider this result quite in accord with the conclusion come to by other investigators, that in the struggle for existence the microbes proper to running water outgrow and starve out the morbific form.

Teleotherapeutics.

A further contribution to the history of the extraordinary method of treating disease with drugs not in contact with the patient (see before, p. 265) has appeared in the shape of a report of some experiments made by M. Voisin on hysterical patients in the Salpêtrière Hospital, Paris (*Brit. Med. Journ.*, Jan. 1, p. 37). The experiments are described as having been made with remedies enclosed in corked and sealed opaque bottles, M. Voison being ignorant of the contents and not uttering a word in the patients' presence. The patients having been thrown into a lethargic, somnolent or cataleptic state, as long as the conditions described were maintained no result was obtained; but it is alleged that if the name of a drug of which the effects are well known, or the effects of any medicament whatever, were mentioned, the hypnotized patient immediately manifested the physiological effects of the remedy. This result, it is explained, was due partly to conscious and partly to unconscious "suggestion." It will be seen, however, that it comes far short of what on a former occasion was alleged to have been observed.

Mutisia Viciæfolia.

Dr. Sacc, of Cocahamba, reports (*Archives de Pharmacie*, Jan., p. 11) some cases of successful treatment of phthisis by means of the seeds of *Mutisia viciæfolia*, a composite plant, native of Bolivia. It is stated that the plant has long been held in repute by the Indians for the cure of phthisis and diseases of the respiratory tracts, but the identity of the remedy has been kept a secret, and considerable difficulty has been experienced in getting a supply of the seeds.

Cannabis Indica in Headache.

Cannabis indica is recommended by Dr. S. Mackenzie as being very useful in headaches of a continuous or chronic character (*Brit. Med. Journ.*, Jan 15, p. 98). He has used the extract with success in doses of half a grain night and morning, gradually increased to two grains at night and one and a half in the morning.

Pulsatilla in Orchitis.

Pulsatilla is spoken highly of in the same Journal (p. 111) by Mr. Gerard Smith as a valuable remedy in acute orchitis and epididymitis, the relief given in such cases being so rapid that it is unnecessary to employ morphine to subdue the pain, the heat and swelling subsiding more rapidly than under any other drug.

Jaborandi as a Galactagogue.

Some careful experiments made by Mr. Chéron have proved that the galactagogue properties ascribed to jaborandi are well founded, and that in order to produce this action the drug must be given in smaller doses than are necessary to cause salivation and diaphoresis. The dose used with success was 5 centigrammes of nitrate of pilocarpine, injected subtaneously as soon as the milk became scanty and repeated every day. From three to twelve injections proved successful, according to the time that the scantiness of secretion had lasted. No ill effects, either to the nurse or to the child, followed its use.

Terpine in Neuralgia.

In a paper recently read before the Société Médico-pratique, Dr. Ducroux recommends the use of terpine in some forms of neuralgia. He has given it in doses of 60 centigrams in three pills to be taken between meals (*Brit. Med. Journ.*, Jan. 8., p. 79).

Scopoleine.

The new mydriatic, scopoleine, obtained from Japanese belladonna root, is spoken highly of by Mr. H. P. Dunn (*Brit. Med. Journ.*, Jan. 8, p. 62). He prefers it to atropine in the treatment of keratitis, corneal ulcers and iritis. When both atropine and eserine have failed in troublesome corneal ulcers, the use of scopoleine has been attended with success. Although he has used it in many cases he has not in any one of them seen irritation resulting from its use. He believes that in addition to its mydriatic action, it possesses some control over the vascular supply of the eyes. The strength of the solution used by Mr. Dunn is one grain to the ounce.

Aconite and Belladonna Poisoning.

A case of poisoning from taking a dose of aconite and belladonna liniment is recorded in the *British Medical Journal* (Jan. 8, p. 62), in which recovery took place after the subcutaneous injection of apomorphia, and subsequently of large doses of ether, and the application of the interrupted current to the vagus nerve. In this case the power of swallowing was lost for some time, so that subcutaneous injections had to be resorted to, and ether was injected in this way to the extent of 120 minims.

Composition of Starch.

M. Em. Bourquelot, who has made a series of experiments as to the action of saliva as well as of water alone upon starch grains, at different temperatures and during varied periods of digestion, has arrived at the conclusion that the grains are not composed solely of amylose and granulose but of a larger number of carbohydrates (*Comptes Rendus*, civ., p. 179).

Chinese Cantharides.

Two Chinese insects have lately been shown at the London drug sales as cantharides; one of them is *Lytta Gorhami*, which is likely to contain some cantharidin and is at present under investigation, and the other belongs to a group of insects which are not remarkable for vesicating properties. It is the *Huechys sanguineus*, of the family *Cicadidæ*, of the order *Hemiptera*. This insect, which is remarkable

for its vermilion-coloured body, has the odour of cantharides, but it is not known whether it really possesses any vesicating property, although it is said to possess in China a reputation as a blistering agent.

Digitalis and Jalap in India.

According to the last report of the Botanical Gardens at Saharunpore, experiments are being made with the view of supplying Indian-grown digitalis to the Bengal Medical Department. Hitherto, although the plant has existed in the hill gardens for several years, its cultivation has not been a success, the seedlings dying off during the first rainy season after being planted in the open ground. The seeds have, however, been sown in the Arnigadh Garden in the open ground, and appear likely to succeed. About 15,000 plants would be annually needed for the production of sufficient leaves for the requirements of the Bengal Medical Department. The cultivation of jalap at Arnigadh appears also to be a success; the crop of tubers in 1885 weighed 1 maund 9 seers, and in 1886 2 maunds 10 seers, and would probably have been more but that the crop was attacked by porcupines, which suddenly displayed a taste for the tubers. It is not intended, however, to supply the medical department until three or four times the present quantity of tubers are in hand. Until lately belladonna has not become acclimatized at these gardens. Last season, however, some seedlings shot up to a height of four or five feet and were plentifully furnished with leaves, and it is hoped that this may prove a permanent variety suitable to the climate. The drugs supplied to the various Government medical depôts at Calcutta, Bombay, Madras, Allahabad, and Meean Mir, during 1885–6 are given in the the report as follows:—Extract hyoscyamus, 268 lbs. 10 ozs.; henbane leaves dried, 227 lbs.; extract of taraxacum, 192 lbs. 3 ozs.; dandelion roots, 450 lbs.; kamala, 40 lbs.; and colocynth fruit, 150½ lbs.

Ipecacuanha in India.

In a recent number of *Nature* (Jan. 6, p. 227), the Director of Kew Gardens calls attention to the curious fact that at Darjeeling, where ipecacuanha cultivation was attempted some years ago with plants derived from the Botanic Gardens at Kew and Edinburgh, the plants from Edinburgh have gradually died out, whilst nearly all the Kew plants lived. The latter had rougher leaves than the Edinburgh variety, and were less vigorous when growing under glass, and evidently formed a distinct physiological variety. In a letter read at the last meeting of the Edinburgh Botanical Society the cinchonas planted in the Shiri Highlands, in East Africa, are reported by Mr. J. Buchanan to be in a flourishing condition.

Calophyllum Inophyllum Leaves.

In the leaves of *Calophyllum inophyllum* there are present between the parallel lateral veins of the leaves laticiferous canals, which are in communication with the lateral veins on either side by means of spiral vessels, a bundle of which accompanies the canal in its whole length, and sends off ramifications to the veins. These have been hitherto supposed to carry water, but M. Trecul (*Comptes Rendus*, civ., p. 31) states his belief that, as they contain milky juice of the same brownish colour as that in the canals, they serve as a means of communication by which the secretions of the plant are distributed to the woody tissue.

Taraxacum.

Some interesting pharmacognostical notes are given by Professor J. Schrenk in the *American Druggist* for January. Speaking of taraxacum he points out that it is generally stated that the root contains a central wood cylinder without any pith, but in a very large number of roots taken from various commercial sources, he has found a distinct pith. From ten to fifteen fibrovascular bundles surrounded by parenchymatous tissue include the pith, the diameter of which in some instances exceeds the thickness of the woody zone. In other respects the roots examined had the normal structure.

Veratrum Viride.

Veratrum viride rhizome is so like that of *V. album* that Flückiger states that it is quite impossible to distinguish the root-stocks of the two species. Professor Schrenk remarks that those of *V. viride* have often a decidedly loose and spongy structure, but he is not certain whether this is characteristic of this species or depends upon the time at which the rhizomes were collected. The only structural difference he has noticed is that the cells of the endoderm, when cut transversely, present a lumen (or empty space) which has the form of a U in *V. viride* and of a V in *Veratrum album*.

Bee Flowers.

A correspondent of the *Gardeners' Chronicle* (Jan. 1, p. 11), writing about flowers most frequently visited by bees, remarks that *Erica carnea* is one of the early flowers much visited by these insects, whilst *Daphne Mezereum*, which has both colour and fragrance, is not a very tempting flower to them. On the other hand, the blossoms of currants, raspberries, and gooseberries, although unattractive as regards colour, divert the attention of bees from brighter flowers in their neighbourhood. He remarks that sweet alyssum and seakale, although apparently tempting flowers, are passed over unvisited by bees.

Australian Wattles.

Baron von Mueller, the author of the valuable 'Eucalyptographia,' is now turning his attention to the Australian plants of the genus *Acacia*, and is about to issue a series of plates with descriptions, similar in character to those of the above-mentioned work. Under the name of wattle or mimosa bark, and Australian gum, the products of many of these trees are exported to this country. In this work Baron Mueller proposes to utilize for diagnostic purposes two characters which have hitherto not received much attention, viz., the number of the divisions in the pollen-mass and the position of the seed (*Nature*, Jan. 20, p. 282).

Tanekaha Bark.

Among other unusual drugs lately offered was the tanning bark of *Phyllocladus trichomanoides*, a New Zealand tree. The bark appeared in the brokers' lists under the name of Tanekaha bark.

Chinese Botany.

The *Journal of Botany* for this month contains an interesting account of the late Dr. Hance, the eminent botanist, whose knowledge of Chinese plants was practically unrivalled. He was frequently consulted concerning Chinese plants and drugs by the late Daniel Hanbury. His herbarium contained 22,000 different species or varieties which had all been poisoned and mounted by himself. This fine collection has been offered, under the provisions of his will, to the British Museum.

NOTE ON AN EPIDEMIC OF MICROCOCCUS PRODIGIOSUS.*

BY M. GRIMBERT.

Some time since several pieces of cooked meat were brought to the author for examination which presented a singular carmine-red coloration, and stained vividly the fingers or linen with which they came into contact. The phenomenon, it appeared, had then occurred regularly for three months. Food cooked over night had been found the next morning covered with red patches, and it then underwent rapid alteration.

Examination under the microscope revealed a quantity of very minute spherical cells, motionless, and appearing colourless in the midst of an amorphous red mass. Upon adding to the preparation solution of methylene the cells appeared very distinctly, forming considerable colonies.

A trace of the red matter was deposited upon sterilized cooked potato and placed under a moist glass. On the second day after the sowing the stains at the spots touched had broadened and assumed a rose colour, and it was easy to distinguish with the naked eye a multitude of isolated points, which blended soon into a uniform mass, extending more and more over the surface of the potato. The rose tint passed afterwards to blood red, a thick glairy layer being formed; at the same time a disagreeable odour was developed, recalling that of tainted meat. Later still the blood red gave place to a very dark, nearly black tint, and finally disappeared partially, leaving a yellowish mucosity. Sterilized milk was also sown and kept in a flask, the neck of which was closed with a plug of cotton. The sowing was effected by touching the surface of the liquid with a platinum wire charged with the substance. The following day the entire surface of the milk had taken a uniform red tint. Sowings effected upon coagulated albumen, cooked meat, and even raw meat, all behaved in a similar manner.

In order to study the colouring matter the red parts of the potato were removed and treated with 95° alcohol. After some days the alcoholic solution, which had taken a magnificent carmine-red colour, was filtered and evaporated. The product of evaporation treated with carbon bisulphide left a yellowish insoluble extractive-like residue, soluble in water and in alcohol. The colouring matter removed by carbon bisulphide was insoluble in cold water, slightly soluble in boiling water, and very soluble in alcohol, ether, chloroform, carbon bisulphide, benzine, oil of turpentine, amylic alcohol, acetic acid, and fats. The addition of an acid intensified its colour; alkalies caused it to assume a dirty yellow tint, but acids restored the original colour. Upon shaking with ether an acetic acid solution that had thus been discoloured by ammonia or baryta water, decanting and acidifying the ethereal solution, it became of a red colour; a reaction analogous to that of fuchsine. When amylic alcohol was used instead of ether the red colour was produced without the addition of an acid. Chlorine destroyed the red colour; sulphurous acid was without action upon it. A spectroscopic examination of the alcoholic solution showed a well-marked absorption band between lines D and E, another fainter band in the neighbourhood of line *b*, and then the gradual extinction of the other colours to violet. This spectrum approximates closely to that of an alcoholic solution of fuchsine of a similar degree of concentration.

The form of the cells, their small dimensions and mode of propagation in potatoes, milk and meat, the reactions of the colouring matter and its absorption spectrum, all point distinctly to the *Micrococcus prodigiosus*, as described by Erdmann, Cohn, Schroeter and Ehrenberg.

The epidemic ceased suddenly on the day after the meat was brought to the author for examination, the disappearance coinciding with a considerable fall in the temperature. Since then it has not been observed, although no precautions have been taken to prevent its return.

* *Journal de Pharmacie*, December, p. 547.

Referring to this communication a correspondent of the *Pharmaceutische Zeitung* says that the description corresponds in every detail with a case of the occurrence of this fungus which was brought under his notice in Cologne in 1883, when he also separated by similar methods the colouring matter resembling fuchsine.

PROXIMATE ANALYSIS OF STIGMATA MAYDIS.*

BY C. J. RADEMAKER, M.D., AND JOHN L. FISCHER, PH.G.

Fifty grams of stigmata maydis were treated with petroleum spirit at a boiling point below 112° F. This extracted 5·25 per cent. of a light yellow fixed oil which saponified readily with caustic potash, and solidified at a temperature of 50° F. No volatile oil was found in the petroleum extract, nor was any obtained by distillation. The oil was soluble in chloroform, ether and petroleum spirit, but was insoluble in alcohol. The action of nitrous acid upon this oil produced no change of colour, but the oil solidified in a few hours.

The drug after drying was next exhausted with ether; this extracted 2·25 per cent. of solid matter, one per cent. of it being soluble in water. This aqueous solution had an acid reaction. The other 1·25 per cent. proved to be resin and chlorophyll. Upon evaporating the aqueous solution to dryness, redissolving the residue in ether and allowing the ether to evaporate spontaneously, a colourless acid crystalline principle was left.

The original drug after being dried was then treated with absolute alcohol, which extracted 3·25 per cent. of solid matter; 2 per cent. of this proved to be resin and colouring matter, the other 1·25 per cent. proved to be an acid, identical with the acid found in the ether extract.

This acid was first discovered by Dr. Vautier (*Arch. Méd. Belges*), and he named it *maizenic acid*. It is freely soluble in water, ether and alcohol, but insoluble in petroleum spirit. It decomposes the alkaline carbonates, and its salts are crystallizable, the potash salt crystallizing in rhomboidal prisms.

To water the drug yielded 19·50 per cent. of solid matter. This was redissolved in water and then made alkaline by caustic potash. The solution was then successively treated with ether, chloroform and petroleum spirit, but no crystalline principle was obtained. The aqueous extract consists principally of sugar, gum and extractive matter.

That portion of the drug that was insoluble in water, gave to a 2 per cent. solution of caustic soda, 3·50 per cent. of solid matter, consisting of albuminoids, phlobaphene, etc., and to a 2 per cent. solution of hydrochloric acid, the drug gave 5·50 per cent. of salts with a small amount of extractive matter.

Upon bleaching the final residue, washing and drying, 37 per cent. of cellulose was obtained.

Another portion of the drug yielded 20 per cent. of moisture. The following shows the amount of the most important constituents:—

Fixed oil	5·25	petroleum spirit extr.
Resin, crystalline principle and chlorophyll . . .	2·25	ether extract.
Resin, crystalline principle and chlorophyll . . .	3·25	alcohol extract.
Sugar, gum and extractive	19·50	water extract.
Albuminoids, phlobaphene, etc.	3·50	from alkaline solution.
Salts and extractive . .	5·50	from acid solution.
Cellulose	37·00	
Water	20·00	
	96·25	

* From the *American Journal of Pharmacy*.

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PHARMACISTS' MAINTENANCE OF PHARMACOPŒIA STANDARDS.

IT will be seen from the correspondence in the present number of the Journal that the opinions we ventured to express as to the general application of a Pharmacopœia standard for medicinal preparations have met with some dissent. We think this has arisen to a great extent from a philanthropic regard for the public safety being allowed to eclipse the consideration of what is essential for enabling the pharmacist to establish and maintain the character of being a trustworthy source from which to obtain medicinal preparations. It is well that, from both points of view, pharmacists should everywhere resolve, as the Sheffield pharmacists have done, to be bound by the precepts and directions of the British Pharmacopœia, but we fail to perceive that it is their business to endeavour to make that authority the standard for regulating transactions which are outside the scope of their business. The pharmacist can legitimately and appropriately manifest his solicitude for the public safety by the care which he exercises in the preparation of medicines, by scrupulously testing and verifying the quality of the articles which he obtains from wholesale houses, and by so doing he will give practical effect to the special qualifications which really place him out of reach of the competition of other traders. This view of the matter does not appear to have received sufficient attention, and it seems hardly to have been perceived that if the grocer is required to exercise the same kind of control over the quality of such drugs and medicinal preparations as he may undertake to sell, the distinction between the two, so far as the safety of the public is concerned, will be done away with. Such a result would not lessen competition.

The fact that the tincture of opium case was not one of outside competition was by no means lost sight of, but it was unnecessary to refer to that circumstance as affecting the decision of the stipendiary magistrate. So far as can be gathered from the report of the case, it does not appear that British Pharmacopœia tincture of opium was demanded by the purchaser, and although the defendant pleaded that he purchased the article as the tincture of the British Pharmacopœia, he had evidently omitted to carry out that personal verification of its quality and contents which would have constituted the most effectual safeguard for the public, and, at the same time, the best protection of his own interests. If pharmacists will allow the exercise of these functions, which so specially appertain to them, to devolve upon the public analyst, it cannot be wondered at if they consequently suffer inconvenience and loss of *prestige.* It is not sufficient to have implicit faith in the supplies of wholesale houses, however much they may be deserving of confidence, for it is the personal guarantee of the pharmacist for every article passing through his hands which can alone place him in a position of greater esteem with the public than the grocer or the oilman. In the case now referred to, a simple examination of the tincture, such as was made by the Sheffield public analyst, would have disclosed its defects, and have furnished sufficient reason for its being returned to the wholesale house that supplied it. The necessity of directing attention to this matter was very justly insisted upon by Mr. DUNCAN in the inaugural address to the Edinburgh Chemists' Assistants and Apprentices' Association last October, and it has been illustrated at the meeting of that Association, reported in the present number of the Journal at page 619.

Another important practical commentary upon the remarks offered in this Journal last week as to the professional functions of the pharmacist has been furnished by the disclosure that has now been made in connection with another of the Sheffield prosecutions. Notwithstanding the statement in the report of the Executive Committee of the Chemists and Druggists' Trade Association that it had ordered the defence of a member against whom proceedings were commenced for having improperly dispensed a prescription containing quinine and iron citrate, it now turns out that there was no ground for disputing the public analyst's certificate that, though the prescription had been correctly dispensed as regards the quantities of the ingredients ordered, the quinine and iron citrate employed was decidedly inferior to that of the British Pharmacopœia, since it contained only 11·8 per cent. quinine instead of 15 per cent. How such an erroneous result can have been concurrently arrived at by three chemists it is difficult to understand, but that is of comparatively little moment as regards the importance of a personal verification of the character of all such articles. Without that security accuracy in dispensing will have but little worth, and both the patient and the dispenser may suffer. Probably in this case also the preparation was purchased as of B.P. standard, the guarantee of the wholesale house being accepted as sufficient, and this is precisely the point where opportunity was afforded for all the mischief that has arisen. The remedy for it would have been the simple precautionary measure of testing the preparation before it was used and then, as in the case of the tincture of opium, it could have been re-

turned as not coming up to the standard required. This simple proceeding would have been a complete protection of the pharmacist against the intervention of the public analyst, and unless recourse is had to that protection which is within the power of every pharmacist to supply himself with, there will be little reasonable ground for complaining of the hardship and inconvenience of prosecutions under the Food and Drugs Act.

COCAINE HYDROCHLORATE.

In resuming this month the issue of the very interesting series of publications under the title of "Ephemeris," the subject of cocaine hydrochlorate is dealt with by Dr. Squibb at some considerable length. For the extraction of the alkaloid from the coca leaves percolation with dilute sulphuric acid is considered the best method, the process being repeated until a very dense and concentrated extract is obtained. This is mixed with carbonate of soda in excess, and well shaken with kerosene oil, which dissolves the liberated alkaloid in a state comparatively free from colouring matter and other substances. It is then washed out of the kerosene by means of acidulated water, and again precipitated by carbonate of soda in the presence of ether. From the ether solution it is finally washed out by dilute hydrochloric acid in fractions, the first fractions removing most of the remaining colouring matter. The fractions sufficiently free from colour are then evaporated at a low temperature in shallow pans, and while the salt is crystallizing it is constantly stirred until a dry residue is obtained, which Dr. Squibb considers to be very nearly pure anhydrous hydrochlorate. When this product is dissolved to near saturation in warm and strong alcohol the solution will after some days yield a crop of distinct and compact crystals. But by the greatest care, however, there will remain in solution from 25 to 30 per cent. of the salt that is in an uncrystallizable condition, or at least uncrystallizable from alcohol. On evaporating the alcohol slowly a sticky amorphous mass is obtained, with some very small crystals distributed through it, and after exposure to the atmosphere for a week or two it spontaneously crystallizes throughout; but the crystals are minute and powdery, and very unlike the first crop in external characters. According to this account, the accuracy of which will be recognized by those who have operated upon this salt, there appears to be considerable reason for suspecting the presence of two different substances. Chemically, and in the reactions with chemical tests, Dr. Squibb considers that this is really the case, but he considers that the main difference consists in the difficulty of crystallizing the one portion. Therapeutically and physiologically, however, Dr. Squibb does not find that there is any difference between these two portions of the product obtained in the manner described above. No doubt much of the cocaine hydrochlorate hitherto used has been made in this way, and it is only within a comparatively recent period that the large compact crystals have been obtainable, and in America only one manufacturer offers to supply them at present. It becomes, however, a very important question to determine whether the difference in the efficacy of these two portions of the gross product is so slight as Dr. Squibb describes it to be. He points out in reference to this question that all the best work of the salt as an anæsthetic was done before this more perfectly crystallized material was obtainable, and according to his statement the use of the better crystallized material has not been attended with any obvious therapeutic advantage.

From the examination of nine different makes of cocaine hydrochlorate Dr. Squibb comes to the conclusion that the difference between them is chiefly one of physical condition. He thinks that, as a matter of fact, it is very doubtful whether the amorphous salt can exist in that state for any considerable length of time, though like the alkaloid it is capable of assuming the amorphous state and retaining it for a time varying according to circumstances. The whole of the nine samples examined are referred to three distinct groups: the first comprised four that were anhydrous and had probably been made by stirring down a solution to dryness, all containing some hygroscopic moisture and decomposition product; the second comprised two brands, consisting of distinct anhydrous crystals; the third also comprised two brands, both consisting of hydrated crystalline masses of needles somewhat effloresced, and with from 6·72 to 8·62 per cent. of water of crystallization.

We are able to announce that the Calendar of the Pharmaceutical Society for 1887 is now ready, and that copies, price 1*s.* each, or free by parcels post 1*s.* 4½*d.*, may be had from the Secretary, 17, Bloomsbury Square. It may be useful to mention that this Calendar, besides lists of Members, Associates and Apprentices of the Society, and subscribers and donors to the Benevolent Fund, contains all needful information as to the examinations, as well as the various Acts of Parliament, Inland Revenue Orders, etc., that affect the business of chemists and druggists. The Registers of Pharmaceutical Chemists and Chemists and Druggists for 1887 are also in a forward condition, and will be ready for delivery in the course of a week.

* * *

The energetic Director of the Royal Gardens at Kew, Mr. W. T. Thiselton Dyer, has announced his intention to issue from time to time, as occasional publications in the pamphlet form, such notes on economic products and plants to which the attention of the Staff of the Royal Gardens may be specially drawn as shall be too detailed for insertion in the annual report. The general title is to be "Bulletin of Miscellaneous Information," and the first number has just been published by Messrs. Eyre and Spottiswoode, price 2*d.* It contains extracts from corre-

spondence respecting "teff" (*Eragrostis abyssinica*), an Abyssinian cereal of economic value, suitable for cultivation at high elevations, together with an interesting note on "Oil of Ben."

* * *

We understand that the 'Year-Book of Pharmacy' for 1886, containing the Transactions of the British Pharmaceutical Conference, and a *résumé* of the literature of pharmacy and allied sciences, is now ready for delivery to members who have paid their subscriptions. The volume is somewhat more bulky than some issued in previous years, and in the "Preface" it is said to contain a larger number of abstracts than any of its predecessors.

* * *

We learn that the result of Mr. Haydon's appeal to the Pharmaceutical Chemists and Registered Chemists and Druggists of Great Britain has been, up to the time of our going to press, one hundred and eighty-two pounds, together with numerous promises of further support.

* * *

Mr. J. A. Wanklyn puts on record that in the water of the Woodhall Spa, near Lincoln, which is known to be exceptionally rich in bromides and iodides, iodine occurs in the free state in sufficient quantity to import a brown colour of considerable depth of tint. This is proved by the formation of the blue iodide upon the addition of starch paste to the water. Further, when the water is shaken with one-twentieth of its volume of carbon bisulphide, it loses its odour and becomes colourless, whilst the carbon bisulphide acquires a pink violet colour through having dissolved out the iodine.

* * *

The Philosophical Faculty of the University of Breslau has conferred the degree of Doctor *honoris causâ* on Otto Maschke, Apotheker and Medical Assessor, on account of his services to science.

* * *

The Portuguese papers announce the death of Dr. J. Pereira Reis, formerly professor of pharmacology in the Oporto Medical School. His published works were numerous, the chief one being an edition of Albano's 'Codigo Pharmaceutico Lusitano.' He was during his life-time a liberal benefactor to various charitable institutions, and has left a portion of his fortune to found a children's hospital.

* * *

At the next meeting of the Chemical Society, on Thursday, February 3, there will be a ballot for the election of Fellows, and the following papers will be read:—"An Explanation of the Laws which govern Substitution in the case of Benzenoid Compounds," by Dr. Armstrong; and "The Synthetical Formation of Closed Carbon Chains: Part II. Some Derivatives of Tetramethylene," by Dr. W. H. Perkin, Jun., and H. Coleman; Part III. "Some Derivatives of Pentamethylene," by Dr. W. H. Perkin, Jun.

* * *

The next meeting of the School of Pharmacy Students' Association will take place on Thursday, Februrary 3, when a paper will be read on "Cocoa Butter" by Mr. E. H. Barritt, and a Report on Analytical Chemistry will be given by Mr. J. G. Tingle.

* * *

A meeting of the Chemists' Assistants' Association will be held on Wednesday next, February 2, when a lecture on "The Wellers," will be delivered by Mr. C. F. Rideal.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN EDINBURGH.

January 18, 25, *and* 26, 1887.

Present on each day—Messrs. Clark, Dott, Gibson, Gilmour, Kinninmont, Maben, Nesbit and Stephenson.

Professor Sir Douglas Maclagan was also present on behalf of the Privy Council.

MAJOR EXAMINATION.

18*th.*—*Two* candidates were examined. *Both* failed.

25*th.*—*Two* candidates were examined. *One* failed. The undermentioned passed, and was declared qualified to be registered as a Pharmaceutical Chemist:—

Robb, David.....Ossett.

MINOR EXAMINATION.

18*th.*—*Fifteen* candidates were examined. *Nine* failed. The undermentioned *six* passed, and were declared qualified to be registered as Chemists and Druggists:—

Ayre, George Martin .....Edinburgh.
Bell, Joseph .....Alnwick.
Cooper, Edwin .....Lincoln.
Craig, Nicol Miller ... .Edinburgh.
Todd, Charles .....Carlisle.
Want, William Phillip .....Lee.

25*th.*—*Fifteen* candidates were examined. *Seven* failed. The undermentioned *eight* passed, and were declared qualified to be registered as Chemists and Druggists:—

Flynn, William.....Lockerbie.
Gass, George Muncaster.....Whitehaven.
Lomax, William Henry .....Darwen.
McIver, John .....Nairn.
Mackie, George .....Peterhead.
Melvin, George.....Aberdeen.
Oglesby, Arthur .....York.
Pickering, Charles Edward ...Stockton-on-Tees.

26*th.*—*Fourteen* candidates were examined. *Nine* failed. The undermentioned *five* passed, and were declared qualified to be registered as Chemists and Druggists:—

Carnaby, Francis William .....Blyth.
Spencer, Charles .....Coventry.
Taylor, Wm. Chadwick Coates.Saltburn-by-Sea.
Whyte, Alexander .....Huntly.
Wilson, John .....Aberdeen.

PRELIMINARY EXAMINATION.

A meeting of the Board of Examiners for England and Wales was held on Thursday, January 27, 1887.

The undermentioned certificates were received in lieu of the Society's examination:—

Certificates of the College of Preceptors.

Garnett, Henry..... .....Evesham.
Tremeer, Arthur John .....Barnstaple.
Woollett, Frederick W. C.....Rye.

Certificate of the Faculty of Physicians and Surgeons of Glasgow.

Rogers, Arthur Robert .....Newmarket.

Certificate of the Incorporated Law Society.

Scott, Richard Forder.....London.

Certificates of the University of Cambridge.

Brown, Alfred .....Leicester.
Carter, Henry Lansdale .....London.
Jowett, Hooper Albert D. .....Lancaster.
Smith, Frederick .....London.
Stephens, John Richard Cook...Swindon.

Certificate of the University of Edinburgh.

Spence, Annie Y. W. .....Linlithgow.

The Report of the College of Preceptors on the examinations held on January 11, was received.

Two hundred and ninety-three candidates had presented themselves for examination, of whom *one hundred and forty-two* had failed. The following *one hundred and fifty-one* passed, and the Registrar was authorized to place their names upon the Register of Apprentices and Students :—

Adams, Herbert Samuel ... .Newbury.
Allen, James.....Wrington.
Amos, Harry Beard .....Canterbury.
Avison, Frank Schofield .....Dukinfield.
Back, Charles Thomas .....London.
Baird, William.....Kelso.
Barrett, Allen Lifton .....Hay.
Bartlett, Percy John .....London.
Bayes, James Austin .....Cardiff.
Baylis, Henry .....Redditch.
Beachell, John .....York.
Bell, Matthew .....Gateshead.
Blore, George James .....Uttoxeter.
Booth, Charles Henry.....Colchester.
Brackenbury, Edgar William...Bardney.
Briggs, Sam .....Halifax.
Burdett, Edgar.....Nottingham.
Burrell, Frederick Charles.....Midd Rasen.
Callaway, James Thomas .....London.
Cammack, Jeffrey .....London.
Cannell, Annie Elizabeth .....Wolverhampton.
Carre, Arthur Bishop .....Guernsey.
Carter, Benjamin Robert .....Hounslow.
Chalmers, Franklin.....Devizes.
Chambers, John Wm. Parsons..Derby.
Choat, Joseph Newsom .....Lynn.
Chrispin, William Foggitt .....Featherstone.
Chudleigh, Thomas Morcom ...Liskeard.
Clemitson, Joseph William ...Bishop Auckland.
Cocker, Harris .....Earlsheaton.
Colman, William .....Manchester.
Connell, John .....Kirkby Folly.
Cooper, John.....Farnsworth.
Coulthard, David.....Carlisle.
Coverdale, Robert .....Louth.
Cowley, Robert Charles .....Douglas.
Dangerfield, Walter John .....Leamington.
Daniel, John.....Dumfries.
Daniels, Joseph William.....Landport.
Darling, John .....Yarm.
Davies, John.....St. Clears.
Davies, John Lloyd.....Llanelly.
Dodd, Henry Vincent.....Slough.
Dodsworth, Robert ....Newcastle-on-Tyne.
Douglas, William.....Dalry.
Dowling, Herbert D. ... .Reading.
Ecclestone, George Thomas ...Soham.
Ellis, David ....Ellesmere.
Elphinstone, Edmond.....New Pitsligo.
Elphinstone, Joseph Lawson...Aberdeen.
Empringham, James .....Lynn.
Evans, Robert Stanley .....Dowlais.
Evans, Sem .....Kidwelly.
Fairburn, George.....Northallerton.
Francis, Austin .....Haverfordwest.
Gillies, William .....Manchester.
Green, James .....Peterborough.
Gunstone, Herbert Challiner...Oxford.
Guttridge, Gladstone .....Nottingham.
Hall, John Stratford ... .Bishop Auckland.
Halley, Daniel .....Aberdeen.
Harburn, John English .....Whitby.
Henderson, James .....Kirkcudbright.
Higgs, Andrew Badgery..... Bodmin.
Highet, Campbell.....Ayr.
Horniblow, Frederick Herbert..Worcester.
Hughes, John .....Penmaenmawr.
Hulme, Thomas ....Manchester.
Hunt, Henry James.....Broughty Ferry.
Hunter, William John .....Spilsby.
Inglis, William.....Lochmaben.
Innes, John .....Douglas.
Jackson, Charles Ernest.....Boston.
Jackson, Herbert Richardson...Bradford.
Jackson, William Oswald .....London.
Jenkins, William .....Cardiff.
Jessop, Sam .....Brighouse.
Johnston, John.....Carlisle.
Jones, Charles Edward .....Liverpool.
Jones, John Monk .....Aspull.
Jubb, Nathaniel .....Langworth.
Lawton, Henry Smith.....Birmingham.
Lemmon, Richard Haworth ...Facit.
Lewis, Claude Byers .....Carmarthen.
Little, Charles Walter .....Guernsey.
Lloyd, John Griffith .....St. Dogmaels.
Lloyd, William Morgan .....Maldon.
Lonsdale, Thomas .....Preston.
Love, James Duncan .....Ayr.
Mann, John Wing .....Spalding.
Marshall, George.....Spilsby.
Martlew, Ernest Hercules .....Southsea.
Mason, Alexander .....Perth.
Milne, Alexander.....Old Aberdeen.
Mitchell, George Alexander ...Crieff.
Morley, Benjamin M.....Norwich.
Neal, Henry Octavius.....Nottingham
Oke, Alfred John.....Little Hulton.
Paterson, Alexander .....Edinburgh.
Pearson, Benjamin .....Grange.
Peters, George Henry.....Wrexham.
Pirie, Wallace G.....Peterhead.
Playford, Hubert.....Leamington.
Popham, Henry Nicholas .....South Shields.
Prime, Thomas Fletcher.....London.
Pritchard, Thomas Henry .....Porth.
Raby, James Herbert .....Bury.
Reid, Robert.....Alloa.
Robertson, James Ambrose ...Portobello.
Robson, Francis White Hope...London.
Scott, Thomas Lamb .....Hetton-le-Hole.
Short, William John .....Portsmouth.
Shuttleworth, John Henry.....Gainsborough.
Simmonds, Frank Livings .....Reading.
Simpson, Aitken .....London.
Sinclair, Neil Crawford .....Greenock.
Slater, Thomas Sutcliffe .....Burnley.
Smith, Alfred Charles.....Newton-le-Willows.
Smith, Stanley .....Truro.
Spence, Alexander .....Linlithgow.
Spence, George.....Gateshead.
Steven, Edward .....Stirling.
Stokes, William Charles .....Weymouth.
Sturton, Frank Ainsworth.....Peterborough.
Swainson, John William.....Devonport.
Taylor, Joseph Crabtree .....Southport.
Thackrey, Frank .....Pateley Bridge.
Thomas, Dan .....Hafod.
Thomas, Frederick William ...London.
Thomas, William Jolliffe .....Brynhyfryd.
Thompson, Joseph George .....Maryport.
Thorp, Walter Thomas .....Glossop.
Tildesley, Frederick George ...Chesterfield.
Turner, John Arthur .....York.
Turtle, Howard Robert .....Chatham.
Vincent, Robert .....Nottingham.
Walker, Alfred Ernest .....Coventry.
Watkinson, William Harrison Farnworth.
Watson, Harry.....Spennymoor.
Watson, James.....Glasgow.
Watson, Lindley Arthur.....Beccles.
Wellburn, Halder.....Pickering.
Wells, William Luty .....Louth.
Wheeldon, James Pickering ...Manchester.

White, Frank .....Liverpool.
Whitelaw, Andrew .....Greenock.
Whitwell, Frederick William...Peterborough.
Wicks, Harry Gilbert.....Keswick.
Wilkes, Harry Smith .....Upton-on-Severn.
Wilson, Edward Arthur.....London.
Wood, Septimus .....Knottingley.

The following is a list of the centres at which the examination was held, showing the number of candidates at each centre and the result:—

	Candidates.				Candidates.		
	Examined.	Passed.	Failed.		Examined.	Passed.	Failed.
Aberdeen	10	5	5	Inverness	2	0	2
Birmingham	12	6	6	Jersey	1	0	1
Brighton	2	0	2	Lancaster	5	1	4
Bristol	5	2	3	Leeds	15	7	8
Cambridge	1	0	1	Lincoln	10	8	2
Canterbury	2	1	1	Liverpool	17	8	9
Cardiff	9	5	4	London	30	18	12
Carlisle	11	6	5	Manchester	27	11	16
Carmarthen	12	6	6	Newcastle	11	8	3
Carnarvon	5	1	4	Norwich	8	5	3
Cheltenham	2	1	1	Nottingham	12	7	5
Darlington	10	3	7	Oxford	3	3	0
Douglas	2	2	0	Peterborough	9	5	4
Dundee	6	2	4	Sheffield	3	1	2
Edinburgh	12	6	6	Shrewsbury	5	1	4
Exeter	4	0	4	Southampton	4	3	1
Glasgow	9	7	2	Truro	5	4	1
Guernsey	3	2	1	Worcester	2	2	0
Hull	1	0	1	York	6	4	2

The questions set for examination were as follows :—

LATIN.

(*Time allowed—from* 11 *a.m. to* 12.30 *p.m.*)

I. (*For all Candidates.*) *Translate into Latin* :—

1. Very many men give the greatest praise to Cæsar.
2. We wish that the enemy may be conquered.
3. The camp of Hannibal was under the walls of Rome.
4. We know that the soul is immortal.
5. When these things were done, Cæsar ordered his soldiers to begin the battle.

II. Translate into English either A. (Cæsar) or B. (Virgil).

(*Candidates must not attempt both authors.*)

A. Cæsar.

1. Tum demum Liscus, oratione Cæsaris adductus, quod antea *tacuerat*, *proponit:* Esse nonnullos, quorum auctoritas apud plebem plurimum *valeat*, qui privatim plus possint, quam ipsi magistratus. Hos seditiosa atque improba oratione multitudinem deterrere, ne frumentum *conferant*; quod præstare *debeat*, si jam principatum Galliæ obtinere non *possent*, Gallorum, quam Romanorum imperia perferre; neque dubitare debeant, quin si Helvetios superaverint Romani, una cum reliqua Gallia Aeduis libertatem sint erepturi.

2. Caius Valerius Procillus, quum a custodibus in fuga trinis catenis vinctus traheretur, in ipsum Cæsarem, hostes equitatu persequentem, incidit. Quæ quidem res Cæsari non minorem quam ipsa victoria voluptatem attulit; quod hominem honestissimum provinciæ Galliæ, suum familiarem et hospitem, ereptum e manibus hostium, sibi restitutum videbat : neque ejus calamitate, de tanta voluptate et gratulatione, quidquam fortuna diminuerat.

III. *Grammatical Questions.*

(For those Candidates only who take Cæsar.)

1. Decline in the singular *hominem honestissimum*, and in the plural *trinis catenis* (Par. 2).

2. Give the principal parts of the verbs in italics (Par. 1).

3. Parse fully *persequentem, minorem, quod, sibi* (Par. 2).

4. Write the Latin numerals (cardinal and ordinal) from *one* to *ten*, and decline *tres*.

B. Virgil.

1. Æolus hæc contra : Tuus, o regina, quid optes
Explorare labor ; mihi jussa *capessere* fas est.
Tu mihi quodcumque hoc regni, tu sceptra Jovemque
Concilias ; tu *das* epulis accumbere Divum,
Nimborumque facis tempestatumque potentem.
Hæc ubi dicta, cavum conversa cuspide montem
Impulit in latus; ac venti, velut agmine facto,
Qua data porta, *ruunt*, et terras turbine *perflant*.

2. Hæc dum Dardanio Æneæ miranda videntur;
Dum stupet, obtutuque hæret defixus in uno,
Regina ad templum forma pulcherrima Dido
Incessit, magna juvenum stipante caterva.
Qualis in Eurotæ ripis, aut per juga Cynthi,
Exercet Diana choros, quam mille secutæ
Hinc atque hinc glomerantur Oreades: illa pharetram
Fert humero, gradiensque deas supereminet omnes ;
Latonæ tacitum pertentant gaudia pectus :
Talis erat Dido, talem se læta ferebat
Per medios, instans operi regnisque futuris.

III. *Grammatical Questions.*

(For those Candidates only who take Virgil.)

1. Decline in the singular *obtutu uno*, and in the plural *deas omnes* (Par. 2).

2. Give the principal parts of the verbs in italics (Par. 1).

3. Parse fully *defixus, quam, hinc, tacitum* (Par. 2).

4. Write the Latin numerals (cardinal and ordinal) from *one* to *ten*, and decline *tres*.

ARITHMETIC.

(*Time allowed—from* 12.30 *p.m. to* 2 *p.m.*)

(N.B.—The working of the examples, as well as the answers, must be written out in full.)

1. Divide 28 tons 4 cwt. 3 qrs. into 36 equal portions, and find the value of one of them at £7 10*s.* 8*d.* per cwt.

2. A merchant buys 32016 tons of iron; he sells half of it at cost price, half of the remainder at a profit of $\frac{1}{2}d.$ a lb., and the rest at a profit of $\frac{1}{4}d.$ a lb.; find his gain.

3. Reduce to its simplest form—

$$\tfrac{7}{27} \text{ of } \frac{3}{6\frac{1}{5}} \text{ of } 2\tfrac{3}{5} - \tfrac{1}{6}\left(2\tfrac{1}{7} - \frac{1}{3\frac{1}{5}} \text{ of } \tfrac{15}{7}\right).$$

4. What decimal of 14 cwt. 1 qr. 20 lb. is 6 cwt. 1 qr. 7 lb?

5. Calculate the rent of 38 acres 2 roods 16 perches, at 17·2083 the acre.

6. Write out the Metric Table of Length. If with 53·46 kilog. of thread a man can weave 462 mètres of linen, 1·14 mètre broad, how many mètres of linen, ·95 mètre broad, can he weave with 37·8 kilog. of thread of the same quality?

7. If by selling a liquid at 15*s.* a gallon I lose 6 per cent., at what price must I sell it to gain $17\frac{1}{2}$ per cent?

ENGLISH.

(*Time allowed—from* 3 *p.m. to* 4.30 *p.m.*)

1. Analyse the following sentence:—

"I sat upon a promontory
And heard a mermaid on a dolphin's back,
Uttering such dulcet and harmonious breath,
That the rude sea grew civil at her song."

2. Parse the following sentence,—"Let honour be to us as strong an obligation as necessity is to others."

3. Correct the following sentences, giving your reasons :—

(i.) We can easier sing than play.
(ii.) Are either of these books yours?
(iii.) He is not only famous for his running, but his jumping.

4. In the following passage supply the necessary capital letters, and put in the stops and inverted commas where

necessary:—the house of commons was all of one mind this is no time to be counting cost said honest birch who well remembered the way in which oliver had made war on the irish are those brave fellows in londonderry to be deserted if we lose them will not all the world cry shame upon us a boom across the river why have we not cut the boom in pieces are our brethren to perish almost in sight of england within a few hours voyage of our shores howe the most vehement man of one party declared that the hearts of the people were set on ireland.

5. Give a short account of a Sovereign, Statesman, or Writer of the Tudor period; or, Give a brief description of some scientific invention of the present century.

Provincial Transactions.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

The monthly general meeting was held at the Society's Lecture Room, Norfolk Row, on Wednesday evening the 19th inst. The chair was occupied by the President (Mr. Newsholme), and there was a good attendance.

The minutes of the last monthly meeting and of the special meeting were read and confirmed.

A donation to the Society's Museum from Mr. John Clark, West Street, was announced, consisting of an excellent herbarium; also fine specimens of crystals, under glass shades. On the proposition of the President, a vote of thanks to the donor was unanimously passed.

The following lecture was then delivered on—

Some Analytical Facts and Processes of Interest to Pharmacists.

BY ALFRED H. ALLEN, F.I.C., F.C.S.,
President of the Society of Public Analysts.

When asked by your worthy President to give a lecture before this Society, it occurred to me that it might be of interest if I were to discuss some of the simpler analytical processes which may readily be employed for testing certain of the articles that pharmacists are in the habit of selling. I suppose it is a fact that certain pharmaceutical preparations, such as tinctures, for instance, are rapidly becoming the product of a limited number of wholesale houses, and that the number of preparations which the retail pharmacist himself prepares is constantly diminishing. This being the case, the retailer is evidently becoming more and more dependent on the care and integrity of the manufacturer and wholesale dealer, and hence it is the more necessary that he should accustom himself to test certain articles with which he is supplied, which, from the circumstances of their manufacture, are liable to vary materially in purity or strength. In saying this, I am in no way arguing that the retail pharmacist should attempt to test every preparation that he buys, nor is there any need that he should do so, as in the event of his being called to account in any instance, the law upholds that it is sufficient defence if he can prove that he bought the article in the state in which he sold it, under a written guarantee from the wholesale dealer; but for his own sake a pharmacist will often desire to acquaint himself with the preparations he buys, and, fortunately, it is possible to do this in many cases without much expenditure of time, or use of very complicated methods or elaborate appliances. Of course I do not propose this evening to touch on all the various pharmaceutical preparations which admit of being chemically tested; as a rule, the tests given in the Pharmacopœia are sufficient for the purpose, and are possessed of reasonable simplicity and accuracy. My object is rather to call your attention to certain points with which some at least of those present are probably unfamiliar.

Of all simple methods of ascertaining the strength of liquid preparations the simple method of taking the specific gravity is perhaps that most widely applicable. By defining the specific gravity of mineral acids, and such preparations as solution of acetate of ammonia and others, the Pharmacopœia furnishes a sufficient test in most cases; but no special method of ascertaining the specific gravity is laid down, the operator being left to employ at his discretion a hydrometer, specific gravity bottle, or, as I have known to be done, a 10-ounce measure.

I have of late found the familiar hydrometer or gravity bottle might be conveniently replaced by the piece of apparatus known as the Westphal hydrostatic balance. It has the advantage that while densities can be ascertained by means of it with all desirable accuracy the results are obtained almost as expeditiously as by employing a hydrometer. Further, the one instrument is suited for determining the density of all liquids, from petroleum ether to chloroform and strong sulphuric acid. The manipulation, as you see, is extremely simple, and the direct reading of the little riders which serve as weights gives without calculation the specific gravity of the liquid under examination. By substituting a piece of stout glass rod, having a volume of exactly 5 c.c., for the thermometer-plummet sold with the apparatus, I have found the arrangement valuable for the determination of the density of substances at the boiling point of water, By means of this arrangement the specific gravity of solid fats and waxes can be directly compared with those of the fluid oils, and some novel and interesting facts become apparent. Thus, though solid waxes are denser than solid fats and fluid oils, when all are compared in a molten state at the temperature of boiling water the waxes are found to be the lightest. The apparatus, consisting of a jacket in which water can be kept constantly boiling, enables determinations of densities at the boiling point by the Westphal balance to be very readily effected.

Another piece of apparatus, which I was the first to introduce to the notice of pharmacists, and which is capable of a limited number of very useful applications, is the nitrometer. On a previous occasion I explained the use of the instrument for assaying the spirit of nitrous ether, and since that time the process devised by me has become well known to pharmacists, and has been adopted in the British Pharmacopœia as one of the alternative methods of assaying this preparation. The same method is applicable to the assay of nitrite of amyl, provided this be previously dissolved in rectified spirit so as to dilute it appropriately; and nitrite of sodium, now of little practical interest to pharmacists, can also be assayed by means of it. A new application for the nitrometer has recently been pointed out by Mr. Gravill, who employs it for the assay of the aromatic spirit of ammonia. When prepared according to the directions given in the new Pharmacopœia, the aromatic spirit of ammonia should contain a perfectly definite amount of ammonium carbonate, and this can be readily ascertained by treating 5 c.c. of the sample in the nitrometer over mercury with dilute hydrochloric acid, measuring the carbonic acid gas evolved, and adding 3·5 c.c. to the measure obtained, as a correction for the gas which remains dissolved in the liquid. According to Mr. Gravill, when thus treated the aromatic spirit of ammonia should, with the correction, yield 36 c.c. of gas; but Mr. A. C. Abraham, who has also employed the process, considers 32 c.c. to be a fairer volume to expect. These figures are very different from some of those obtained by these operators from commercial samples. Another application of the nitrometer is to the assay of peroxide of hydrogen, a preparation a good deal used in Sheffield, and which, being somewhat unstable, is often very far from being of professed quality. The strength of peroxide of hydrogen is usually expressed in volumes of available oxygen which it contains, the preparation being sold as five volumes, ten volumes, or twenty volumes, according to circumstances. The strength can be ascertained very

readily by filling a nitrometer with a concentrated solution of sulphate of sodium, which for this purpose is preferable to brine; 1 c.c. of the sample to be tested is then introduced through the tap, and this is followed by a strong solution of potassium permanganate which has been previously acidulated with sulphuric acid. The reaction occurs very promptly, oxygen gas being freely evolved, and the permanent coloration of the contents of the tube suffices to show that an excess of the permanganate has been employed. Only one half of the volume of gas, however, comes from the peroxide of hydrogen, the remainder having its origin in the potassium permanganate employed: therefore 1 c.c. of a sample of hydrogen, described as of ten volume strength, ought to give 20 c.c. of oxygen in the nitrometer.

Another application of the nitrometer, which may occasionally be of interest to pharmacists, is for the estimation of urea in urine. For this purpose the tube is filled with brine and 2 c.c. of the sample introduced through the tap. This is followed by 10 c.c. of the usual solution of bromine in caustic soda. Before the bromized soda has time to sink through the brine it comes in contact with the urine, and the great bulk of the nitrogen gas is liberated. By now placing a clip on the india-rubber connecting-tube, and agitating the nitrometer tube vigorously, the reaction is completed, and the volume of gas may be read off. Not unfrequently, the reading is delayed by the existence of froth on the surface of the liquid in the closed tube, but this may be instantaneously got rid of by introducing a few drops of alcohol through the tap. A preferable method of employing the nitrometer for assaying urine is to bring the bromized soda and urine into contact with each other in a small flask fitted with a perforated cork, and connected by narrow india-rubber tubing with the cap of the nitrometer filled with water. From 2 to 5 c.c. of urine will be found to furnish a convenient volume of gas for measurement in the nitrometer. Each centimetre of nitrogen gas evolved represents 0·0029 gram of urea in the urine operated on.

The use of volumetric solutions for assaying certain pharmaceutical preparations is well known to all readers of the Pharmacopœia, and the processes therein described require no comment, but there is one method which deserves attention from its increasing application, and for having proved the solution of a very troublesome problem in organic analysis. I refer to the indicator known as phenolphthalein, and its application for the determination of free fatty acids. As is well known, litmus is scarcely affected by many of the weaker acids, but phenolphthalein indicates their existence with facility. Thus, if it be desired to ascertain the proportion of free fatty acid in, say, olive oil, it is only necessary to take a definite quantity of the sample, say 50 grams, and treat it with 3 or 4 ounces of methylated spirit, which is itself free from any trace of free acid. On then adding a few drops of a solution of phenolphthalein and running in a standard solution of caustic soda from a burette, agitating thoroughly after each addition, no change will be perceived as long as any free fatty acid remains unneutralized, but on the addition of the least excess of soda a permanent pink coloration will be produced. The reaction is definite, and the determination as distinctly marked as in the case of a mineral acid, but care is required owing to the high combining weight of oleic acid. The value of such a method is exemplified by the varying proportions of free acid present in various commercial samples of olive oil. Of course, those used for cooking and preparing salad are generally fairly pure; but the inferior specimens employed for lubricating often contain a very large proportion of free oleic acid, the amount in some cases reaching 25 per cent. The same process, employing a small quantity of the sample, can be used for examining oleic acid itself, which often is far from pure. It not unfrequently contains 10 per cent. or more of neutral fixed oil which has escaped saponification, and many samples also contain a notable proportion of hydrocarbons and other unsaponifiable matters. These facts seem hitherto to have escaped the attention of pharmacists.

One of the most valuable means of effecting the approximate analysis of organic substances is the employment of immiscible solvents, though in mineral analysis the method finds few applications. The process consists in the agitation of a substance in one solvent with another solvent insoluble, or only slightly soluble, in the former liquid. Under these circumstances the dissolved body is divided between the two solvents in proportions which are probably dependent on the relative solubility of the substance in the two media, and the relative quantities of the two media employed. Thus it may be supposed that if a substance be ninety-nine times more soluble in chloroform than in water, and its aqueous solution be shaken with an equal measure of chloroform, 99 per cent. of the whole substance will pass into the chloroform. On separating this layer and again agitating the residual aqueous liquid with an equal quantity of chloroform 99 per cent. of the remaining substance will be dissolved, thus making the exhaustion practically complete. Something also depends on the quantity of solvent employed, and the temperature at which the operation is conducted. Various immiscible solvents are used; ether, chloroform, amylic alcohol, benzene and petroleum ether being those most commonly employed. Each of these has its special applications, but where the substance to be dissolved is soluble in that menstruum I give the preference to ether above all others. Thus, when chloroform, benzene or petroleum ether is used, and the aqueous liquid is alkaline, a troublesome emulsion is apt to be produced, but this difficulty occurs far less frequently when ether is employed. The following table shows the behaviour of a variety of organic substances on treatment with acidulated and alkalized water and solvents immiscible therewith. It must not be supposed, however, that the immiscible solvents can be employed indifferently, as some of the bodies are removed from their aqueous solutions by one solvent, but are unaffected by others, owing to their limited solubility therein. This is especially the case with alkaloids and glucosides, and hence the table must simply be regarded as showing their general tendency. Details of their behaviour under such conditions are to be found in Dragendorff's well-known scheme for the separation of alkaloids, etc.

One of the best examples of the employment of a miscible solvent for the rapid assay of a pharmaceutical preparation is furnished by the Pharmacopœia process for examining the citrate of iron and quinine. This method, which was first suggested by myself, gives with reasonable care exceedingly accurate results. It consists simply in dissolving 50 grains of the scales in an ounce of water, adding excess of ammonia, and then agitating the liquid repeatedly with ether or chloroform until exhaustion is complete. The ether or chloroform in solution is then evaporated with the residual alkaloid, and should weigh at least 7½ grains, equal to 15 per cent. in the preparation. By an extraordinary mistake, the Pharmacopœia, as originally printed, describes 16 per cent. as the amount to be found, although the method of preparing the scales rendered this percentage impossible to attain. So far as accuracy is concerned, I find it a matter of indifference whether ether or chloroform be used, but for convenience of manipulation give a decided preference to ether, as it separates very promptly from the aqueous liquid instead of forming the troublesome emulsion so often obtained when chloroform is employed. The first treatment with ether removes some 14½ per cent. of alkaloid from Howard's citrate of iron and quinine, and a second treatment renders the extraction nearly complete, but the perfection of the treatment must not be taken for granted. I have fully established the accuracy of the process on specimens of known composition, into which definite amounts of alkaloid were intro-

duced, and have had no difficulty in recovering the quinine completely. A similar process is now prescribed by the Pharmacopœia for the assay of extract of nux vomica.

On agitating the substance with water acidulated with sulphuric acid, and a suitable solvent immiscible therewith (such as ether, chloroform, amylic alcohol, benzene, or petroleum ether), the following distribution will occur:—

Table showing the Behaviour of Organic Substances with Immiscible Solvents.

The acidulated aqueous liquid will contain carbohydrates, soluble alkaloids and acids, organic bases, proteids, etc., which may be further separated by adding a moderate excess of soda, and again shaking with a suitable immiscible solvent, when there will be obtained:—		The immiscible layer will contain hydrocarbons, oils, various acids, resins, colouring matters, phenols, glucosides, etc., which may be further separated by agitating the liquid with water containing caustic soda, when there will be obtained:—	
In the alkaline aqueous liquid.—	In the immiscible layer.—	In the alkaline aqueous liquid.—	In the immiscible layer.—
Carbohydrates: as sugars, gums, dextrin.	Most vegetable alkaloids: as quinine, strychnine, aconitine, atropine, nicotine (cinchonine, morphine; the last two with difficulty).	Fatty acids: as stearic, oleic, valeric.	Solid hydrocarbons: as paraffin, naphthalene, anthracene.
Soluble alcohols: as methyl alcohol, ethyl alcohol, glycerin.	Coal tar bases: as aniline and its homologues (rosaniline), chrysotoluidine (pyridine), homologues of pyridine.	Various other acids: as benzoic, salicylic, phthalic, meconic.	Liquid hydrocarbons: as petroleum products: rosin oil, benzene.
Soluble acids: as acetic, oxalic, lactic, malic, tartaric, sulphophenic.		Acid dyes and colouring matters: as picric and chrysophanic acids, alizarin, aurin, bilirubin.	Essential oils: as turpentine oil.
Certain alkaloids or organic bases: as curarine, urea, glycocine, solanine, and possibly cinchonine, morphine and pyridine.		Acid resins: as colophony.	Nitro-compounds: as nitrobenzene.
Certain colouring matters: as indigo products.		Phenols and their allies: as carbolic and cresylic acids, thymol, creasote.	Ethers and their allies: as ether, chloroform compound ethers, nitroglycerine.
Proteids and their allies: as albumen, casein, gelatin.		Certain glucosides, etc.: as santonin, cantharidin, picrotoxin.	Fixed oils, fats and waxes.
			Neutral resins and colouring matters.
			Camphors: as laurel camphor, borneol, menthol.
			Alcohols insoluble or nearly insoluble in water: as amylic and cetyl alcohols, cholesterin.
			Certain glucosides, etc.: as saponin, digitalin, santonin.
			Certain weak alkaloids: as caffeine, colchicine, narcotine, piperine, theobromine.

The lecture, which was profusely illustrated with the most approved and modern apparatus, was listened to throughout with great interest.

Mr. Ward proposed that the best thanks of the meeting be passed to Mr. Allen, for delivering to the Society at so late an hour, and at personal inconvenience, the lecture they had listened to, and which the lecturer had preeminently adapted to the requirements of their calling.

Mr. Furness seconded the resolution, which was supported by Mr. Bradwall and carried unanimously.

Mr. Allen briefly responded, remarking that in his vocation as Borough Analyst it had always been, and would continue to be, simply his desire to do his duty. That an occasion like the present afforded an opportunity of mutual intercourse, and expressed the pleasure he had to thus meet the pharmacists of the town and neighbourhood.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The sixth meeting of the session was held in the Pharmaceutical Society's House, 36, York Place, Edinburgh, on the evening of Wednesday, January 12, at 9.15. Mr. William Duncan, President, in the chair.

The minutes of last meeting having been read and approved, the evening was devoted to the reading and discussion of a number of "Notes and Queries." The arrangements being under the charge of Mr. A. M. Macdonald, who opened the proceedings by reading a note on—

A Deposit in a Mixture: What is it?

The short note which I have to bring before you at this time refers to the following mixture:—

℞ Tinct. digitalis	℥j
Ferri et quiniæ cit.	ʒij
Acid. phosph. dil.	℥j
Infus. quassiæ . . . . . ad	℥vj

On mixing the above ingredients a copious precipitate is produced, and after a rather incomplete examination of the matter, the opinion arrived at is that the precipitate is phosphate of iron or ferric phosphate, with a slight admixture of tannate of quinine obtained by the presence of the tincture of digitalis, and which does not redissolve in the phosphoric acid.

The mixture was made by me in the order of the ingredients in the recipe, so that the quinine was precipitated first; then on the addition of the phosphoric acid a copious precipitate was formed. No account was taken of the infusion of quassia. After removing the precipitate by filtration the filtrate will still be found to contain iron, which is due, no doubt, to the citric acid in the citrate of iron and quinine, which still holds some of the iron in combination.

After the precipitate has been well washed and dried, then redissolved in hydrochloric acid, decided evidence is obtained of the presence of iron, existing, I conclude, as a ferric phosphate, and on testing the precipitate a slight bitterness is felt, showing, as I think, that tannate of quinine, redissolved by the phosphoric acid, is present also. The conclusion, therefore, is that the main bulk of the precipitate is ferric phosphate.

This is then a clear case of incompatibility.

The next question is as to whether it is an intentional case. Perchloride of mercury with iodide of potassium or salicylic acid and bicarbonate of potassium; both of these are incompatible, but intentionally so. The case we are considering shows, on the part of the prescriber, a lack of acquaintance with chemical reactions. His object, no doubt, was to administer iron and quinine as a general tonic, whilst the phosphoric acid was to act as a brain tonic. It is probable he did not foresee the decomposition which takes place, producing an unsightly mixture. One is inclined to ask, "Could he not have found a better method?"

The discussion on this note was taken part in by Messrs. Lunan, Taylor, Stephenson and Robbie.

The following query was then submitted to the meeting:—"What should be dispensed when 'liquor taraxaci' is ordered." It was found that one half were in favour of the official succus and the other half in favour of the official extractum liquidum. It was felt that uniformity of practice would be a great advantage, and would prevent awkward occurrences, such as occasionally happen at the present time.

Mr. A. W. King then read the following:—

Note on a Sample of Distilled Water.

Some time ago in the course of business I had occasion to prepare some proof spirit. When I mixed the rectified spirit and distilled water I got a result which I certainly had not anticipated. Instead of the clear transparent liquid with which we are familiar I got a white opaque fluid which looked as if it had been mixed in a dairyman's milk-can. At first I thought the rectified spirit must be at fault, but an experiment or two showed that the blame lay with the distilled water.

Although this is the only time that I have seen this occur, yet it is not an isolated case, as a fellow-student informed me that about the same time he had had a similar experience. It is quite possible, however, that the water may have been obtained from the same source. The nature of the precipitate with the spirit pointed to the impurity being a salt of some kind, and on testing a little of the water it proved to contain calcium.

Going a step further the calcium was found to be in combination with sulphuric acid.

In short, the so-called distilled water was neither more nor less than a saturated solution of calcium sulphate. This impurity in the water is of such a nature that it runs a good chance of escaping detection, and as in this case the impurity was brought to light in the preparation of proof spirit, those pharmacists—and they are still a numerous body—who prepare their spirit with common water run a greater chance of failing to detect it.

Of course, in making solutions of lead, the impurity would be at once noticeable, though it is possible that the blame might be laid on the water containing CO_3. The amount of the salt in solution would lead one to suppose that the water had never been distilled, but the absence of chlorides shows that it is really a distilled water the method of collection in all probability being responsible for the impurity.

This freedom from chlorides would also allow the water to be used for nitrate of silver lotions without anything wrong being suspected. As this distilled water was obtained from a wholesale house of the highest repute in the trade, and as it certainly does not answer the tests of the British Pharmacopœia, the accidental discovery of this impurity confirms the declaration of our President in his opening address as to the necessity of a careful testing of drugs, etc., by the retail pharmacist.

Mr. Mackenzie stated that he had recently seen a similar sample which had been used for making a solution of potassium bicarbonate, and the resulting precipitate of $CaCO_3$ led to the discovery of the impurity.

Mr. Hill mentioned that he had recently received a precipitate from half a gallon of a solution of $KHCO_3$ made with distilled water. He had not yet examined the precipitate, but from its appearance he expected to find it to be $CaCO_3$, and probably the explanation was supplied by Mr. King's interesting paper.

Mr. W. Charles Baker then read a note on—

Linimentum Terebinthinæ.

In a review of the year 1886, the *Pharmaceutical Journal*, referring to this preparation, says it has been "as provocative of conflicting opinions as it appears to be prolific in diversity of products, which have been reported as ranging from thin, more or less permanent emulsions, to solid jellies. This variety in results has been referred with equal confidence to peculiarity in the turpentine used, the quality of the soft soap, the quantity of water, and the method of manipulation." The Journal points out that the discussion has shown that the last, namely, the method of manipulation, has an important influence on the final product.

Some of the correspondents of the pharmaceutical periodicals think that the quantity of water ordered in the B.P. is a mistake, and one, Mr. Baxter, suggests that the quantity should be doubled.

Mr. Michael Conroy, in a paper read before the Liverpool Chemists' Association, goes further than this, and says that if a liquid preparation be required, the quantity of water must be doubled. In his opinion the quality of the soap and of the oil of turpentine does not affect the result, and the mode of manipulation is the main factor in the case.

The first time I made this liniment (using sapo mollis, B.P., and commercial oil of turpentine) I got a beautiful, liquid, milk-like emulsion, which kept for some months and showed no tendency to separate. Making it again shortly afterwards, and using the same materials and B.P. quantities, I got a stiff jelly in which the pestle of the mortar would stand upright.

Seeing I had obtained such different results, although using the same materials, I naturally thought the cause must be the method of manipulation, and I then made a few experiments which confirmed me in the opinion—which Mr. Conroy has since shown to be his—that the quality of the turpentine has little to do with the final product.

While admitting the increase in the quantity of water to be a great improvement, I do not agree with Mr. Conroy that this is necessary in order to get a liquid preparation, and the sample which is shown (made with the B.P. quantity of water) will prove this.

After mixing the soap and the water together thoroughly, the turpentine solution of camphor should be added, very gradually at first, until an emulsion is formed; it should then be added in quantities at a time, and the whole stirred with the pestle until thoroughly mixed. If it be added too gradually after the emulsion is formed, a stiff jelly will be the result.

Mr. Leman stated that his experience was somewhat similar to that of Mr. Baxter, who found that pure materials gave the best results; but he found on making a second trial that even the finest turpentine and soap would give an unsatisfactory result if differently manipulated. He agreed with others who took part in the debate in attributing the various results to difference in the method of working.

Mr. J. Mackenzie then read a note on—

Tinctura Ferri Acetatis.

Lately this Association was treated by one of its members to an original note giving the results of some experiments made with reference to tinct. ferri acet., B.P.

1885 (see before, p. 495). The author of that note complained of the want of stability of the preparation, and gave it as his idea that the decomposition was brought about by the presence of ammonia, from which it was a matter of great difficulty to entirely free the precipitated ferric hydrate.

The object of the note I am about to give is not intended in any way to upset the findings or ideas stated, but merely to lay before you a few facts regarding tinct. ferri acet. as I have found it.

At the outset, however, I must let you know that this tincture was not prepared by me, but at the same time I can give an unqualified assurance that it was prepared strictly in conformity with the directions given in the B.P., although apparently from the results I have obtained we must infer that there has been some condition either skilfully observed or accidentally present in the manipulation.

This tincture was prepared the day after the issue of the new Pharmacopœia. It has been kept in a clear glass stoppered bottle, and, although from its position, being at the back of other bottles, it has not been exposed to a strong light, still there has been no attempt to conceal it from the influence of that factor. For the last eight or ten months the bottle has been less than half full, and, lately, the stopper has been frequently taken out, and up to the present time there is not the slightest indication of precipitation.

On proceeding to examine this tincture I found the presence of acetic ether very evident, and, as I wished to take as little as possible for granted, I ascertained the presence of acetate of iron.

I filled a 1-ounce bottle with tincture, and have exposed it for six days to as strong a light as it is possible for us to get at this time of the year, at the same time keeping it in a warm place. I then put a quantity of it into a test tube and brought it to the boil, and both of these samples are still bright and clear, without the slightest indication of a precipitate.

I may mention, however, that upon boiling, or even heating, it assumes a dark port wine colour, which is not permanently deep, but whether it will come back to its normal colour again or not I have not had sufficient time to prove.

As the results of these tests appeared to be negative I feared lest the tincture might be deficient in the amount of acetate of iron it ought to contain. To ascertain this I estimated it by the B.P. process given for the estimation of the strong liquor, using of course an equivalent to 1 drachm of the strong liquor. The result of this I considered to be very satisfactory, for, after washing and igniting, I found the residue to weigh $5\frac{1}{2}$ grains, and this made me pretty sure that it was not owing to any poverty of the preparation in that respect that no decomposition had occurred.

Finally I tested it for the presence of ammonia, and this I found to be present, not in large quantity, but nevertheless sufficient to give an evident reaction both with hydrochloric acid and glacial acetic acid. I likewise got a faint coloration with moistened red litmus paper.

I have now laid before you the facts I have ascertained about this tincture, and as you have all had a considerable time to digest the subject since it was first introduced, I hope some enlightening discussion will follow. Chemistry is no fickle dame that will give different results, given the same conditions; and as there are evidently some conditions required in this preparation, the observance of which will give us an elegant and stable tincture, I hope we shall be fortunate enough to discover them.

Although the results I have obtained are somewhat opposed to those given lately, still I fear no criticism or discussion. In going about these investigations I would have been equally as happy to get a precipitate as not. What I would like to see is the elucidation of the correct method for making this preparation. I regret very much that owing to want of time I was unable to prepare a tincture from the very foundation. Owing to the conflicting evidence in regard to the keeping properties of this tincture, however, I consider it very probable that the key to the whole affair lies in the method of manipulation, which I am quite willing in the meantime to hold as being accidentally observed, for I am led to understand others have prepared a tincture of equally stable appearance to that I have just dealt with without observing any special precautions; and as a sort of pillar for this argument, and as a beautiful illustration of the importance there may be attached to small things and the influence of the method of manipulation, I refer you to Mr. Baker's simple solution of the correct method to prepare lin. terebinthinæ.

Mr. W. C. Baker then made a communication on—

A Fungoid Growth in Liquor Strychninæ.

It was found that a sample of the liquor quickly developed a fungoid growth. The filtered liquor was stable. This, he thought, might be due to the cause indicated by Brunnengraber, who found that fungi grew in salts of alkaloids when they were spread out to dry. He found, however, that after filtering the distilled water through animal charcoal, a liquor made with it did not decompose.

In the discussion which followed it was stated, that probably living germs present in the water or organic substances favourable to the growth of fungi spores in the strychnia would be removed or destroyed by the charcoal.

The following notes were then read by Mr. J. Rutherford Hill:—

Abnormal Development in an Orange.

At a festive season, such as we have recently passed through, the faculty of scientific observation is probably, as a rule, allowed to remain in abeyance. Even at such a time, however, the habitual and thoughtful observer may come across phenomena of scientific interest which are worthy of a little consideration, as is indicated by the subject of this note.

A few weeks ago a member of the Association brought under my notice an instance of abnormal development in the common sweet orange, which, so far as I know, seems to be rather unusual. It not uncommonly happens that the carpels of an orange are more or less separated from one another, giving rise to what are called "horned" or "fingered" oranges, but the following departure from the ordinary structure is unusual. Externally, as you see, the orange is about the average size and shows no peculiarity of structure. The rind is unusually thin. On dividing it in two halves by tearing the carpels asunder, we discover the peculiar structure to which I would direct your attention. Unfortunately the specimen is not in good condition. It was laid aside for a day or two, and on again looking at it I found that a plentiful crop of the ubiquitous *Penicillium glaucum* had grown on the exposed surfaces, and to some extent obscured the abnormal structure. You will still, however, be able to make out its main features. It was found that these carpels were imbedded right in the centre of the other carpels, presenting the appearance of an orange inside an orange.

I had an opportunity of showing the specimen to Mr. Patrick Geddes, who thought that possibly the peculiarity might be due to starvation or deficient nutrition of some of the carpels. Another explanation might be that two sets of carpels, or a double ovary, were produced, and if so the cause would be precisely opposite, namely overfeeding, or excessive nutrition.

On examining the inner carpels they were found to contain seeds quite complete, though a little smaller than those in the outer carpels. The smallness might have been due to the pressure of the outer carpels. It was also observed that a distinct axis or peduncle passed up

through the outer carpels to the base of the three inner carpels. These circumstances seem to favour the view that there were at least two ovaries, and possibly two complete flowers, and that the phenomenon was really an orange within an orange.

Note on B.P. Infusions.

The following note is a reply to the query, "Should the B.P. infusions be made up to the measure of the quantity of menstruum ordered?"

I believe it is a very common thing in practice to answer this query in the affirmative. The Pharmacopœia, however, does not direct that such should be done, and it is an error to do so.

Take, for instance, infusion of senna. A considerable quantity of the menstruum is retained by the drug, and if the infusion be made up to 10 fluid ounces it will not correspond to the official strength of 2 ounces to 1 pint stated under senna. If, however, the official directions are closely followed the product, though measuring considerably less than 10 ounces, will correspond to the official strength. The making of infusions is therefore a wonderful operation, unless some means be taken to secure the active ingredients still left in the drug.

It is a common practice in pharmacies, when a prescription for, say, 10 ounces of any infusion is received, to put the quantities for 10 ounces in the infusion pot, infuse, strain, and make up to 10 ounces with water. The proper method would be to set on quantities for a little over 10 ounces, infuse, and strain off 10 ounces. By this means time is saved and efficiency secured.

Note on the Official Formulæ for Liq. Atropinæ Sulph. and Liq. Sodii Arseniatis.

Recently the following query was handed to me. How can the statement, "16½ fluid drachms or 99 fluid parts" in the official formula for liq. atropinæ sulph. be reconciled with the statement "2 fluid ounces (that is, 16 fluid drachms) or 99 fluid parts" in the official formula for "liq. sodii arseniatis?"

The explanation of the apparent discrepancy is found by referring to the preface to the 1885 Pharmacopœia, p. 8, where the following paragraph occurs :—

"An attempt has been made to introduce a method of setting out the relative quantities of ingredients used in some of the processes by supplementing the respective weights and measures by proportional parts. It was at first proposed that the use of parts should altogether supersede that of specified weights and measures, but it was thought better, at least for the present, merely to supplement weights and measures by parts where the context permits, and where this can be made more clearly to show the proportion which the several parts bear to each other. Wherever this method is employed, the term "parts" signifies parts by weight, and the term "fluid parts" signifies the volume of an equal number of parts (by weight understood) of water."

The use of the term "fluid parts" is unfortunate, and also misleading, and it would probably have been better to have said "parts" in all cases, letting it be understood that in every case "parts by weight" was intended. The use of the qualifying word "fluid" is, so far as I can see, quite unnecessary. The idea of grain measures seems to have been running in the minds of the editors, and I find that not a few are under the impression that "99 fluid parts" means 99 grain measures, and that a pipette or burette may be used to regulate the quantity. This, of course, is only correct for distilled water or liquids of exactly similar density. The specific gravity of camphor water in liq. atropinæ sulph. appears to be taken as between ·969 and ·970. That is to say, a flask that would hold 1000 grains of distilled water would only hold 969 or 970 grains of camphor water. Therefore, the 16½ fluid drachms of camphor water weigh practically the same as the two ounces (or 16 fluid drachms) of distilled water in the liq. sodii arseniatis, and thus, in both cases, the strength of the liquor is 1 per cent. by weight, not, as some seem to suppose, by measure.

As a matter of fact, however, I have never found any appreciable difference between the specific gravity of distilled water and camphor water made according to the official formula. When we recollect that the density of camphor is near ·992, and that it is only soluble in water to the extent of 1 in 1300 it is not easy to see how the density of camphor water can differ, to any appreciable extent, from that of distilled water. While the reason given for the discrepancy appears to be the real one, the fact remains, nevertheless, that some one has blundered. I think the editors have done so, but as this note has been hurriedly written, I should not be surprised if the author has miscalculated.

Note on Spurious Cubebs.

By the kindness of one of our honorary members, Mr. MacEwan, I am able to show you a sample of spurious cubebs, which is described in the *Chemist and Druggist* for November 6, 1886 (p. 620). "Among the lots catalogued for the last public sales of drugs was a parcel of five cases (each about 160 lbs.), berries imported from Bombay. The name under which the lot was catalogued was 'Cubebs,' but the parcel was not actually offered for sale, it being withdrawn by the auctioneers. These so-called cubebs consisted of a mixture of the berries of a species of *Rhamnus*, the immature fruits of common black pepper, a few pepper stalks, and flowers of *Alpinia*, together with some true cubebs."

The fraud is easily detected in the whole drug, but if ground it would probably be less easily recognized and possibly, not to say probably, it may find its way into commerce in the latter condition. I have recently come across evidence that seems to indicate that adulterated cubebs may be met with in commerce at the present time. Mr. MacEwan writes to me: "At present there is a parcel of pulv. cubebæ in Mincing Lane which has failed to find a purchaser. It seems to be siftings ground up, and could be bought for about £5 a cwt. True cubebs are worth £20 a cwt. in first hands at present."

I have also reason to doubt whether the published tests for genuine cubebs are sufficient to detect sophistication.

Specimen of a Drug offered as Senega.

I am also indebted to Mr. MacEwan for the sample of this substance, which I now show you. It is the root of *Chlorocodon Whitei*, a plant belonging to the Natural Order Asclepiadaceæ. Mr. MacEwan says—"It is known to the natives of Natal as 'Mundi,' and used by them as a tonic. It resembles Indian Sarsae in appearance. The root was not named in the drug catalogue, but brokers going round took it for senega, and would have bought it as such, had it not come from South Africa. They knew as much as to know that no senega comes from that quarter. If I said previously that the root was offered as senega, I withdraw the statement."

It can be very readily distinguished from senega. The variety of senega which it most resembles is that known as "Northern Senega," the root of *Polygala Senega* var. *latifolia*. I show a specimen of the latter for comparison.

On the motion of the Chairman, a cordial vote of thanks was awarded to Mr. MacDonald for the arrangement of the meeting, and to the members who had contributed notes.

Some queries were held over to a future occasion, and at the close of the meeting some new remedies were shown.

Proceedings of Societies in London.

ROYAL INSTITUTION.

The Sun's Heat.

"The probable origin, the total amount and the possible duration of the sun's heat," formed the subject of an interesting lecture by Sir William Thomson, on the 21st inst., at the first Friday evening meeting of the Royal Institution for the session. In considering the question of the quantity of heat that has been, and still continues to be, radiated from the sun, the lecturer reminded his audience that as information concerning the habits of animal and vegetable life does not extend much further back than three thousand years, historical data do not furnish sufficient evidence to show any appreciable alteration in the quantity of heat radiated. Since the earth, owing to its greater proximity, receives about 6½ per cent. more heat from the sun in January than in July without a very noticeable alteration in the temperature of the globe, it follows that a diminution of from 5 to 10 per cent. in the amount of the sun's heat in three thousand years would be barely perceptible. But although history fails in this respect, geology carries us back for some millions of years, and several indications point to the existence of the sun for a period of at least twenty million years. Mentioning the apparently almost unaccountable manner in which the sun continued to radiate heat, Sir William Thomson humorously remarked that as we travel round the sun once a year, it was evident it could not receive supplies by any underground railway or similar unobserved manner. Certainly a theory had recently been put forward that the heat is maintained by the impinging of innumerable small particles of matter upon the sun's surface with such force as to effect their combustion; but this, he said, has not been generally accepted. All present scientific knowledge, however, allows of the hypothesis that the sun is composed of red hot fluid matter, but whether in a liquid or gaseous state remains to be ascertained, since, as the gravity of the sun is twenty-seven and a half times that of the earth, under such increased pressure all the known conditions of dynamics would be altered. Some idea of the greater gravity of the sun, the lecturer remarked, can be gathered from the fact that although a mass of lead, falling 425 metres, on striking the earth's surface would generate sufficient heat to raise the temperature of an equal weight of water 1° C., yet with the sun's gravity a fall of 15 metres only would be required to obtain the same result. Sir William Thomson then described Helmholtz's theory as to the continual radiation of heat from the sun. The sun, he said, had gained its heat by coalesence, and although in giving out heat it cools and shrinks, yet the very decrease of the sun's bulk and consequent increase of its density causes further heat to be radiated. Although this might appear paradoxical at first, it must be remembered that the sun as a fluid continues to give out its heat by the continual contraction due to the action of its gravity. The lecturer proceeded to further explain the theory by resorting to figures, though in dealing with such a subject figures so stupendous are reached as almost to defy conception. He assumed as the nearest and most probable computation that the heat radiated by the sun, estimated as active energy, is equivalent to about four hundred and seventy-six thousand million million million horse-power; and as the extent of the sun's surface is calculated to be about six million million million square metres, this would give a radiation equivalent to seventy-eight thousand horse-power per metre of surface. Thus, then, the lecturer went so far as to say, if the active power of eight ironclads, each of ten thousand horse-power, could be concentrated as active power into one square metre of matter, it might be assumed that so much matter could be obtained in the same condition as it exists at the sun's surface at the present time. Further, the radius of the sun is calculated at six hundred and ninety-seven thousand kilometres, or about one two-hundred-and-fifteenth of the distance between the sun and the earth. Taking, then, the average density of the sun, as estimated, as about half the density of average rock, Sir W. Thomson said the weight of a section of the sun, one metre square at the surface, and gradually decreasing in proportion to the centre of the sun, would be about three hundred and twenty-six million tons. Supposing, then, this weight to be contracting with a spiral motion without friction, from the square metre surface to the centre of the sun, a contracting movement of only twenty-eight metres per year along the radius of the sun, if the gravity remained the same throughout, would generate sufficient heat by the compression of matter to preserve the radiation of the sun's heat at the estimate of seventy-eight thousand horse-power per metre. But since the gravity of the sun is greatest at the surface, and decreases in proportion until it is absolutely nothing at the centre of the sun, in order to maintain the radiation of the sun's heat at such a figure, an average contraction of the radius of thirty-five metres per year is required. This contraction would be equivalent to seventy metres every two years, or seventy kilometres every two thousand years. As a decrease of seventy kilometres in the sun's radius would be equivalent to a contraction equal to about one-hundredth per cent. of the sun's bulk, Sir W. Thomson mentioned that as a probability the sun will last at the present rate of radiation of heat at least about ten million years. Of course, the lecturer observed, in putting forward these figures he did not assert that any such movements of matter took place in the sun's body, but he only wished to explain that could such movements exist a body radiating the same amount of heat as the sun would be formed. As evidence of the probability of currents in the sun's body, he alluded to the sun's spots, which he considered to be caused by the flow of incandescent matter from the interior to the surface of the sun, whilst the surrounding parts consist of cooler matter. Sir W. Thomson mentioned that some theorists thought that the sun would last for a longer period than ten million years, but he considered that limit to be, if anything, an over-estimate of what might be expected of the sun in the future. Supposing the radiation of heat to have always remained constant, then, the lecturer stated, at a period of twenty million years back the sun would have been about four times its present size. He next proceeded to discuss various other theories proposed as to the total amount of the sun's heat, and alluded to one especially in which the determining influences were chemical combination, dissociation and reunion. As, however, one kilogramme of matter falling a distance of forty-five kilometres under the influence of the sun's gravity would attain a force more than equivalent to the heat generated by the same weight of any two bodies in chemical combination, an outside estimate of which would be three thousand thermal units, Sir W. Thomson thought that the power of chemical combination was trifling as compared with that of gravity. Still as conditions are considerably altered within the sun's sphere, more light will have to be thrown upon the kinetic theory of gases before a definite rejection of such an idea can be made. The lecturer then referred to the probable origin of the sun, and here again, without committing himself to a definite answer to the question, Sir W. Thomson contented himself with mentioning the conditions under which he considered it possible that the sun might have been formed. Two bodies, each equal to one half of the sun's mass and of the density of the earth, which is about four times the present density of the sun, might have met with great velocity; and if the distance by which they were originally separated were twice the distance of the earth from the sun, a transverse velocity of 1·4 would, on the collision, ensure the attachment of the two bodies by revolving one around the other, and, finally, by conglomeration. In this case, might not, the lecturer sug-

gested, the comets and other phenomena be but mere splashes from the meeting of two such bodies? Sir W. Thomson does not, however, confine himself to the assumption that there were only two bodies in collision, but as he himself put it, the lowest number is two, the highest, the number of atoms of which the sun's mass is composed. He then showed a few peculiar meteorites, which from their shape and composition supported this theory, showing, as they did, that they had evidently reached the earth in an oblique direction. The lecturer then created some amusement by remarking that he could not conclude with a good conscience without saying he did not know anything at all about the subject, and as a parting word he put forward the following speculation:—Although some of the sun's heat has reached the earth or other bodies, has it all arrived at some goal, or are the heat waves which started away from the sun twenty million years ago still travelling through the luminiferous ether or not? If so, as it is computed that the heat waves travel 186,000 miles per second, how far would they have reached at the present time?

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

A Correction.

Sir,—Please give me the opportunity of stating that in the Sheffield citrate of iron and quinine case alluded to last week in the report of the Chemists' and Druggists' Trade Association, Mr. Allen was right and I wrong. I and two other analysts found, on the average, 15 per cent. of alkaloid in the scales with which the medicine was made. We have since worked with fresh solvent, chloroform, and now only get 11½ per cent.; thus confirming Mr. Allen's result. The chloroform first employed obviously must have contained fixed matter. How it became impure we can never know, for the bottleful was all used before my suspicions were aroused. The mode of manufacture and storage of chloroform would indicate that the entrance of impurity, wherever it occurred, was quite accidental.

John Attfield.

The Proceedings under the Sale of Food and Drugs Act at Sheffield.

Sir,—In the report of the Law and Parliamentary Sub-Committee of the Chemists and Druggists' Trade Association, published on p. 597 of the *Pharmaceutical Journal*, reference is made to proceedings recently commenced in Sheffield against certain pharmacists for infringement of the Sale of Food and Drugs Act.

I may leave Professor Attfield to correct the erroneous impression produced by the reference to the case of improperly dispensing a prescription containing citrate of iron and quinine, but I must beg leave personally to contradict the statement that a summons was issued against a vendor of "·850 spirit of nitre." I send you a copy of my quarterly report as Analyst for the Borough of Sheffield, from which you will see that "out of six samples purchased as 'sweet spirit of nitre,' four were of fair quality, and one of decidedly inferior quality, but not sufficiently bad to justify its positive condemnation. The remaining sample was very deficient in the real nitrous ether, which is the most characteristic constituent of sweet spirit of nitre, containing only one-twenty-fifth of the minimum amount described by the British Pharmacopœia as present in the official 'spirit of nitrous ether.' The sample was in addition very deficient in alcohol, having a specific gravity of ·878, and containing only 67·5 per cent. of real alcohol."

This was the only sample of "sweet spirit of nitre" against the vendor of which a summons was issued. There were, however, two summonses issued against the vendors of samples purchased under the name of "spirit of nitrous ether," which samples had specific gravities of ·851 and ·857 respectively, and evolved in the nitrometer ten and nine measures of nitric oxide gas, instead of the "not much less than twenty-five measures" of the B.P. preparation. Clearly, however, neither of these samples can be that referred to in the report under the description of "·850 spirit of nitre." The report does not distinctly state, but certainly leaves it to be inferred, that the Association was prepared to dispute the propriety of my condemnation of the said sample and defend the vendor. If the Trade Association is to justify the appeal now being made on its behalf to the chemists of Great Britain, it should take care not to promulgate statements so ambiguous as to amount to injurious allegations against those whose duties sometimes bring them reluctantly in conflict with individual members of the trade while continuing to entertain a high respect for the great majority.

Sheffield. Alfred H. Allen.

North of England Pharmaceutical Association Meeting.

Sir,—I should willingly have let my ideas on the question of pharmaceutical education remain quiescent, had it not been that your report of the recent meeting of the North of England Pharmaceutical Association puts my name in print in connection with the subject.

I went to the meeting, hoping to hear a general expression from my fellow tradesmen of their views on the curriculum and Pharmacy Act question, and anticipating that there might be various shades of opinion, as appeared probable from the discussion which took place some time before in the Council of the Association. I had drafted two amendments, with the view of submitting one or other should the tone of the discussion render it desirable. But though the Secretary had told me he had sent out eighty circulars calling the meeting, there were only four establishments represented there. That is, the President and three of his staff, myself and partner, the Secretary and one other member of the trade.

It certainly is very hard upon the President, after providing all the enthusiasm to be found in the Association, and two-thirds of the work from his own place of business, that he should have to provide half the meeting also.

The President was of course bound to submit the resolution of which he had given notice; but as I had not told anyone of my intention, I was not so bound, and thought a motion, if carried by so insignificant a meeting, was scarcely better than lost, so I concluded to refrain.

When appealed to by the Chairman for my views, I said I could support his resolution down to the word "satisfactory,"—"That no scheme for remedying the defects in the present system of examination in pharmacy can be satisfactory."

This was cordially laughed at, but I declined the President's kind offer to have it put to the meeting as an amendment. The original resolution perhaps implies that the course proposed (the curriculum, etc.) would be satisfactory. Inasmuch as there is this implied meaning, I could not support it. Inasmuch as this is not actually stated, I did not feel bound to oppose it. In its somewhat vague construction, I thought it mattered little whether it passed or not, and the bulk of the trade signified the same by their show of absence.

Eighty were called, eight-twelfths of a dozen came, and half gross absent (half gross negligence). Virtually my view had the support of the absent ones; they evidently thought it little matter whether the resolution passed or not. By the way, Mr. Editor, that is rather a happy thought. In future, when the moral support of the trade is required on any point, print the contrary on the circular calling the meeting, and assume that all the absent ones do not support the contrary.

But to return to business. It is very creditable to our Secretary that he can make so presentable a report of so small a meeting. In the absence of a shorthand writer we cannot expect any one's words to be exactly reproduced. He could not know that I had two amendments drafted when I did not tell him, and what he reports is nearly correct. There is just this little difference, that I had the following drafts ready, but did not care to submit them to the meeting where the President and his staff constituted half the company, myself and partner half the remainder, and—I do not mean it in any offensive way when I say that the two other voters were not large and influential bodies.

"1*st Draft.*—That no scheme of improved pharmaceutical education can be satisfactory which does not provide some improved prospect of the educated pharmacist being able to make a living by the practice of pharmacy."

This, I felt, had the same fault as the President's resolution; it is merely negative, so I wrote:—

"2*nd Draft.*—That any scheme of improved pharmaceutical education will be satisfactory which provides an improved prospect of the educated pharmacist being able to make a living by the practice of pharmacy."

I believe if a large body of voters had been present either of these would have been preferred to the original.

I think the only remark I did make worth reporting was that the best effect of the curriculum would be its keeping many men out of the pharmaceutical ranks, and that had it been in force when I was an apprentice I should probably have been excluded from the list of pharmaceutical chemists to this day.

11, *Grey Street, Newcastle.* BARNARD S. PROCTOR.

ARE TRADE STANDARDS FOR MEDICINAL PREPARATIONS DESIRABLE?

Sir,—It is with considerable feelings of regret that I have read the leading article in your issue of the 22nd inst. That the outcome of over eighteen years of pharmaceutical legislation should be "for pharmacists to find themselves forced into an apparent competition with other classes of traders, who supply articles nominally of the same kind as they do, and hold themselves out to the public as the purveyors of drugs and medical preparations," is indeed a let-down from the high pretensions for care of public safety which have hitherto been deemed the special object of the Pharmaceutical Society. I think, however, that in this matter you have based your argument on a wrong foundation. The case of the weak tincture of opium is not a case of outside competition. Of course, none but a chemist could legally supply any preparation of opium, and, therefore, the supposition of outside competition falls to the ground. Has not this fact been overlooked? That the control of the strength of the preparations sold by pharmacists and chemists is in the hands of the Society is clear, whether it is legally clear is another matter; but the 15th section of the Act seems to give the Society power to see that all preparations of the Pharmacopœia are of the proper strength. If tincture of opium is not a pharmacopœia preparation, then the sooner the better either the Pharmacy Act and the Sale of Food and Drugs Act are altered, or else the entire legislation as to pharmacy is rescinded.

You also state that "we do not believe a remedy is to be sought for this evil by legislation or by restrictive regulation of trade of any kind." If that is the case, why consult the public safety by having an Act of Parliament placing the sale of certain poisons in the hands of men who have entered a trade under restrictive regulations?

If restrictive legislation is to be deprecated, then the Pharmacy Act ought to be abolished. Your farther recommendation that pharmacists should conform to the guidance of the B.P., "not out of fear of the law, but from a professional regard," would then be applicable. As to the argument that the general public is the arbiter, and that public appreciation will be given to the advantages obtained from pharmaceutic skill, surely if the public appreciated diluted tinctures they will equally appreciate diluted skill.

Nor can I agree with you that it is not expedient to establish a compulsory standard for all persons.

This has been the intention of all recent regulations and Acts of Parliament, and if the safety of the public is to be consulted at all it should be by securing to it the uniformity of remedial agents.

The decision of the stipendiary is no doubt a great discouragement, but as a case has been cited for discussion in a higher court we hope that it may be reversed. Yet your article, I may venture to say, is a still greater disappointment, and one cannot but be pained to hear from our younger members the very natural exclamation, "Oh! what is the use of studying or passing an examination if this is to be the result!"

I can only hope that if the appeal case results in the stipendiary's ruling being upheld that immediate action will be taken to make the B.P. the standard for all articles bearing the names of its preparations.

4, *High Street, Sheffield.* GEORGE A. CUBLEY.

Sir,—Some of the views contained in your leader of last week's Journal, on the resolutions passed at the recent meeting of the chemists of this town, will not, I venture to think, commend themselves to the sound judgment and approval of the majority of pharmacists—those who are bent upon maintaining the standard and purity of their preparations.

To hold, "It should not be a matter of any importance to them what the oilman, or the grocer, or the stores, might sell under the name of any medicinal preparations, but they should seek to establish such a repute with the public for the quality of their drugs and preparations, as to command custom by reason of the confidence felt that the articles purchased by them could be relied upon, because they were supplied by a pharmacist," is to my mind wholly wide of the mark, and with the former part of the quotation I entirely disagree. It seems to me to be a matter of very grave importance indeed, and one that demands our serious consideration as to whether the grocer or the stores shall be permitted to impose upon the public comparatively inert preparations, such as paregoric minus the opium. It is too serious a question to be allowed to lie dormant and without arousing public interest and public enlightenment. The Council of the local Association was, in my opinion, perfectly justified in calling together its members and passing the strongly worded resolutions they did. By this means the whole affair has been exposed, and the particulars put forcefully and intelligently before the mind of the public. I do not attach much importance to the ruling of the stipendiary, as to whether he was in the right or the wrong in his interpretation of the law—although I believe he was decidedly wrong according to the evidence adduced and the true facts of the cases—but I contend it does matter whether powerful and popular remedies—some even poisonous ones—shall be made up of inert substances in lieu of the more active, such preparations being well known by authentiated and recognized formulæ.

The poorer classes of our towns are not for the most part capable of ascertaining for themselves the uniformity and purity of the many medicinal remedies they require, and it is but an act of simple justice they should be supplied with the article demanded, and more particularly so when such article is acknowledged and known to be a Pharmacopœial preparation. May the day soon dawn when the British Pharmacopœia will contain its well-known synonyms.

Sheffield. WILLIAM WARD.

LIQUOR STRYCHNINÆ, B.P.

Sir,—I read with great interest Mr. E. H. Farr's note on Liq. Strychninæ, B.P., 1885. I made 4 ounces of it during last summer strictly according to the Pharmacopœia, but to my astonishment and alarm, when requiring a small quantity a fortnight since, for dispensing, I found a plentiful crop of crystals had settled to the bottom of the bottle. I could not understand it, as in the case of so powerful a preparation, I was particularly careful in strictly carrying out the B.P. directions.

Foulsham. H. G. MADDISON.

H. W. Green.—Custard Powder.—The following recipe is given by Cooley:—Sago meal, 2 lbs.; powdered turmeric, ½ oz.; bitter almond powder, cassia and mace, of each ½ dr. For preparation of butyric ether, see last week's Journal, p. 604.

A. F. Brookes.—Probably the sales to which you refer were of the nature of wholesale transactions. If not, information respecting the practice should be forwarded to the Registrar, 17, Bloomsbury Square.

H. B. G. Morris.—The report of the Committee on Education and Examination will be found in the Journal for April 15, 1882; the discussion and resolutions thereupon in the Journal for March 10, 1883. Mr. Barclay's paper was published in the Journal for November 27, 1886. Other papers, etc., will be found indexed under "Curriculum."

Pinus.—The oil in excess appears to liberate some of the liquid of the Lin. pot. iod. c. sapone.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Maddison, Eagle, Marshall, Vizer, Wokes, Jones, Farr, Armstrong, Newsholme, Phenol, Reformer, W. Baxter, Jun.

THE POISON OF THE STINGING-NETTLE.

BY ALFRED W. BENNETT, M.A., F.L.S.,
Lecturer on Botany at St. Thomas's Hospital.

Some considerable time ago I called attention in the columns of this Journal to the unsatisfactory state of our knowledge respecting the fluid which gives the pungency to the stings of our common stinging-nettles, *Urtica dioica* and *urens*, and pointed out the difficulties in the way of accepting the ordinary theory that it is due to formic acid. Dr. G. Haberlandt, in a paper on the "Anatomy and Physiology of Stinging-hairs," read before the Academy of Sciences at Vienna, has now given the *coup de grâce* to this hypothesis, showing that formic acid has no such virulent properties in the minute quantities in which alone it could be present in the stinging-glands of the nettle; and that the irritation must be produced by a fixed substance, since the dried contents of the gland will cause the ordinary effects of a nettle-sting if introduced beneath the skin, while formic acid is, of course, volatile. Dr. Haberlandt finds, on the other hand, invariably in the fluid a substance which possesses all the properties of an albuminoid; it is destroyed by boiling water. The substance which produces the irritation is probably, he considers, of the nature of an unformed ferment.

Dr. Haberlandt's experiments seem to me, valuable as they are, rather to open up more widely than to close this interesting subject, and I commend it to the attention of chemists who have the opportunity of investigating it further.

The mechanical contrivances for the ejection of the poison Dr. Haberlandt found to be similar in our wild stinging-nettles and in the tropical species of *Laportea*, *Loasa*, *Blumenbachia*, *Cajophora*, *Jatropha*, and *Wigandia*, in many of which the virulence of the poison is much greater. In all the sting consists of a multicellular base surmounted by a very large secreting cell. Below the silicified apex of the latter the cell-wall is always very thin. While in our stinging-nettles the brittleness of the recurved apex of the sting is occasioned by the deposition of silica, in *Loasa papaverifolia* the same effect is produced by calcium carbonate, and in *Jatropha stimulata* by the lignification of the cell-wall.

NOTE ON AN EARLY TREATISE ON SOME BRANCHES OF PHARMACY.

BY ROBERT MODLEN.

In the town of Zurich was born (A.D. 1516), of poor parents, Conrad Gesner, a man who became eminent as a physician and writer in many branches of science, especially natural history. He was one of the most indefatigable of men, and Hallam speaks of him as probably the most comprehensive scholar of his age. To quote the words of a recent writer, "Gesner wrote on many subjects; yet his fame rests on his almost incredible achievements in natural history, on which he wrote many volumes, illustrated by thousands of figures drawn by his own hand from specimens in his collection, or executed under his own direction by his assistants. His museum of animals, plants, fossils, etc., brought visitors from all parts, and his correspondence was carried on with the learned men of every nation. When we consider that he accomplished all this while obtaining his living as a physician, that he was always of delicate health, and that he died before reaching fifty, his achievements seem truly wonderful. He died in the scene of his many laborious studies, amongst the objects he had spent his life in collecting,—being carried to a couch prepared for him in his museum. He died A.D. 1565."

Among other works, he wrote a treatise on distilling, called the Treasure of Euonymus, published, of course, in Latin. An English translation, by Peter Morwyng, "Felow of Magdaline Colleadge in Oxford," is in the library of the Pharmaceutical Society, and it is of this book that I purpose giving a brief description.

It is a small volume, of four hundred and eight pages, printed in black letter, and published in 1559 by "John Daie, dwelling over Aldersgate beneath St. Martines." This, it will be observed, was six years before the death of Gesner, thus giving a proof of his celebrity. John Day, it may be remarked, was a celebrated printer of that time, he having printed the folio Bible dedicated to Edward VI., in 1549; Ascham's works; Latimer's sermons; Foxe's Martyrs, etc He was also a publisher, and in his address to the Christian Reader he says, speaking of this book, that "consideringe with myselfe" how useful a thing it is to restore the sick and maintain the whole in their health, and how often the efforts of the best physicians are baffled because their medicines are negligently prepared, "I thought it my part by this my travail and expense somewhat to serve herein thy necessity. Wherfor, I have caused this precious treasure to be translated into our usuall and native language, that like as all men are subject to sickness, so in likewise all men may by this occasion learne the way unto helth."

After this address follows the author's preface, in which he traces the history of distillation from the earliest times, and says that "the Art of Destillation—hath invented many profitable things for man's life, and in Phisicke also certain mervelous thinges, and praiseworthy, if a man prepare them righte and diligentlye. For the lacke of knowledge, covetousness, or negligence of Phisitians and common Apothecaries is the cause why many such preparations are set little by."

Gesner defines distillation as the "drawynge forthe of a thinner and purer humor out of a juice by the force of heate," and gives a description of different kinds. He is particular as to the "bignes" of the furnace, and the quality of the fuel, whether it be green or dry. He seems to have had an idea of fractional distillation, for in speakIng of distilling wines, he says "the foure elementes ascend up in their order; the lightest, subtilst and hoatest first, that is, the fire; secondarily the aire; thirdly water; the earthe remaineth in the bottom."

Frequent traces of astrological influence are observable, as for instance, herbs and flowers ought to be gathered "whyle the mone encreasith."

The book is illustrated by diagrams of the different vessels used in distilling, and plants in common use at the time. These engravings are very fairly executed. Descriptions of many essences are given, with their properties and uses. Among others the celebrated Aurum Potabile is fully described. The following account of chicory water may be taken as a fair specimen:—"Intybum, endive: the water coleth all hotte diseases; and all burnynge of fyre, or water hoote, it healeth them if they be wash therewith. It is good also for quotidian agewes, and obstructions of the bowels, both druncke and mynistred outwarde."

A very interesting circumstance is that Gesner mentions koumiss. "The liquor of milke distilled, the chymistes and destyllers do use. It is a wonder that men say, amongst the Tartareans, water distilled of milke doth make men dronke. The milke must therefor be somewhat thicker, and tary somewhat long upon the fyre. Whiche thing peradventure chaunceth in meare's milke."

A recipe for "Aqua Vitæ against the Pestilence" contains, among a great variety of other things, pearls, jacinths, coral, unicorn's horn, etc.

As might be expected Gesner quotes largely from Raymond Sully, Albertus Magnus, "Giber a chymist," and other old writers.

Such is a short account of this interesting old book, which has evidently been in its time a reference book in some laboratory, bearing as it does some few stains, and having MS. notes and underlined passages. It is to be regretted that this copy is not in the original binding.

Gillingham, Chatham.

NOTE ON "INSECT POWDER."*

The Dalmatian insect powder, *Chrysanthemum cinerariæfolium*, B. et H., known also by its Dalmatian name *buhach*, has been cultivated for several years past on a large scale in certain portions of California, the cultivators being Dalmatians who have settled there.

The best soil for this plant is loam with a large proportion of sand. This kind of soil is particularly suitable for sowing, but it should be well mixed with old dung. The seed itself is mixed with sand and distributed over the soil as uniformly as possible, after which the soil is raked to the depth of about half an inch, and then gently pressed by passing a roller over it. Until the plants spring up, the beds must be irrigated every evening, unless it rains. But great care must be taken not to overdo it, as the plant is very sensitive, throughout its whole life, towards undue moisture of the soil. After the plants have sprung up, they need not be watered more than twice a week. Weeds must be kept away until transplantation takes place, which occurs when the plant is about six inches high. It is then set out precisely like cabbage, about twenty inches distant from every neighbour, and afterwards needs no further attendance.

Buhach is a biennial [?] plant, therefore it flowers in the year subsequent to that of sowing. The flowers must be cut off just when they are about to open, as they contain the largest amount of essential oil in this condition. The cut flowers must be carefully guarded against dampness, and must be dried in the shade, never by exposure to the sun or to artificial heat. After the period of flowering is over, the plants are cut off four inches over the ground, reduced to powder, and this powder mixed with that of the flowers, in a proportion not exceeding 1 part of the former to 2 parts of the latter. [This is the statement made by the author of the work from which we quote. It is made in such a manner that it appears to be the regular process followed, there being no intention at all to utilize the flowers alone.] The finer the mixed powder of herb and flowers is, the more effective will it prove to be. If any one wishes to prepare the powder himself, and does not possess a suitable mill, he may use a mortar covered with leather. The quantity thus worked in a mortar should, however, not exceed about one pound, to avoid heating the powder. When the substance appears to be comminuted, it is transferred to a fine hair-sieve, and the refuse remaining on it put back in the mortar. It is very difficult to reduce the stems to powder in this manner, which—as the author naively but truly states—is not a serious disadvantage, as the flowers are the most valuable portion of the plant. Insect powder should be preserved in glass or metallic vessels, which should be closed air-tight.

Insect powder may be used either in form of dry powder, or by fumigation, or in form of alcoholic extract, or mixed with water, or in form of infusion.

The work from which we quote advises to make the first-mentioned method of using insect powder cheaper by mixing it with flour, saw-dust or wood-ashes, which do not interfere with the insecticidal powers. [Of course, this may be done by the user of the powder, provided the dilution is not carried too far.] The mixture ought to be made at least twenty-four hours before it is to be used, and should meanwhile be kept in air-tight vessels. Experiments have been made which show that such mixtures acquire greater efficiency by keeping. It was found, for instance, that a mixture of one part of insect powder and 11 parts of flour, applied, immediately after being mixed, to certain caterpillars, was just sufficiently strong to kill them. But the same effect was produced by applying to them a mixture of 1 part of insect powder and 22 parts of flour which had been mixed twenty-four hours before. [The explanation of this may be that the volatile oil of the flowers probably becomes more thoroughly diffused through the mixture in the course of time.—*Ed. Am. Dr.*]

The employment of insect powder by way of fumigation is exceedingly effective, particularly in closed rooms, where the dense smoke produced by it, which is not at all disagreeable to human beings, soon kills all insects, particularly those having tender or soft bodies. This method is especially valuable for the purpose of killing mosquitoes in rooms. All that is necessary is to place a burning coal in a spoon or other receptacle, and to sprinkle insect powder upon it. In larger rooms, the spoon may be carried about, or several may be thus used in order to distribute the fumes properly. After a few minutes, every mosquito will be found dead; and, if the fumigation be kept up for about half an hour, the same fate will have overtaken also—according to the author—any fleas that might have been present. [He says nothing of bed-bugs, but it is certainly worth while to try the above method for getting rid of this troublesome pest, which is spreading gradually into houses of opulence and comfort, where such disgusting visitors had been previously unheard of.—*Ed. Am. Dr.*]

The third method of employment in form of alcoholic extract is the most advantageous for use in the fields and garden.

The principal drawback connected with the use of insect powder is this, that its effect, when applied in substance, is only certain when it comes in actual contact with soft-bodied insects. In the case of hard-bodied or haired insects it often produces only stupefaction for a time. This drawback is to a great extent removed by employing the alcoholic liquid extract, which may be prepared by percolation, or, according to the author, by macerating one pound of insect powder for four or five days with two pints of alcohol in a warm place, then separating the alcohol and adding 1 pint of glycerin. This liquid extract is to be diluted with water before use. For hard-bodied insects it may be diluted with 20 parts, for more sensitive insects with 30 to 40 parts of water. If it is to be used out of doors, it is self-evident that it should not be applied while rain is threatening, nor during the hot part of the day. The best time is early in the morning while the dew is still on the ground or during cloudy days.

If a decoction of insect powder is desired, this may be readily made by pouring boiling water upon it and macerating in a covered vessel until cold.

In many cases a simple mixture of insect powder and water will be found quite effective. A good proportion is, according to the author, one-half ounce to two gallons. [This seems to be altogether too weak.]

The decoction, however, is much more effective. It must be used as soon after preparation as possible, and at a time when its effect will not be interfered with by the condition of the atmosphere.

It should be stated that the majority of insects do not die immediately after having come in contact with insect powder or one of its preparations. They are at first only stupefied, but death usually ensues after a few hours, and in some cases not until after several days.

* Abstract of a chapter on the subject in 'Die Tropische Agrikultur. Ein Handbuch für Pflanzer und Kaufleute.' Von Heinrich Semler in San Francisco. 8vo. Wismar, 1886, vol. i., pp. 207. Reprinted from the *American Druggist*, January.

The Pharmaceutical Journal.

SATURDAY, FEBRUARY 5, 1887.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE REGISTERS AND THE REGISTRAR'S REPORTS.

THE Reports on the Registers of Pharmaceutical Chemists and Chemists and Druggists and on the Numerical Strength of the Pharmaceutical Society, presented by the Registrar and Secretary to the Council at its meeting on Wednesday last, afford the usual annual opportunity of referring to the conditions under which pharmacy is practised in Great Britain, so far as these are disclosed by official statistics. In the first place it is noteworthy that the Register of Chemists and Druggists for 1887 contains 120 names less than that for the previous year, the number being 13,447, of which 2198 are those of persons who are also pharmaceutical chemists, against 13,567. This difference does not, however, represent correctly the balance for the last year, since the decrease is largely due to the steps taken recently to free the Register from two years' accumulations of entries that had become incorrect through deaths or removals, which led to the erasure of no less than 298 names. A more correct idea as to the strength of the Register relatively to former years is obtainable by making the comparison with the report presented in February, 1885, immediately after a similar expurgation, when the total number of entries on the general Register of Chemists and Druggists was 13,400, so that in two years the number of qualified chemists and druggists in Great Britain has increased by 47. The increase has not, however, extended to both classes included in that register, since there were 37 fewer pharmaceutical chemists at the commencement of the present year than at the beginning of 1885, the number being 2198 against 2235. This regrettable decrease is of course due to the inadequacy of the number of persons passing the Major examination to compensate for the losses from this class through deaths of both examined men and those who became pharmaceutical chemists without examination before 1852. So far as concerns the entries of examined pharmaceutical chemists, which now number 1621, or nearly three-fourths of the whole class, these show a steady increase, there being now 51 more than two years ago. But the extent to which the returns are affected by erasures of *ante* 1852 entries, of which there are still 577 on the Register of Pharmaceutical Chemists, is indicated by the fact that in the last two years these erasures have numbered 88, or within 6 of the total number of Major passes during the same time.

Of course the increase in the proportion of examined pharmaceutical chemists, just referred to, is more than equalled by the increase in the number of entries on the general Register of Chemists and Druggists of persons possessing the Minor qualification, the total of which now reaches 5675. Considerable as this number is, it may surprise many to observe that it still falls far short of the total of entries of unexamined persons who were registered in virtue of having been in business before the passing of the Pharmacy Act, 1868. On the other hand, some will hardly be prepared to see that two out of every seven persons who possess the Minor qualification have also passed the Major examination. The figures are given in the following table :—

	January 1, 1886.		January 1, 1887.	
	Number.	Per cent. of entire Register.	Number.	Per cent. of entire Register.
Pharmaceutical Chemists :—				
Examined . .	1581 } 2219	11·65 } 16·35	1621 } 2198	12·05 } 16·34
Non-examined	638 }	4·70 }	577 }	4·29 }
Chemists and Druggists who have passed the Minor only . .	3980	29·33	4054	30·14
Remainder, including those who have passed the Modified . .	7368	54·32	7195	53·52
Total	13,567	100·00	13,447	100·00

Turning now to the report on the numerical strength of the Pharmaceutical Society, it will be seen that there has been a decrease in the number of Members. This is the case not only with "Chemist and Druggist Members," the decrease of which is inevitable, and must continue, until this class becomes extinct; but it is also true of "Pharmaceutical Chemist Members." The latter decrease, amounting to 51, is no doubt regrettable, but it is attributable principally to the cause before referred to as accounting for a decrease in the entries on the Register of Pharmaceutical Chemists, namely, that the number of persons passing the Major examination is not equal to the death rate among the examined and non-examined of that class combined. In fact, the position is here intensified, since every erasure of the name of a person not possessing the Major qualification from the Register of Pharmaceutical Chemists must represent the loss of a member of the Society. With respect, however, to the important class of Associates in Business the returns are more satisfactory. Here there has again been an increase, the number being 1281 against 1261. The Associates not in Business have also increased from 887 to 899. On the other

hand the number of Apprentices has fallen from 1220 to 1194. The exact numerical relation of the Pharmaceutical Society to the body of chemists and druggists is shown in the following table:—

	January 1, 1886.		January 1, 1887.	
	No.	Per cent of whole.	No.	Per cent of whole.
Pharmaceutical Chemists, Members of the Society .	1809	82·52	1758	80·00
Other Registered Chemists and Druggists connected with the Pharmaceutical Society	2874	—	2874	—
Total of Pharmaceutical Chemists and Druggists connected with the Society . . .	4683	34·52	4632	34·52
Registered Apprentices subscribing to the Society .	1220	--	1194	—

Although the aspirations of those who wish to see the Pharmaceutical Society become numerically more representative of the entire body of chemists and druggists will hardly be satisfied with the stationary position revealed in the curious identity of the figures representing the percentage relation with those of last year, we think it is fair subject for congratulation that the Society has in this respect maintained its position through a period that has proved at least embarrassing to more than one other voluntary association.

The report of the Council proceedings in the present number will furnish gratifying information to many of our readers who have taken an active part in the endeavour to stimulate progress towards the establishment of a better system of pharmaceutical education. The Bill that has been drawn up with that special object by the Law and Parliamentary Committee has now been unanimously adopted by the Council, and the Committee has been instructed to take the necessary steps for its introduction into Parliament. These steps mark an important epoch in the history of the Society, and we cannot doubt that they will commend themselves to the sound judgment and approval of the majority of pharmacists in this country as having been instigated by a thorough appreciation of the necessities of the case, and by an earnest desire to improve the position and prospects of those who engage in the pursuit of pharmacy.

* * *

We take this opportunity of reminding members of the Society that the evening meeting will take place on Wednesday next, the 9th inst., and that the chair will be taken at eight o'clock precisely. The official notice (which appears in the advertisement columns of the present number) states that some important donations to the Museum, recently received from the Colonial Commissioners, will then be exhibited and described by the Curator. The paper to be read on this occasion will deal with the subject of the tests of quinine sulphate, to which much attention has been directed lately; also, notes on the determination of caffeine, and on cocaine hydrochlorate.

* * *

We are glad to notice that the re-organization of the Scottish Branch of the Pharmaceutical Society is about to be followed up by the resumption of the evening meetings in Edinburgh, and that the first meeting for the Session is announced to take place on the 16th inst., at the Society's House in York Place, when a paper will be read by Mr. Dott on "The Evidence for the Existence of Acid Morphine Meconate." We congratulate our Scottish friends on this renewal of their activity in the promotion of pharmaceutical interests.

* * *

Sir John Lubbock has lost no time in introducing into the House of Commons his "Bill to provide for the earlier closing of Shops, and to make further provision with respect to trading on Sunday." It provides that, subject to the provisions of any order made by a local authority in accordance with the Act, all shops except those mentioned in the schedule—licensed victuallers', refreshment houses, tobacconists' shops and news agencies—shall be closed not later than ten o'clock in the evening on Saturday, or one other day in the week appointed in lieu of Saturday by the local authority, and not later than eight o'clock in the evening on every other day of the week. An exception is made in respect to the evening before public and bank holidays. But the order of the local authority referred to, based upon an application signed by two-thirds of the shopkeepers, may authorize an extension of the time, or, on the other hand, may order shops not scheduled to be closed not earlier than two o'clock on one day of each week. There is a saving clause for pharmaceutical chemists and chemists and druggists, providing that they shall not be liable to any fine under the Act for supplying medicines, drugs, or medical appliances after the hour appointed; but the provision is not to be deemed to authorize a pharmaceutical chemist or chemist and druggist to keep open shop after the specified hour.

* * *

In reference to the objection raised by Mr. Allen (before, p. 623) to the statement in the report of the Law Committee of the Chemists and Druggists' Trade Association (before, p. 597) that a summons, issued and afterwards withdrawn by the Sheffield local authorities, applied to "850 spirit of nitre," Mr. Haydon writes to say that this description of the article in question was based upon the representation of the vendor and of Professor Attfield, who certified that its specific gravity was ·849.

* * *

Mr. Haydon informs us that his personal canvas of the London wholesale trade on behalf of the Chemists and Druggists' Trade Association has resulted in the subscription of fifty-five guineas, which, in addition to other contributions, brings the amount collected up to £299 15*s*. This shows a fair appreciation of his energy in some quarters, upon which we congratulate him; but the future hopes of the Association will, nevertheless, depend more upon the extent to which half-crowns are sent in by those members of the trade which the Association seeks to represent.

* * *

We regret to record the sudden death of Mrs. Anne Horncastle, who in December last was elected an Annuitant on the Benevolent Fund.

* * *

On Monday next, the 7th inst, a meeting of the London Section of the Society of Chemical Industry will be held in the Chemical Society's Rooms.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, February 2, 1887.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT.

MR. THOMAS PRESTON GOSTLING, VICE-PRESIDENT.

Messrs. Allen, Atkins, Baildon, Borland, Bottle, Butt, Cross, Greenish, Hampson, Hills, Radley, Richardson, Robbins, Savage, Schacht, Southall, Symes, Williams and Woolley.

The minutes of the previous meeting were read and confirmed.

Members of the Council who Retire.

The lot having been taken in the usual manner to determine the seven members of the Council who should retire in May next, the following names were drawn:—

Baildon.	Savage.	Symes.
Borland.	Southall.	Williams.
Cross.		

The following who remained in by lot last year now retire by rotation:—

Atkins.	Hampson.	Richardson.
Butt.	Hills.	Robbins.
Carteighe.		

The following seven remain in office another year:—

Allen.	Greenish.	Schacht.
Bottle.	Radley.	Woolley.
Gostling.		

Diploma.

David Robb, being duly registered as a pharmaceutical chemist, was granted a diploma stamped with the seal of the Society.

Elections.

MEMBERS.

Pharmaceutical Chemists.

The following, having passed the Major examination and tendered their subscriptions for the current year, were elected "Members" of the Society:—

Dickson, James Currie ... .London.
Fleetcroft, John Frederick.....Chester.
Johnston, William ....London.
Pinder, Robert.....London.
Reade, Leonard James .....Wolverhampton.
Smith, John Henry .....Leamington.
Turney, John Davy.....Plymouth.

ASSOCIATES IN BUSINESS.

The following, having passed their respective examinations, being in business on their own account, and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society:—

Minor.

Arthur, John .....Great Yarmouth.
Black, Thomas.....Hoyland Nether.
Fitton, George Webster .....Hertford.
Fitton, Robert .....Huddersfield.
Green, Edmund Clement F. ...Frome.
McDerment, James.....Ayr.
Oldfield, Manton.....Erith.
Preece, Charles Godwin .....Bildeston.
Shallcross, Joseph Richard.....Hadleigh.
Smith, Norman Sellers .....Colyton.
Tocher, James Fowler.....Peterhead.
Weller, James Mills.....Long Stratton.
Willcocks, Arthur Squire .....Datchet.
Williams, Alfred Griffiths .....Newport (Mon.).

Modified.

Wilson, Franklin.....Hull.

ASSOCIATES.

The following having passed the Minor examination and tendered (or paid as Apprentices or Students) their subscriptions for the current year, were elected "Associates" of the Society:—

Ashton, George .....Buxton.
Brown, Charles.....London.
Butterfield, Frederick Victor ...Thirsk.
Cooper, Edwin .....Lincoln.
Garnett, James.....Kendal.
Grierson, George Arthur.....Edinburgh.
Johnson, Leonard .....Aiskew.
Melvin, George.....Aberdeen.
Troughton, Reginald .....Edinburgh.
Webber, James Wilkey .....Taunton.
Want, William Phillip .....Lee.

APPRENTICES OR STUDENTS.

The following, having passed the Preliminary examination, and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Antcliffe, Herbert .....Sheffield.
Back, Charles Thomas .....London.
Bartlett, Percy John .....London.
Brown, Walter Sims .....Caistor.
Cammack, Jno. Francis Jeffrey.London.
Cannell, Annie Elizabeth .....Wolverhampton.
Carré, Arthur Bishop .....Guernsey.
Carruthers, Ernest Murray.....Cambridge.
Chalmers, Franklin.....Devizes.
Chambers, John Wm. Parsons..Derby.
Chudleigh, Thomas Morcom ...Liskeard.
Clayton, Walter F. .....London.
Cocker, Harris .....Earlsheaton.
Colman, William .....Manchester.
Cooper, John Henry .....Loughborough.
Davidson, James .....Gateshead.
Davison, Daniel .....Cromer.
Dean, John Thomas.....Haslingden.
Douglas, William.....Dalry.
Ellis, David ....Ellesmere.
Eynon, Charles James.....Leamington.
Fardon, Arthur Edwin ..... Bristol.
Fieldsend, Arthur .....Penistone.
Garnett, Henry..... .....Evesham.
Goodman, Josiah .....London.
Guttridge, Gladstone .....Nottingham.
Hancock, Fred .....Oldham.
Harburn, John English .....Whitby.
Harris, Frank Anderson .....Worksop.
Hulme, Thomas ....Manchester.
Hurlston, Alfred Frederick ...Coventry.
Hutchinson, Alfred .....Nottingham.
Jewell, Alfred Furniss.....Grantham.
Jones, Charles Edward .....Liverpool.
Jones, Hugh Kyffin.....Mochdre.
Jowett, Hooper Albert D. .....Lancaster.
Kent, William Hy. Plaisted ...East Molesey.
Kneale, James Coole .....Douglas.
Langford, Frederick Charles ...London.
Lewis, Richard George .....Carmarthen.
Lloyd, William Morgan .....Maldon.
Loveluck, Griffith David.....Taibach.
Mackenzie, Stewart Murdoch...Musselburgh.
Martin, John .....St. Stythians.
Merson, George .....Fraserburgh.
Milbank, Sydney Thomas .....Bishop Stortford.
Mitchell, Walter Stuart .....Gloucester.
Olds, George ....Farnboro' Station.
Parry, Thomas .....Sandgate.
Pattinson, Hedley.....Haltwhistle.
Pattinson, William .....Hexham.
Playfoot, Frederic Hubert.....Leamington.
Ponsford, Alfred .....Newton Abbot.
Pritchard, Elias Roberts..... Aberdaron.

Roe, Edwin John.....Nottingham.
Sagar, Robert Thompson .....Halifax.
Sapwell, Cecil Guy Columba ...London.
Scott, Thomas Lamb .....Hetton-le-Hole.
Seedhouse, William .....Cambridge.
Smith, Frederick .....London.
Spence, Alexander .....Linlithgow.
Taylor, Frederick Kaye .....Bradford.
Taylor, Thomas Morley .. ..Bath.
Thomas, Dan .....Hafod.
Upson, Arthur ....Southampton.
Whiteley, George.....York.
Winn, William Wilford .....Great Ayton.
Woodland, William..... .....Selhurst.

Several persons were restored to their former status in the Society upon payment of the current year's subscription and a fine.

The Registrar's Report.

The Registrar's annual report, showing the numerical strength of the Society, the statistics of the examinations, and the state of the Registers, was laid on the table. It was ordered to be entered on the minutes and published. It is printed at pages 632 and 633.

Reports of Committees.

FINANCE.

The report of this Committee was received and adopted on the motion of the President, and various accounts were ordered to be paid.

BENEVOLENT FUND.

The report of this Committee included a recommendation of the following grants :—

£5 to the widow (aged 50) of a registered chemist and druggist. Applicant has had one previous grant of like amount. (Wiltshire.)

£5 to a registered chemist and druggist (aged 55) who has a wife and two daughters dependent on him, and is unable to get employment. Has had six previous grants. (Somerset.)

£15 to the widow (aged 68) of a registered chemist and druggist, an unsuccessful candidate at the late election. (Lancashire.)

Two cases had been deferred for further inquiries, and one had not been entertained.

It was recommended that in the future successful applicants for aid should be informed of the amount and conditions of the grant.

The Vice-President, in moving the adoption of the report, remarked on the few applications for relief which had come forward during the past month, which he hoped showed a better state of things amongst their friends.

The Council went into committee to discuss the last paragraph of the report, the result of which was that the paragraph in question was struck out, the matter being left in the discretion of the Committee.

With this alteration the report and recommendations were unanimously adopted.

LIBRARY, MUSEUM, LABORATORY AND HOUSE COMMITTEE.

Library.

The report of the Librarian had been received, including the following particulars :—

Attendance.		Total.	Highest.	Lowest.	Average.
December .	Day . . .	293	24	1	12
	Evening .	136	18	2	8
Year 1886 .	**Day . . .**	**4724**	**39**	**1**	**16**
	Evening . .	**1649**	**18**	**0**	**8**

Circulation of books.	Town.	Country.	Total.	Carriage paid.
December . .	108	112	220	£1 10 8
Year 1886 . .	**1277**	**1507**	**2784**	**20 15 9**

The undermentioned donation to the Library in London had been received, and the Committee recommended that the usual letter of thanks be sent to the donor :—

Helmsing (L.), Ueber den Nachweis des Cocaïns im Thierkörper, 1886. From Professor Dragendorff.

The Committee recommended the purchase of the undermentioned works :—

For the Library in London—

Medical Press and Circular.
Fox, Sanitary Examinations of Water, Air, and Food, 2nd ed., 1886.
Tuson, Veterinary Pharmacopœia, 4th ed., 1886.
Faraday, Chemical History of a Candle, new ed. 1886.
Taylor, Sagacity and Morality of Plants, 1884.
Strasburger, Handbook of Practical Botany, 1887.
Hehn, Wanderings of Plants and Animals, 1885.
Friend, Flowers and Flower-lore, 2nd ed., 1884.
Stillé and Maisch, National Dispensatory, 4th ed., 1886.
Schmiedeberg, Elements of Pharmacology.
Vierteljahresschrift über die Fortschritte auf dem Gebiete der Chemie der Nahrungs- und Genussmittel.

For the Library in Edinburgh—

Dittmar, Analytical Chemistry.
Lubbock, Flowers, Fruits and Leaves.

Museum.

The Curator's report had been received, and included the following particulars :—

Attendance during December.	Total.	Highest.	Lowest.	Average.
Morning .	260	26	2	11
Evening .	67	14	1	3

The following donations had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors :—

Specimen of Spurious Opium.
From Messrs. Battley and Watts.

Specimens of Bergamot Oranges.
From Sir J. B. Lawes.

Specimen of Pure Crystallized Aconitine.
From Messrs. Hopkin and Williams.

Specimens of the Root of *Lachnanthes tinctoria* and of "Khatai" root.
From Messrs. T. Christy and Co.

Specimen of Strophanthus Pods.
From Mr. J. W. Moir.

Specimen of Dagga.
From Messrs. Burroughs and Welcome.

Specimen of Aloes Wood and of the Wood of *Erythroxylon monogynum*.
From Surgeon-General G. Bidie, Madras.

Herbarium specimen of the Japanese Menthol Plant.
From Messrs. Cocking and Co., Japan.

The following donations to the Society's Museum in Edinburgh, had been reported by Mr. J. Rutherford Hill, Assistant Secretary :—

Specimen of Calcite in fine crystals.
From Mr. J. Sharp, Edinburgh.

Specimen of Antifebrin.
From Messrs. Symington and Fraser, Edinburgh.

Specimens of Aluminium Aceto-tartrate; Aluminium Aceto-glycerinite; Ammonium Sulpho-icthyolate.
From Mr. James Jack, Cork.

An application for a grant of specimens of medicinal plants and of specimens of materia medica had been received from the Secretary of the Oldham Chemists' Assistants and Apprentices' Association, and the Curator had been directed to supply the specimens required, as far as possible, from the duplicates in the Museum Department. Letters of thanks had been received from the Principal of Owens College, Manchester, for duplicate specimens of British Guiana drugs, and from the Secretary of the Torquay Chemists' Assistants' Association, for the loan of a series

of specimens illustrating the official cinchona barks, and the methods of collecting it.

The Professors had attended, and reported on their respective classes.

The report of Mr. J. R. Hill, Assistant Secretary in Scotland, on the various departments under his care during the past year, had been submitted to the Committee, and was considered very satisfactory. It was recommended that the Museum in Edinburgh be supplied with a complete set of official chemical substances.

The PRESIDENT, in moving the adoption of the report, remarked on the very satisfactory nature of the report sent by Mr. Hill with regard to the Museum and other property of the Society in Scotland. The resources which the Society had placed at the disposal of members in the North, in giving them a new house, with room for a good library and ample specimens, had been highly appreciated, as shown by the very large attendance of students and members.

The motion was unanimously agreed to.

GENERAL PURPOSES.

The report of this Committee included the usual letter from the Solicitor, stating the progress of cases which had been placed in his hands.

James Furniss, 80, South Street, Park, Sheffield, had paid into Court two penalties sued for, and costs.

Israel Nuttall, Horwich, near Bolton, had paid into Court a penalty and costs, for illegally using the title chemist and druggist.

T. Hudspith, 7, High Street, Langley Moor, near Durham, had been ordered to pay two penalties and costs on the higher scale.

The Committee had further considered a case which had previously been before it, and recommended that proceedings be taken. In another case further consideration had been deferred.

The Council went into committee to consider the report. On resuming, the report and recommendations were adopted.

LAW AND PARLIAMENTARY.

This Committee had approved with one verbal alteration a draft Bill, as drawn by the Solicitor with the assistance of the President, and now submitted it to the Council for adoption in the following form:—

A Bill intituled a Bill to Amend "The Pharmacy Act, 1852," *and "The Pharmacy Act,* 1868."

Whereas it is expedient to further secure that persons known as chemists and druggists should possess a competent practical knowledge of their business:

Be it enacted by the Queen's Most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal and Commons in this present Parliament assembled, and by authority of the same as follows:

1. The powers of the Act, passed in the fifteenth and sixteenth years of the reign of Her present Majesty, intituled, an "Act for Regulating the Qualification of Pharmaceutical Chemists," and of "The Pharmacy Act, 1868," with respect to examinations required for obtaining certificates of qualification under the said Acts, or either of them, shall be extended so as to provide for the division of the said examinations into Preliminary and other parts of the same; also for periods of time and study between any of the said parts; also that persons presenting themselves for a final part of an examination shall have deposited with the Registrar under the said Acts certificates of their having duly attended courses of instruction in chemistry, botany, and materia medica, and having for not less than three years in the whole served in the capacity of apprentices or pupils in the open shops of chemists and druggists.

2. It shall be lawful for the Pharmaceutical Society of Great Britain from time to time, by bye-laws duly confirmed, to regulate the said division of examinations and also the said periods of time and study between any of the said parts, also to allow and provide for and to regulate the reception of certificates issued by other examining bodies in lieu of or so as to satisfy the examiners in lieu of the preliminary part of any examination, also to prescribe the courses of instruction in chemistry, botany and materia medica to be duly attended as aforesaid, also forms of certificates to be for any purpose of this Act deposited with the said Registrar, and also notices to be given and fees to be paid by persons intending to present themselves for examination or any part of an examination, or desiring any registration under the said Acts or either of them, and it shall at all times be lawful for the Council of the said Society by resolution, on being satisfied by a certificate of a Committee of the same Council that any person therein named has acquired, whether in England or Scotland, or elsewhere, competent practical skill and knowledge in and of the business of a chemist and druggist, to waive and dispense with the whole or any part of the said term of three years or any period of time aforesaid, and any evidence of having attended any such courses of instruction as aforesaid in relation to the person therein named.

3. This Act shall not extend to Ireland.

4. This Act shall come into operation on the first day of January, one thousand eight hundred and eighty and may be cited for all purposes as "The Pharmacy Acts Amendment Acts, 1887."

The PRESIDENT moved the adoption of the report.

Mr. WILLIAMS asked if the acceptance of the report would involve proceedings in Parliament.

The PRESIDENT said that would form the substance of a subsequent resolution, but of course, if this resolution were adopted, the other would follow. The Committee had carried out the duty imposed upon it by the Council, of drafting a Bill which would enable the Society by bye-laws to frame certain schemes of compulsory education before examination. It must be understood that this Bill was not in itself a scheme, and did not commit the Council to any particular scheme. It simply asked Parliament to give the Council power to make bye-laws, which would afterwards have to be framed for the purpose. In that case, not only must the Council go through certain formalities, but the proposed Bye-laws must be approved by the members, and afterwards confirmed by the Privy Council. Some persons were, he believed, under a little misapprehension as to that. When application was made twelve months ago for confirmation of the Bye-laws to the Privy Council, the reply was that the powers of the Act of 1868 were not wide enough, and the Council had decided by a resolution passed in November last that it was desirable to seek for these powers. That resolution limited the scope of the work, and the Committee was instructed to draft a Bill on educational lines, and not to introduce matter which might be the subject of contention. It was not necessary to adduce any arguments on the merits of the Bill beyond calling attention to the fact that it was an enabling Bill, not a scheme which would come into operation without a number of other processes to which the consent of the Society, as well as the members of a future Council, would have to be obtained.

Mr. SCHACHT seconded the motion.

Mr. RADLEY said he saw it was proposed to give power to waive the period of three years' pupilage; he supposed that had been well considered.

The PRESIDENT said, Yes. In the case of all bodies to whom wide powers were given with regard to examinations and education it was customary to have some means of dealing with exceptional cases; for instance, in the case of the Incorporated Law Society all the conditions under which an articled clerk entered the law were laid down in an Act of Parliament, the term of pupilage, the certificates of examining bodies which were accepted in lieu of a certain period of service, and so on; but there was power placed in the hands of the judge to waive all those conditions if he thought fit. It had been thought desirable in this case

REGISTRAR'S REPORT.

MEMBERS, ASSOCIATES, AND APPRENTICES OF THE SOCIETY FOR THE YEAR 1886.

	Life Members.		Subscribing Members.		Associates in Business.	Associates not in Business.	Apprentices.
	Pharmaceutical Chemists.	Chemists & Druggists.	Pharmaceutical Chemists.	Chemists & Druggists.			
Number in 1885	225	2	1584	724	1261	...	...
,, restored, 1886 ...	...	...	2	2	5	...	...
,, elected, 1886 ...	...	...	44	6	121	...	...
	225	2	1630	732	1387	...	...
Deaths, Secessions, etc. ...	9	...	88	40	106	...	...
Total Strength of the Society	**216**	**2**	**1542**	**692**	**1281**	**899**	**1194**
Summary:—							
1885	225	2	1584	724	1261	887	1220
1886	216	2	1542	692	1281	899	1194
Increase	...	...	...	...	20	12	...
Decrease	9	...	42	32	...	...	26

COMPARATIVE STATEMENT OF THE NUMERICAL STRENGTH OF THE SOCIETY FOR 5 YEARS: 1882-86.

MEMBERS.—PHARMACEUTICAL CHEMISTS.

	1882	1883	1884	1885	1886
Restored to Membership ...	8	10	4	8	2
Elected ,, ...	35	50	52	50*	44
(Total additions) ...	43	60	56	58	46
Deaths, Secessions, etc. ...	92	74	71	91	88
Decrease ...	49	14	15	33	42
Total Number of Subscribing Members	**1646**	**1632**	**1617***	**1584**	**1542**

MEMBERS.—CHEMISTS AND DRUGGISTS.

	1882	1883	1884	1885	1886
Restored to Membership ...	3	2	6	6	2
Elected ,, ...	15	14	16	8	6
(Total additions) ...	18	16	22	14	8
Deaths, Secessions, etc. ...	27	33	43	29	40
Decrease ...	9	17	21	15	32
Total Number of Subscribing Members	**777**	**760**	**739**	**724**	**694**

ASSOCIATES IN BUSINESS.

	1882	1883	1884	1885	1886
Restored	4	5	3	8	5
Elected	115	138	114	113	121
(Total additions) ...	119	143	117	121	126
Deaths, Secessions, etc. ...	81	72	61	94	106
Increase ...	38	71	56	27	20
Total Number of Associates in Business	**1107**	**1178**	**1234***	**1261**	**1281**

ASSOCIATES NOT IN BUSINESS.

	1882	1883	1884	1885	1886
Increase ...	7	3	7	53	12
Decrease ...	...	...	...	...	...
Total Number of Associates not in Business	**824**	**827**	**834**	**887**	**899**

APPRENTICES OR STUDENTS.

	1882	1883	1884	1885	1886
Increase ...	...	61	58	64	...
Decrease ...	9	...	...	...	26
Total Number of Apprentices or Students	**1037**	**1098**	**1156**	**1220**	**1194**

LIFE MEMBERS.

	1882.	1883.	1884.	1885.	1886.
Pharmaceutical Chemists	**236**	**229**	**228**	**225**	**216**
Increase	...	...	...	...	...
Decrease	2	7	1	3	9
Chemists and Druggists	**2**	**2**	**2**	**2**	**2**

* 1 who paid in 1884 as an Associate in Business, afterwards passed the Major, and was elected a Member in the same year.

ANALYSIS OF EXAMINATIONS FOR THE YEAR 1886.

FIRST OR PRELIMINARY EXAMINATION.

Number of Candidates during the Year.	Number of Successful Candidates during the Year.	Number of Rejections during the Year.	Number of Examinations during the Year	Average Number of Candidates at each Examination.	Average Number of Rejections at each Examination.	Percentage of Rejections.
1305	632	673	4	326·25	168·25	51·57

MAJOR, MINOR, AND MODIFIED EXAMINATIONS.

ENGLAND AND WALES.

Number of days on which the Board met for conducting the Major, Minor, and Modified Examinations... 30
Average attendance of the Members of the Board of Examiners at each Meeting 15

Examinations.	Number of Candidates during the Year.	Number of Successful Candidates during the Year.	Number of Rejections during the Year.	Number of Examinations during the Year.	Average Number of Candidates at each Meeting.	Average Number of Rejections at each Meeting.	Percentage of Rejections.
Major	90	51	39	6	15·00	6·50	43·33
Minor	824	304	520	6	137·33	86·66	63 10
Modified	2	0	2	2	1·00	1·00	100·00

SCOTLAND.

Number of days on which the Board met for conducting the Major, Minor, and Modified Examinations... 19
Average attendance of the Members of the Board of Examiners at each Meeting 8

Examinations.	Number of Candidates during the Year.	Number of Successful Candidates during the Year.	Number of Rejections during the Year.	Number of Examinations during the Year.	Average Number of Candidates at each Meeting.	Average Number of Rejections at each Meeting.	Percentage of Rejections.
Major	8	5	3	4	2·00	0·75	37·50
Minor	246	94	152	4	61·50	38·00	61·78
Modified	1	1	0	1	1·00	0·00	0·00

THE REGISTERS OF PHARMACEUTICAL CHEMISTS AND CHEMISTS AND DRUGGISTS, 1886.

Additions during the year:—

Number of persons who have passed the—	
Modified Examination	1
Minor Examination.....	398
Major „ 56*	
Number of persons registered on payment of the Registration Fee, having been in business before August 1, 1868.....	10
Number of persons restored to the Register on payment of a fine	19
Decrease of numbers on the Register	120
	548

* These having already been included in the number who passed the Minor, do not increase the numbers on the Register.

Erasures during the year:—

Deaths:—	
Notices from Registrars	167
Other sources	75
Erased at the request of registered persons themselves.....	8
Erased by the Registrar in pursuance of the provision set forth in Section 10 of the Pharmacy Act, 1868, after sending two registered letters to which no answer has been given...	298
	548

Number of Pharmaceutical Chemists on the Register, December 31st, 1886 2,198
„ „ Chemists and Druggists 11,249
13,447

by the Solicitor as well as by the Committee that there should be a power of dispensing under certain conditions with this period. For instance, a man very highly qualified, say in Australia, might come and wish to be examined, and if he produced evidence of having studied and had practical experience over there the Council might waive the three years' term in this country. Similarly, with regard to Ireland. It would be desirable that there should be in any scheme of the kind a committee of the Council to deal with special cases.

Mr. SCHACHT wished to particularly endorse what had been said by the President in reference to the limited scope of this resolution. He perfectly agreed with him that it only enabled the Council to do something in the future, and as he had been a little identified in the past with certain ideas as to what should be the course adopted, he wished to say that they having been for a time altogether put aside by the decision of the Privy Council, he should now enter on the matter, supposing this Bill were passed, with an entirely free mind, with no desire to take advantage of what had been done in the past, further than to reap what experience he had from the previous investigation on the subject. In asking for this Bill the Council would be simply asking for powers, and it in no way pledged the Council to any definite scheme.

Mr. SYMES said there were some who, though they strongly approved of the Bill still thought that other things also were required, but he understood they were not on that occasion to discuss those matters. There was one point, however, he should like to put. When this Bill got into Parliament, although promoted for a simple object quite outside controversy as was believed, was it not possible that certain Members of Parliament, who might have certain things in mind which might be matters of controversy, might introduce them into the Bill? He did not wish to offer them any suggestions of the kind, but they all knew there were certain things which would be disastrous to the calling rather than otherwise, and if tacked on to the Bill they would find they had got something which was not worth having. He wished to ask seriously whether the trade would be in any way endangered by legislation which might be attached to this Bill, which he believed would benefit both the trade and profession of pharmacy by insisting on a better education, or could they be sure of carrying this through exactly as it was for a purely educational matter?

Mr. HAMPSON said he presumed the Council would have the power of withdrawing the Bill if objectionable provisions were attempted to be introduced into it, and, if not, chemists and druggists would still have the power as a body of bringing the necessary pressure to bear on Parliament, which in all probability would be sufficient to cause the defeat of the altered Bill. Hitherto he had not taken a very active part in supporting a measure which would give power to the Society for increasing the educational status and requirements, but inasmuch as he found out on the last occasion when this matter was before the Council there was an almost unanimous opinion in favour of bringing about this change, he did not intend to-day to be in a minority, but should give this scheme the benefit of his support, and hoped it would be carried through Parliament. It was a definite issue, and though he certainly thought other things might be asked for at the same time, perhaps it was better under the circumstances to wait, the issue being so clear—viz., to improve the educational status and, he hoped, the public confidence in the calling—so that there could scarcely be any doubt that Government would yield to the desire. The Council simply asked for power to be given under a certain condition—the approval of the Privy Council—and he hoped that if the Bill passed the Council would move with considerable caution, and not introduce such changes as would bring forward any opposition, but rather move by steps, so as to bring the new conditions into effect by degrees, and not interfere in any way with the trade or its requirements.

Mr. WILLIAMS said he should like to be able to support this motion if he possibly could, but he felt great difficulty about it. He must say he preferred the first draft to the second, but as a matter of fact he thought it was a very proper thing for the Society to take power if possible to make bye-laws to meet educational necessities. He had no objection to the principle involved, but when he considered what was to follow from this he thought it would be a false step to accept the motion. His feeling was very strongly that an amended Pharmacy Act was required, and if this were a clause in the amended Pharmacy Act he should be prepared to support it; but whether it was wise to pass a resolution to take a Bill into Parliament to carry this into effect was another question altogether, as it might stop the way for future legislation, which was so much required.

Mr. CROSS said it was quite plain on the face of this Bill what the intention of it was. There was a great deal in what Mr. Williams had said, and it was an opinion which he himself had held in common with other members that the new Pharmacy Act should be more inclusive, and that the chemists and druggists' grievances should be attacked as a whole. In this view they were defeated. Under those circumstances he felt that to raise a discussion on that point would now be out of place; but there was also much to be said in favour of attacking difficulties in detail. There was no doubt at present that pharmaceutical chemists and chemists and druggists were not in the position they would like to be, more especially as far as trade defence was concerned. He could not see much in the Pharmacy Act, though it was not worth while to state its deficiencies in public, and it was perhaps as well to say as little about it as possible, looking forward to something better in the future. If their grievances were to be attacked in detail the chief grievance should be taken first, and that was that the qualification of a chemist and druggist was of a questionable nature, and he much regretted to say, from expressions which had been let fall and facts generally known, that belief had been prevalent that the examinations were not so complete as they might be. The chief point at the present time was to make the qualification a matter beyond question. This would be only pursuing the policy their fathers had pursued before them. Pharmacists would have had no claim in 1852, and again in 1868, if they had not educated themselves beforehand; let them complete this matter and then attack the next. They could not sit still long and allow seven people to do what six people dare not do, and if they could get this Bill through there was no reason why they should not again trouble the Legislature. He was not sure that their policy had not been too quiescent, waiting to get all they wanted by a great accumulation of grievances, which might have led to the idea that they wanted so much it was useless to offer them anything. They might go this session and again next session, and by their very persistence they might eventually obtain what was wanted.

Mr. ATKINS did not think there was any ground for encouraging the notion that the examinations were at all defective. What was defective was the education, and when the Council asked for powers to improve the education, it should be distinctly reiterated that it did not wish to increase either the stringency or the cost, but it did wish that education should be distributed over a lifetime, or at least over a portion of a lifetime, believing that matters should not be left as they had been hitherto to the voluntary principle, which was confessedly a failure, there being such a heavy percentage of failure in the examinations, but that the principle of compulsion must be brought to bear. However slowly that conclusion had been arrived at, the Council had been compelled by the logic of circumstances to come to it This Bill was purely

an enabling Bill to acquire power, but of course that meant business. The object was that when this power was obtained the Council should go forward on different lines. He entirely agreed with Mr. Schacht, that while the Council had laboured long and hard at a measure which he thought had been brought to a high state of perfection, still that was not an ultimatum, and he for one should be prepared, when he came to discuss the scheme again, to receive all the side lights which would be brought forward by other contributors. A good deal had been said about education schemes lately, and if this Bill were obtained, something would have to be done. He quite agreed with the President with regard to the power of waiving certain conditions; the Council should be prepared to deal, as he understood, on very elastic lines, to only require the evidence of pupilage for a definite time, but that need not necessarily be under the old-fashioned lines of indentures; all that would be required was evidence of substantial and lengthened training. He need hardly call attention to the last time clause, which could not be a fixed quantity, as it must depend on the fate of the Bill.

Mr. GREENISH said the course the Council was taking in connection with this Bill seemed to him the natural outcome of the rejection of the Bye-laws by the Privy Council. He was distinctly in favour of improved education, but he questioned very much the policy of going to Parliament with this Bill. It seemed to him, from his experience, that when a Bill of this kind went to Parliament it was no longer the property of the Society, but it was public property, so to speak, and any member could try to introduce any clauses or clause he thought fit, which might be very objectionable to pharmacists. He very much doubted whether this Bill had the sympathy of chemists and druggists throughout Great Britain. He believed about one-half were utterly indifferent to a compulsory curriculum, and thought there were not more than one-fourth who were really in favour of it. His difficulty in voting was, as he had stated, that he did not know where the Bill would land them, and was much afraid the Society would come out of Parliament worse than it was before.

Mr. BAILDON said he should support the Bill to a great extent. He felt very strongly indeed that measures were required to insure a more regular and thorough training for those who were to become chemists and druggists. The three years mentioned in the clause was, if anything, an inadequate period for an apprentice to be trained, but it would greatly improve the quality of those who entered the trade if they were compelled to serve a regular course of instruction in the sciences in which they were to be examined. There was no doubt the tendency, not only in their own body, but in other branches of science, had been towards cramming, than which nothing could do more evil to the person who went in for it, or produce worse results upon him in after-life. The idea that the young were to put so much knowledge into the memory in order simply to pass an examination, and take as little trouble as possible about it, was a very low idea altogether, and he was in hopes, by enforcing the curriculum and obliging the students to attend thoroughly qualified teachers and to go through a systematical course, their ideas would be elevated, and they would be led to attain a thorough grasp of the subject rather than to merely pass the examination. On the other hand, he felt the doubt, expressed by others, as to the policy of bringing this Bill into Parliament as a separate Bill. There was no doubt the danger that other things might be introduced by outside influence, and that it might get beyond the control of the Council. There was also the difficulty that if the Council were continually going up with small Bills it might become a nuisance to the Government and fail in that way. However he would not vote against the motion as it stood, because the Council had still to decide whether it should go on at once to introduce the Bill, and he hoped that those who read the report of the debate would bear in mind that, although the Council approved of the principle, and even of the details of the Bill, it had to consider what restrictions should be put on candidates, and especially that there was this power of waiving the three years pupilage when thought necessary. On one little point of detail he would suggest whether it was necessary in line 20 to insert the words, "By certificate of the Committee of the said Council," and whether it would not be sufficient to say "by resolution." He thought it was rather tying the Council down to a certain form of procedure. He did not know with what degree of favour this proposal would be received in the North, but he thought all should consider the question very carefully before raising any clamour against it. No injury would be done that he could see to existing chemists and druggists; they would be put to no additional expense or trouble, and from the trade point of view, it was surely no disadvantage to somewhat limit the number of competitors. He was in some doubt as to the policy of proceeding by separate Bills dealing with each subject by itself, but he was strongly in favour of the principle of a systematic training.

Mr. HILLS said he had followed the discussion with considerable interest, and was heartily glad to hear Mr. Baildon and others speak in terms of approbation of a more perfect scheme of education, which they all thought was necessary for the future good of their own craft. The only point that required to be specified, as far as he could see, was as to the advisability of proceeding with a simple Bill of this kind, and he did not quite gather from Mr. Greenish and Mr. Williams which way they intended to vote. Being both past-Presidents of the Society those gentlemen were naturally looked up to with the greatest respect, and it was a great pity they could not see their way to join in a unanimous vote. This Bill seemed to him much less likely to incur opposition, to have a number of unsatisfactory details added to it, than if it were a larger measure. It was simply a question of education, on which most of the body were united. There might be some who were indifferent, but surely the members of that Council ought to be in the van, and to try and induce them to look at it from this point of view: that something was being done which would ultimately prove to be of great value to the craft generally. He thought himself the simpler the Bill was the less likely it would be to incur opposition, or to have anything objectionable tacked on to it. As to adding a number of other things—trade matters, as they were called—they would be sure to excite opposition, and to have things tacked on; and perhaps the education portion of the scheme would be wrecked with the other.

Mr. GREENISH thought gentlemen should at least give past-Presidents the credit for moral courage when they had to get up and speak on such an occasion, when nineteen out of twenty-one were in favour of a particular scheme, and express their dissent. His feeling was so strong against taking this Bill into Parliament for such a limited matter, that he could not conscientiously vote in favour of it.

Mr. HILLS said he knew that both Mr. Williams and Mr. Greenish had the subject of education very closely at heart, and were really in the van in the movement, and he was very sorry that they happened to be the only ones who could not see their way to support a Bill dealing with that matter simply.

Mr. ATKINS said probably the other members of the Council felt very much with Mr. Greenish and Mr. Williams that this was not all that was wanted; but they were guided purely by tactical considerations, and guided by expediency as to what extent they should go forward. If it were supposed that because they voted for an education scheme, they were indifferent to trade questions, he begged at once to disavow that idea. He believed the conditions of the trade were perilously

critical at the present time. The hearts of men were failing them in regard to their craft. It must not be supposed that the Council was indifferent to those trade conditions. He felt most intensely for the men who were passing through these trying times, and if it were supposed the Council was endeavouring to screw up on the one hand with regard to the qualification, and was indifferent to what might be called the bread-and-cheese question, he was sure he had the Council entirely with him in saying it was not so. The Council was guided purely by the consideration that it might get this Bill through Parliament, when a larger scheme might be wrecked.

Mr. ALLEN said under some circumstances he should have preferred to give a silent vote on this matter, but as the Council had been reminded that it required some moral courage on the part of those opposed to presentation of this Bill to Parliament, he would also remind the Council that it required some moral courage to stand up in face of things, as they were now-a-days, and support it. Mr. Atkins had alluded to the perilous condition of things in the country; he, as a Londoner, and having been a countryman, was well aware of the state of things both in country and in town, and in many cases it was as bad, if not worse, in town than in the country. He supported this Bill for one reason, because he thought it was one way, and decidedly the first way, of putting their house in order, both with the public and with the politicians. Mr. Greenish said a certain section of the community, of pharmacists were very apathetic in regard to it. No doubt a certain section were apathetic with regard to everything. He had heard something of "two or three years' weary talk on the subject of education." He had seen that in print, or had heard it, but as far as he was concerned he would go in for two or three weary years more, because the majority of those round that table believed that that was the best and truest interest of pharmacists. The younger section of the community, as exemplified by the Chemists' Assistants' Association in London, had come to the conclusion that there was something radically wrong with regard to education as leading up to examination, and had adopted to all intents and purposes the scheme which was unfortunately defeated by the Privy Council. Again, there was an association of traders represented by a meeting in the Midlands, which also said the education was radically wrong, and something more was required; and here again were the thoughtful portion of the community of pharmacists, as exemplified by a general meeting of their own members, who adopted the proposed curriculum bye-laws by a very large majority. There was, therefore, every evidence to support the introduction of a Bill of this character, and for that reason he certainly should support it. By one of those coincidences which sometimes occurred, they had that day the Registrar's report presented, from which it appeared that out of 1070 who went in for the Minor examination in England and Scotland, 672 were rejected. He could not conceive, if some scheme were founded based on the power which this Act would give, that such a result would happen. He looked on this Act, or something akin to it, as one of the best things for the rising pharmacists. They would know, and their parents would know what was in front of them, and he could not but believe that any young man who knew thoroughly well what was before him in the way of examination would, so soon as he found himself unfitted for the business, retire from it and take to something else. At present they dragged on for three or four weary years, only to find when they came to London that they were ill adapted for the business, and the consequence was a large number of rejected candidates who eventually filled the position of illegitimate or piratical traders.

Mr. ROBBINS said he should support the Bill, and did not dread the consequences, because he did not think there was anything to dread. The most the Council had to fear would be that it would not be able to carry the Bill through, but with determination he had no doubt success would be obtained. He could scarcely imagine that there would be any opposition to it outside, and he could not see that any chemist would suffer in the smallest degree from its passing. If anyone could complain it would be the coming students, and he contended that it would be a great advantage to them also, as they would have better opportunities of preparing for the examination than the present. He did not see that the Government could tack on anything objectionable; but if it did attempt to do so the Society was strong enough to offer a formidable opposition, and prevent the altered Bill passing. He thought this was one of the greatest steps the Society had taken for a considerable time, and that it would ultimately lead to the great advantage of pharmacists generally.

Mr. SOUTHALL had great pleasure in supporting the motion. No doubt there was a great deal of feeling amongst the trade that things were unsatisfactory as regarded the examinations. He often heard complaints that they were not of much good, but if there was a good curriculum it would be found that it would improve the examinations and trade generally. Of course, the Council, in going for education, had to be rather before the general mass of the trade. It always had been so, and he hoped it always would.

Mr. BOTTLE said this Bill had his entire approbation. He had watched it, and as far as was necessary amended it in committee, and should be pleased to be able to support it by getting some assistance in the House of Commons when it went there. It would be a source of very great satisfaction to him if the Bill went from that Council with a unanimous vote, and so far as he had heard there was no objection to it. The friends who did not see their way to support it did not object on account of anything in it; but they were faint-hearted, and said they could not be sure of carrying it as it was. But they could not be sure of that with any Bill; the moment it was introduced any amendment might be proposed by any member. The duty of the Council was to be vigilant and to see that nothing was introduced which might be objectionable to the trade. On the other hand the trade element might endeavour to add something, and he should not be surprised if such a thing occurred; and if there was no objection to it the Council would certainly not object to any such addition. Still the Council would have to watch narrowly that nothing was introduced which was objectionable, but on the other hand it would hail heartily any additions which might be made to the advantage of the trade. He would ask those who did not think the Bill went to the extent desired to support it as far as he went, being assured that any amendment which might be introduced in the interests of trade and the public at large would have the full consideration and support of the Council.

The VICE-PRESIDENT said the Bill had his entire concurrence, and he thought it would be to the interest of future pharmacists that it should pass. It would also be to the interest of the public.

Mr. HAMPSON said he should like to appeal to those who opposed this Bill, and he might do so all the more heartily as he had for a long time held the same views himself. He really saw no danger in the promotion of this Bill. From the pharmacist's point of view it appeared a desirable thing to accomplish. In future no doubt the Council would have to ask Parliament for something else, and if this Bill came into operation, and better educated pharmacists resulted, it would be in a better position to make those requests to Parliament. No doubt there were some dangers, but these might very well be faced. All steps of this kind were surrounded with a certain amount of difficulty and danger, but so was every important act in life. He would put aside the feeling, and support the Bill on the ground of the advantage it was to the community that those entrusted

with the handling of dangerous medicines and preparations should be an educated body, and that this was a step which would bring about that result.

Mr. SYMES said he should be glad to hear from the President, whether there was any foundation for the fear he had expressed at the commencement of the discussion that undesirable clauses might be added to this Bill.

Mr. WILLIAMS said he had entirely limited himself in his former remarks to the question of the draft Bill, but discussion had gone off in a totally different direction, and the Council had been discussing the propriety of going to Parliament. It was quite clear that if the motion were agreed to the other would follow as a matter of course. He could support the Bill, though on some matters of detail he thought it might be improved; but he certainly looked with dread on going forward to Parliament. He should not, however, vote against the motion.

Mr. GREENISH said, having recorded his strong conviction—without doing which he should not have felt comfortable—that it was impolitic to take the Bill into Parliament at the present time, when there seemed to be everything against them, the Privy Council, members of Parliament, coroners, magistrates, *et hoc genus omne*, still, as he approved of the Bill itself, he should vote for it.

Mr. RICHARDSON said he rejoiced that the two dissenting members were content, as he understood, to join in passing this unanimously. He did not contemplate any exception being taken to it by their constituents, who would, he believed, rejoice to see that the Council was moving, and setting the ball rolling. He hoped this would be the beginning of a very much better state of things in the future for the followers of pharmacy. Any intelligent man must see that this was one of the best things which could be done, not only for the chemists and druggists, but for those who should practise pharmacy in the future.

The PRESIDENT begged to assure Mr. Baildon that the suggestion he had made had been considered by the Committee. It was convenient to use the word "certificate" in clause 2, seeing that the Registrar received certificates for all purposes. The Bill had not been drafted hastily, and he had read almost every Act of Parliament dealing with education in every way. There had been the usual difficulties with the legal adviser in getting into legal language the precise things which the Committee wished, but he thought they had succeeded at last, and he wished Mr. Baildon to understand that the notion was that there should be a kind of standing committee which should deal with educational matters, and send up its certificate, to be afterwards approved by the Council. With regard to the dangers of legislation, it was only fair to remind the Council that by the Rules of Parliament when once a Bill was introduced it became the property of the House. On the other hand there was a general understanding that when a Bill was promoted by a person or corporation there must be some very great public advantage to be gained by interfering with it. Still it was possible that Parliament might think it desirable that the Bill should be taken out of the hands of the promoters, and a series of amendments of a damaging character might be introduced. Then assuming these were carried, there would be only one course to be pursued. The Society would cease to be the promoter of the Bill, and would have to oppose it, and would have to call on its friends throughout the country for support. The frank statement made that day and the general expression of approval of the Bill, would tend to make the members of the Society rally round it and prevent anything of the kind. Mr. Cross, at the first meeting of the Committee, dealt with it as to going to Parliament for one object only, but to-day he had made the suggestion that possibly the balance of advantage would be in going piecemeal, and he was not sure that there was not some truth in that. But besides that he believed that the Privy Council Department considered it was the duty of the State to legislate on all poison matters, and of the Pharmaceutical Society to legislate on all educational matters, and in a Bill recently introduced by that department that line had been taken up by the Government. That Bill did not touch education or anything dealing with the Society *quâ* education or examination. To that extent, therefore, the Bill would not be running counter to the underlying current prevalent in the department, and he did not think the Privy Council would be at all desirous of tacking on any of these public or trade questions to a purely educational Bill. There was an enormous disadvantage in having an educational matter mixed up in one Bill with the sale of poisons. The Irish Act was a Pharmacy Act solely, and there was a separate enactment with regard to the sale of poisons, which had led more than once to the suggestion of the Privy Council that in future it would be more convenient to keep these things separate. It might properly be held that they, as a Society, were personally interested in the trade questions, which to some extent warped their judgment, but it could not be said that they did not understand the educational and examinational question. The only difference between them and a Government department would be the extent to which any changes in education could be made, and the rate at which they should be introduced, and so on. All this could be arranged by and bye, if the Council got the powers sought for, and he was satisfied that the trade would be doing itself injustice if it did not as a body support the Council in its endeavours to get this Bill. Some years ago, when he was formerly on the Council, it was a common thing for important resolutions to be carried, after some discussion, unanimously; but of recent years there had been a little difficulty about that, and he thought they had got perhaps a little too conscientious. The Council was to some extent of the nature of a Cabinet, not merely a Parliament. He submitted that it was very difficult for anything to be constructed that twenty-one gentlemen could vote for, without there being some differences of degree, and he could quite sympathize with Mr. Greenish and Mr. Williams as to their doubts about the wisdom of moving in a particular direction; but as they agreed with the Bill itself, and found that their colleagues had thought the matter out, he really asked them to say that on the whole they would vote with the majority.

The motion was put and carried unanimously.

The PRESIDENT then moved that the Law and Parliamentary Committee be instructed to take the necessary steps for the introduction into Parliament of the Bill now agreed to.

Mr. ROBBINS seconded the motion, which was unanimously agreed to.

THE NORTH BRITISH BRANCH.

The PRESIDENT stated that on January 12 last the following gentlemen were elected the Executive of the North British Branch:—Messrs. Ainslie, Boa, Clark, Frazer, Gibson, Gilmour, Hardie, Kermath, Kinninmont, Maben, Mackay, Mackenzie, Nesbit, Noble, Storrar, Strachan and Watt. He had also to report that at a meeting of the Executive, held since, Mr. Baildon had been elected Chairman of the Executive. The members of Council would all unite in congratulating their north country friends on having so excellent an officer, and it would be a distinct advantage for a time that the gentleman who held the office of Chairman of the Executive should be a member of the Council. The position taken by Mr. Baildon for the last two years with reference to the Society's affairs in Scotland had been an active one, and he made no reference to that when he said that he did think, apart from that, that the Executive had adopted a wise suggestion in electing him to be its head. Mr. Watt, of Haddington, had been elected

Vice-Chairman. Consequent upon this appointment, Mr. Stephenson had sent a letter saying he had seen this appointment in the press, and asking when it was desired that the balance in his hands should be transferred, and for instructions upon the subject. The Council had decided that the Chairman of the Executive should have charge of the funds, and he would therefore propose—

"That the thanks of the Council be given to Mr. J. B. Stephenson for his valuable services as Hon. Treasurer to the Society in Scotland during the five years he has held that office. That he be authorized to hand over to the Chairman of the Executive of the North British Branch his account to the end of January, 1887, and any balance in hand at that date.

The VICE-PRESIDENT seconded the motion.

Mr. ATKINS supported the motion from his personal knowledge of Mr. Stephenson, and wished to echo the opinion of the President that the Society had had in Mr. Stephenson a most zealous and painstaking officer.

Mr. BORLAND said he had, as a Scotchman, come into frequent communication with Mr. Stephenson, and he might say of him that no man in Scotland could have discharged the duties imposed upon him in a more faithful and conscientious manner than he had done during the last five years. Although in some matters his views had been somewhat different from those entertained by the Council, he had always shown a most faithful attachment to the Pharmaceutical Society of Great Britain. Whatever he had done had been in its interests, and with a view to further its progress, and to bring it prominently before the community as an institution worthy of support.

Mr. BAILDON said unless one had been on the spot, and seen the zeal and ability which Mr. Stephenson devoted to the affairs of the Society in Scotland, he could hardly appreciate his services. Mr. Stephenson stepped into the breach at the time of the lamented decease of Mr. John Mackay, and the Society could not have found a more able man to fill the position. Only the other day the Assistant-Secretary expressed in the warmest terms his indebtedness to Mr. Stephenson, for although there had been some friction at the outset between Mr. Stephenson's views and those of the Council, that did not detract in the least from the devotion with which he attended to the business of the Society.

The motion was put and carried unanimously.

REPORT OF EXAMINATIONS.

January, 1887.

SCOTLAND.

	Candidates.		
	Examined.	Passed.	Failed.
Major (18th)	2	0	2
„ (25th)	2	1	1
	—4	—1	—3
Minor (18th)	15	6	9
„ (25th)	15	8	7
„ (26th)	14	5	9
	—48	—20	—28

Preliminary Examination.

Candidates.

Examined.	Passed.	Failed.
293	151	142

Eleven certificates received in lieu of the Society's Examination :—

3 College of Preceptors.
1 Faculty of Physicians and Surgeons of Glasgow.
1 Incorporated Law Society.
5 University of Cambridge.
1 „ „ Edinburgh.

The PRESIDENT said a letter had been received from the Hon. Secretary of the North of England Pharmaceutical Society, enclosing a resolution passed at a meetign of that body, to the effect that no system for remedying the defects of the present system of examination and education will be satisfactory unless it provide for compulsory training under some such conditions as those already laid down by the Council.

There was also a letter from the Aberdeen and North of Scotland Society of Chemists and Druggists, enclosing a resolution returning the warmest thanks of the Society for the handsome grant of £50, and adding their sincere appreciation of the courteous words in which the President moved the adoption of the report, and the unanimity with which it was carried by the Council.

There was also a letter from the Sheffield Pharmaceutical and Chemical Society, enclosing the resolutions passed at a recent meeting, which have already been published. The last resolution, referring to the action of the Council, the President proposed should be referred to the General Purposes Committee.

This was agreed to.

A letter was read enclosing copy of a resolution passed at a quarterly meeting of the chemists of Leamington, Warwick and Kenilworth, in reference to the proceedings that were taken against Mrs. Judd.

The PRESIDENT then proposed a vote of thanks to Mr. Thring, of Ceylon, who had been good enough to present to the Society, through Mr. Shand, some very fine specimens of cinchona stems.

This was unanimously agreed to.

THE CONVERSAZIONE.

It was resolved that a conversazione be held on May 18, the President, Vice-President and Treasurer, with Messrs Allen, Butt and Hills being appointed the Committee to carry out the arrangements, and the Secretary being directed to apply to the Director of the South Kensington Museum for permission to hold the conversazione there as usual.

BUILDING COMMITTEE.

This Committee had considered and approved a draft contract with a building firm, prepared by the solicitor and architect, and recommended its execution by the Council.

It was recommended that the works be proceeded with under the direction of the Committee and the Society's architect.

The Council went into committee to consider this report, and had a long discussion upon it, the architect attending.

On resuming, the report of the Committee was received and adopted unanimously.

Provincial Transactions.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

The annual supper was held on Wednesday, January 26, in the Freemasons' Hall, Surrey Street, when nearly forty members and guests were present.

The chair was occupied by the President, Mr. Newsholme, who was supported by Mr. A. H. Allen, Borough Analyst and President of the Society of Public Analysts; Messrs. Jervis, Preston, Cubley, Ward, Furness, Ellinor, Bradwall, Hon. Sec., etc.

The President gave the usual loyal toasts, and referred facetiously to the Jubilee of Her Majesty's reign, and to modes of commemorating the present year which to pharmacists would commend themselves with special force.

The toast of the evening, that of "Success to the Sheffield Pharmaceutical and Chemical Society," was proposed by Mr. A. H. Allen, who said he was informed the Society included in its roll of members 95 per cent. of

the chemists of the town; he sincerely hoped it would very shortly include 100 per cent. He was aware of the difficulties connected with the carrying on of an association of this description. Unlike the Medical School, which could ask for subscriptions of £5000 and receive the amount, a society of this description had to be largely self-supporting. He felt it a great honour that the toast of the evening had been entrusted to him. Although an honorary member of the Sheffield Pharmaceutical and Chemical Society, still he could not be said to be actually engaged in pharmacy, and perhaps it was on account of his being an outsider in this sense that the toast had been entrusted to him. They must all admit that an association of this kind could not fail to be of incalculable benefit to all concerned. Referring to the Society's work as an educational body, he was gratified to hear of increased laboratory accommodation and premises now thoroughly adapted to the work the Society has set itself to accomplish. He coupled with the toast the name of the ex-President, Mr. Preston.

Mr. Preston, in responding to the toast, said the Council of the Society had the weal of the whole body of chemists at heart, and he thought this would be readily admitted on a perusal of the curriculum and syllabus of the present session of the Society's School, or by any of those who had been fortunate enough to attend the lectures during the session. He had no hesitation in saying that the papers which had been read at their monthly meetings would compare favourably with those delivered in the metropolis or elsewhere.

Mr. Dobb proposed "The Pharmaceutical Society of Great Britain." He could speak, he said, as a chemist of thirty-four years' standing, and referred to the time when he was in opposition to the Society, because it failed to recognize a large and important section of the chemists of that day. But all that was long ago past; the Pharmaceutical Society had done, was doing, and would continue to do good work.

Mr. Ward, F.C.S., Local Secretary, responded. He said it was the tenth time he had at their annual supper replied to the toast. Some fault had from time to time been found with the Pharmaceutical Society, but he believed he was justified in saying that only one-half of the members of the trade whose prerogative it was to vote at the election of the Council exercised the privilege placed in their hands. He assured them the Council of the Pharmaceutical Society was much more active than was generally supposed; he might mention that of legal cases only a small fraction of those in which the Council took action came into public notice.

Mr. Cubley proposed "The Sheffield School of Pharmacy," which was replied to by Mr. Grierson, Lecturer on Botany.

Other toasts followed, which were interspersed with songs, recitations, etc., and an enjoyable evening was spent.

Proceedings of Societies in London.

CHEMICAL SOCIETY.

A meeting of the Chemical Society was held on Thursday, January 20, Dr. Hugo Müller F.R.S, President, in the chair. A number of certificates were read for the first time, after which the following papers were read:—

Some Silicon Compounds and their Derivatives. By J. Emerson Reynolds, M.D., F.R.S.—Although large numbers of silicon analogues of carbon compounds are known, it is pointed out that we do not find among the former any well-defined representatives of cyanogen and its deriviatives. The present investigation was commenced some years ago with the primary purpose of obtaining such compounds, if possible, and generally of examining reactions in which the silicon haloids—particularly the tetrabromide—and organic nitrogen compounds take part. In the course of the work a number of new bodies have been obtained, only a few of which can, however, be regarded as cyanogen-derivatives. The author, in this the first paper of a series, describes the action of silicon tetrabromide on thiocarbamide, as the products obtained in this branch of the inquiry were exhibited at the conversazione of the Royal Society last June. It is shown that silicon tetrabromide in benzene solution acts in a very remarkable manner with thiocarbamide, the latter affording a condensed amide with which the tetrabromide unites. Eight molecules of thiocarbamide combine with only one of silicon tetrabromide at the temperature of boiling benzene. Attempts to make this amide unite with a larger proportion of the bromide only lead to decomposition. The product is a thick liquid at a temperature 65° C., below the fusing point of pure thiocarbamide (140° C.), and becomes solid at ordinary temperatures. Solvents of the tetrabromide do not extract any from this product, nor is it dissolved by any liquid without decomposition. When boiled with anhydrous alcohol it affords a monobromo-derivative of pentathiocarbamide, which is obtained from the alcoholic solution in beautiful groups of silky crystals. At the same time bromethyl-thiocarbamide and bromethyl-dithiocarbamide are obtained along with ethylic silicates.

In reply to Mr. Rideal, Professor Reynolds said that in preparing silicon tetrabromide, it was essential to use silica which had been precipitated in the gelatinous form and to mix it most intimately with the carbon (lamp-black); the action of the bromine took place at an extremely high temperature. Replying to the President's question—Had analogous compounds been obtained from urea? he said that urea did react with silicon tetrabromide, but not in the same way as thiocarbamide.

Dr. Armstrong remarked that, assuming the bromine to be the linking agent, it was noteworthy that in the silicon compound and also in that of ethyl bromide with thiocarbamide the ratio was Br: $2CSN_2H_4$: this perhaps might be regarded as an indication that the thiocarbamide molecule had at least the formula $C_2S_2N_4H_8$; the ratio in the remarkable compound with bromine was, however, different.

Chromo-organic Acids. Part I. Certain Chromoxalates. By Emil A. Werner.—This paper contains an account of the salts resulting from the combination of chromium oxalate with certain metallic oxalates. A study of these compounds has led to the conclusion that they cannot be considered as ordinary double salts, but are in point of fact salts of complex chromoxalic acids. A similar view of the constitution or these compounds was advanced by Malaguti in 1843, but strange to say has been entirely ignored, since all workers with these particular compounds (with the exception of Clarke and Kebler) have treated them as double or triple salts. Malaguti's view has been considerably extended, and new experimental evidence furnished in support of it; it has also been shown that the oxalic radicle can be displaced by those of other organic acids, salts of which have been obtained. The paper concludes with the description of a new series of chromoxalates, whose members are shown to be closely related to those already known. The following are examples of the formulæ given by the author to the three classes of salts:—

$$\begin{array}{lcl} Cr(O.C_2O_3K)_3 & Cr\left\{\begin{array}{l}O.C_2O_3K\\O.C_2O_2.O\end{array}\right. & Cr.O.C_2O_2.O \\ | & \| & ||| \\ Cr(O.C_2O_3K)_3 & Cr\left\{\begin{array}{l}O.C_2O_2.O\\O.C_2O_3K\end{array}\right. & Cr.O.C_2O_2.O \end{array}\Big\}Ba$$

Blue salt. Red salt. Green salt.

Dr. Japp thought that some of the provisional constitutional formulæ proposed by the author for the various series of chromoxalates were open to criticism. In the formula for the salt of the "red series," for example, two oxygen-atoms, united to oxalic acid radicles, were represented as satisfying each other's affinities—an arrangement which would place these stable salts in the same category as the explosive peroxides of acetyl and benzoyl; whilst at the same time the two chromium-atoms in the

formula were doubly linked. It was only necessary, however, to suppose that these vacant affinities of the chromium-atoms were satisfied by those of the oxygen-atoms in order to represent the salts as perfectly normal, thus :—

$$KO.C_2O_2.O.Cr<^{O}_{O}>C_2O_2$$
$$\quad\quad\quad

occurrence of any other salts of mercury than oxide, and also gets rid of such impurities as lead and tin, should they be present, by precipitating them as hydrates and redissolving them.

The mercurous oxide was estimated by treating a weighed amount of the sample with dilute hydrochloric acid until all the yellow colour disappeared, and nothing remained undissolved but the small quantity of mercurous chloride. This was filtered off, washed with hot water, dried at 100° C., and weighed. From this weight was calculated the percentage of mercurous oxide. The mercuric oxide was estimated by passing sulphuretted hydrogen through the filtrates obtained in the previous estimation, after nearly neutralizing them with alkali. The resulting sulphide was then separated, dried and weighed, from which weight was obtained the equivalent weight of mercuric oxide.

The following are the results of 100 parts of each sample :—

	HgO.	Hg_2O.	Fixed matter.
1.....	98·238	·454	·272
2.....	96·489	·895	1·007
3.....	98·174	·532	·371
4.....	98·237	·746	·416
5.....	97·692	·268	·212
6.....	96·895	·853	·954
7.....	97·787	·758	1·015

The deficits, I presume, may be attributed to moisture which was not separately estimated, except in one or two cases, as a check.

It will be seen that all these samples are very satisfactory, especially when we consider the amount of time and trouble required to wash away the last traces of a bye-product from a large quantity of a preparation.

The mercurous oxide may be due to the mercuric chloride containing some soluble mercurous salt, which is scarcely probable, or else it may form in the mercuric oxide on keeping. A freshly made sample, prepared by myself, gave a perfectly clear solution with dilute hydrochloric acid.

A discussion followed, in which the Chairman, Secretary, Messrs. Southall, Farr, and White joined. There being no miscellaneous business brought forward, the meeting then adjourned.

CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting of this Association was held at 103, Great Russell Street, on January 26, Mr. H. H. Millhouse (President) in the chair.

Mr. Bird having read the minutes of the previous meeting, they were confirmed.

The Chairman then called on Mr. MacEwan to read a paper on "The Pharmacognosy and Chemistry of Calabar Beans," of which the following is an abstract.

The Pharmacognosy and Chemistry of Calabar Beans.

BY PETER MACEWAN, F.C.S.,
Pharmaceutical Chemist.

Two years ago the author examined a number of samples of the extract of Calabar bean of commerce, and the results were communicated to an evening meeting of the North British Branch of the Pharmaceutical Society.* At the same time Mr. Adam Gibson communicated a paper on the preparation of the extract, in which he showed that a menstruum containing 66 per cent. of alcohol was better adapted for the exhaustion of the drug than the rectified spirit prescribed by the Pharmacopœia, the yield of extract being about four times more, while it contained only half as much alkaloid. The author's results from the examination of commercial extracts showed that they varied in alkaloidal strength from 1·1 per cent. to 10·5 per cent. (nearly); and while part of this variation was apparently due to the use of menstrua of different alcoholic strength, there were two samples, containing 6·6 per cent. and 10·47 per cent. of alkaloid, which appeared to have been prepared from a drug of unusual potency, and it was suggested that probably the bean obtained from *Physostigma cylindrospermum* had been used in their preparation. The inquiries since made regarding this point form the basis of this communication.

The official Calabar bean was first brought to England in 1840, by Dr. W. F. Daniel, but it was nearly twenty years later before the late Dr. Balfour, Professor of Botany at the Edinburgh University, and Regius keeper of the Botanic Garden of that city, received a specimen of it for identification, and he gave it the generic name *Physostigma*—literally inflated stigma, in reference to the hooded appendage of that portion of the flower; and the specific name *venenosum*, owing to its toxic properties. Previous to this (in 1855) the late Professor Christison had tried the physiological effect of the drug upon himself. Daniel Hanbury was the first English pharmacist who took notice of the new drug, his papers to the *Pharmaceutical Journal* about 1864 referring chiefly to the best methods for exhibiting it medicinally. At the same time Dr. T. R. Fraser began that series of elaborate experiments, pharmacological and physiological, which demonstrated the action of physostigma. It will be found on examining a moderate quantity of beans that the shapes are not altogether alike, and that some beans are violet black, while others are of a coffee-brown colour. The former are fully-ripe seeds, and the latter are probably immature. This difference has been suggested as an indication of probable difference in strength; moreover, the fact that the native priests of Calabar know how to select non-potent seeds for use as ordeal beans by any of their favourites, indicates that some variation in the alkaloidal strength of the bean may be looked for. In 1879, another kind of bean appeared in the London drug market for the first time, mixed with the ordinary Calabar beans. Mr. Holmes found a similar bean in the British Museum labelled *Mucuna cylindrosperma*, but, the evidence being against the seed having been obtained from a Mucuna, he named it *Physostigma cylindrospermum*. The seeds are longer and more cylindrical than the ordinary bean, but the most distinctive point of difference between the two is that the hilum of the long bean does not extend to the extremity where the micropyle is visible, but stops short about a quarter of an inch therefrom. But the author has failed to find that this bean has ever occurred in the market since 1879. Unless, therefore, the samples of strong extract examined by him had been some time in stock, or had been prepared from beans that had been a long time in stock, the surmise that they were prepared from the long bean is probably erroneous.

The chemical constituents of Calabar bean other than those peculiar to leguminous seeds generally are its alkaloids, physostigmine and calabarine; also phytosterin, a body related in composition to cholesterin. The activity of the bean is attributable to physostigmine. Calabarine is reported to have a physiological action resembling that of strychnine.

The purpose of the experiments commenced by the author was to ascertain the proportion in which the various constituents exist in the brown and black varieties of the official drug, and also in the cylindrical bean, and to determine their properties, chemical and physical. As he is not now in the position to complete the work he suggested that some member of the Association might take it up.

Mr. MacEwan said that in preparing the bean for analysis comminution is best effected by a mill, as the mortar and pestle cause considerable loss of the tough testa. The proportion of moisture in the brown and

* *Pharm. Journ.*, [3], xv., 594.

black beans is the same, viz., 7·2 per cent., but a slight difference in the percentage of ash was observable, the black yielding 3·1 per cent. and the brown 3·4 per cent. He thought a complete analysis of the constituents of the ash might throw some light on the condition in which the alkaloid exists in the bean.

In the analysis with solvents 50 grams of bean were used in fine powder, and maceration in each solvent was continued for not less than fourteen days. Petroleum ether and ethylic ether (anhydrous) were so used. In each case 50 c.c. of the respective liquors were evaporated on a water-bath to determine the amount of matter dissolved, and this checked with the amount obtained from the rest. The black bean yielded to petroleum ether 1·068 per cent. of a thick golden yellow oil, which contained tufts of white crystals, but did not possess any distinctive odour. The brown bean showed a decided difference, only 0·2 per cent. of the same being obtained. Examination of this residue proved that the crystalline body was phytosterin. This substance was first isolated by Dr. O. Hesse, and a description of it was given by him in *Annalen der Chemie* (cxii., 175). It is insoluble in water, even if alkaline; is more soluble in glacial acetic acid than in other strong acids, and is little affected by cold alcohol. The body melts at 132° to 133° C. to a colourless fluid, which forms radiate crystals on cooling. At a higher temperature it partially volatilizes, but again crystallizes when cooled. The formula of phytosterin was determined by Hesse to be $C_{26}H_{44}O$, and, though resembling cholesterin, the two bodies are by no means the same.

Ethylic ether extracted from the bean (after petroleum ether) 0·36 per cent. of a yellow oil of an agreeable odour, which separated a white granular body. The oil was soluble in alcohol, the solid in ether. The latter did not appear to be phytosterin, for it failed to crystallize.

In assaying extract of physostigma, the author obtained excellent results by a gravimetric method, which consisted in treating the extract with water acidulated with acetic acid, removing extractive and colouring matter with lead subacetate, subsequently removing excess of lead, adding ammonium carbonate to alkalinity, and dissolving out the alkaloid with chloroform. According to Harnack and Witkowski the bean contains two alkaloids—physostigmine and calabarine—which are physiologically antagonistic to each other. They attributed the variation in the potency of commercial samples of alkaloid to the presence of calabarine in greater or less quantity. Physostigmine is soluble in chloroform and ether, and its iodohydrargyrate is soluble in absolute alcohol. Calabarine has been described as being soluble in chloroform, but not in ether, and its iodohydrargyrate as insoluble in alcohol.

For several reasons the author is inclined to doubt the existence of calabarine. The alkaloidal residue, obtained by the method described, ought to contain it. But this residue is wholly soluble in acidulated water, and the iodohydrargyrate thrown down from it is quite soluble in alcohol. The residue itself when treated with ether was found to be soluble.

The variation which exists in the commercial alkaloid the author is inclined to attribute rather to faulty methods of preparation, among which he includes the official method. In order to avoid in assaying the contamination due to the formation of rubeserine by oxidation he tried the method of precipitation by Mayer's solution, following the directions of Massing, of Dorpat, but failed to get the Mayer's solution to work satisfactorily. Subsequent experiments led him to conclude that the volumetric process was far from reliable, and that the gravimetric, with ordinary precautions, gave more satisfaction, the alkaloidal residue being available for testing for calabarine. He recommends the following:—Digest the powdered bean with it own weight of a mixture of 3 parts of rectified spirit and 1 part of water for a day, then pack in a percolator, and percolate with the same alcoholic menstruum until the percolate on dilution with water gives only a slight opacity with Mayer's solution. Evaporate the spirit, and treat the residue with lead acetate, etc., as previously described. The alkaloidal residue obtained should be of a pale amber colour, and wholly soluble in a dilute acid.

The Chairman, in opening the discussion, made some remarks on the practical nature of the paper, which he thought would be found of much interest to pharmacists.

Mr. J. E. Saul said that he had had to manipulate eserine on the large scale, and, like other pharmacists, had been annoyed at the proneness to change of its salts in solution. It had very recently been stated in one of the London journals of pharmacy that the red coloration was due to absorption of ammonia, and that the addition of some weak acid, such as boric, would effectually prevent the change. He (the speaker) did not consider that the work of either Petit or Duquesnel pointed to ammonia absorption as the cause of change, and his own experiments quite confirmed the opinion that oxygen was the factor in the reaction. The addition of ammonia or any other alkali merely liberated the easily decomposable alkaloid, and it would be found on shaking the tube in order to allow the liquid to absorb oxygen that the colour rapidly deepened. Moreover he had found in practice that neither a weak acid like boric nor a strong one such as hydrochloric prevented this peculiar degradation of the alkaloid; the change from the point of view of the pharmacist being best described as degradation, as rubeserine had been proved to possess neither toxic nor mydriatic properties. If an already coloured solution were heated with dilute hydrochloric acid the red tint is not in the least degree affected. On heating a coloured solution with such a reducing agent as HPH_2O_2, however, the colour is completely discharged, and the same result immediately follows in the cold if sulphurous acid be employed. To practically apply these remarks he would suggest to those who wished to prepare a stable solution of eserine sulphate that they should first deprive their distilled water of dissolved gases by boiling until the liquid "bumps," rapidly chilling, adding the quickly-weighed salt, then a drop or two per ounce of sulphurous acid, and finally preserving in a full closely-stoppered bottle, for SO_2 is of course both volatile and easily oxidized. A solution thus prepared has been tried and found to exercise no irritating effect on the eye. The oxidation reaction of Petit had often been referred to as a valuable test for the alkaloid; but the process of evaporating a solution down with excess of ammonia was in an ordinary pharmacy both unpleasant and tedious. He (Mr. Saul) had found that by heating a solution of a salt of the alkaloid to the boiling point and then adding a few drops of 70 per cent HNO_3, an orange-coloured liquid was produced, which on supersaturation with NaHO yielded an intensely vivid violet solution, becoming wine-red on dilution with water. This violet colour he noticed was exceedingly sensitive to acids and alkalies, assuming a pale orange tint on the addition of the former, and again resuming the purple hue when the acid reaction had been destroyed. After criticizing the method of extraction on which Mr. MacEwan had founded his opinion of the non-existence of calabarine, suggesting the use in medicine of a less deliquescent salt of eserine than the sulphate, such as the hydrobromide, and referring to the state of combination in which the alkaloids exist in the seed, Mr. Saul concluded by proposing a cordial vote of thanks to the author for his excellent paper.

Mr. T. A. Ellwood stated that he had used the extract of Calabar bean rather largely. A medical man of his acquaintance always used to prescribe an extract made from the nucleus of the seed, the testa being removed, and, according to him, the extract thus made was more uniform and reliable in its effects than one made from the entire seed, which, whilst it produced the same

effects, was more variable; he considered, therefore, that an extract of the nucleus was the best pharmaceutical preparation. The speaker would also like to point out that phytosterin and cholesterin belonged to the same class of compounds, the former being a methyl compound of the latter. In preparing the extract of the bean he had used rectified spirit with water and acetic or hydrochloric acid added, and found that acetic acid afforded best results.

Mr. MacEwan then replied with regard to Mr. Saul's remarks. It is usually assumed that the change from physostigmine to rubeserine is due to ammonia, addition of alkali to a solution of the alkaloid imparted an intense violet colour to it. This being destroyed by SO_2 showed that it was due to oxidation. Mr. Saul's suggestion that sulphurous acid should be employed to preserve the solution was a very valuable and practical one. With respect to the ash showing the state of combination of the alkaloid in the bean, he would expect to find it combined with H_2SO_4 or H_3PO_4, and in the near future he thought it would probably be found that alkaloids generally were combined with these acids, and not with organic ones. With regard to Mr. Ellwood's remarks, it was generally stated that the testa was inert, but that gentleman's experience seemed to prove the contrary. The variation in strength of the commercial extract was probably due more to the different menstrua employed than to differences in the proportion of testa. Mr. Saul did not think that the process used in the experiments with Mr. Gibson was quite satisfactory, he could only state that it gave constant results, and there was no evidence of any decomposition; a process which gave constant results must be most accurate. The great difficulty in using Mayer's solution was that the precipitate could be dissolved. On the whole he found the volumetric processes for the estimation of alkaloids were far from satisfactory, whilst, on the other hand, if you got something definite and evaporate, of which you could prove the purity and actually weigh, you could feel satisfied with your results.

The Chairman: Mr. Ellwood says the testa is inert; if that be so the variation might be due to more testa in some seeds than in others.

Mr. Ellwood corrected, saying that he only mentioned it as being variable in therapeutical effects, he had no information as to actual strength.

Mr. MacEwan: The testa is generally considered to be inert. Mr. Ellwood has therefore made a discovery, and this, together with the proportion of testa in different seeds are two good points for investigation.

The Chairman then stated that thinking the paper was rather a short one, Mr. E. H. Farr had kindly consented to fill up the rest of the time by a note on some of the adulterations of cubebs.

Mr. Farr then exhibited and described most of the adulterations which have recently been found in cubebs as offered at the drug sales, and of which mention has been made in the trade journals from time to time, and supplemented his remarks by handing round a card on which sections were mounted, showing in a practical manner the structural differences, as seen by the naked eye or with an ordinary pocket lens.

The proceedings then terminated.

BOOKS RECEIVED.

A Manual of Botany, including the Structure, Classification, Properties, Uses, and Functions of Plants. By Robert Bentley, F.L.S., M.R.C.S., etc. Fifth Edition. London: J. and A. Churchill. From the Publishers.

What to do in Cases of Poisoning. By William Murrell, M.D., etc. Fifth Edition. London: H. K. Lewis. From the Publisher.

Year-Book of Pharmacy, with the Transactions of the British Pharmaceutical Conference, 1886. London: J. and A. Churchill. From the Secretaries.

Obituary.

Notice has been received of the death of the following:—

On the 16th of December, 1886, Mr. William Brightin Silvers, Chemist and Druggist, Camberwell. Aged 28 years. Mr. Silvers was an Associate in Business of the Pharmaceutical Society.

On the 8th of January, 1887, after a lingering illness, Mr. Michael Jones, Chemist and Druggist, Chester Street, Flint. Aged 69 years. Mr. Jones had been a Member of the Pharmaceutical Society since 1869, and Local Secretary for Flintshire from the time Local Secretaries were first appointed.

On the 15th of January, Mr. Joseph Brough, Chemist and Druggist, High Street, Longton. Aged 66 years.

On the 19th of January, Mr. Edward Selleck, Pharmaceutical Chemist, Highgate Road, N.W. Aged 69 years. Mr. Selleck had been a Member of the Pharmaceutical Society since 1868.

On the 20th of January, Mr. John Firth, Chemist and Druggist, Albert Road, Queensbury. Aged 63 years.

On the 23rd of January, Mr. Charles Albert George, Chemist and Druggist, Brookhill, Sheffield. Aged 44 years. Mr. George had been a Member of the Pharmaceutical Society since 1878.

On the 25th of January, Mr. Edward Orlando Cleaver, Chemist and Druggist, High Street, Croydon. Aged 41 years. Mr. Cleaver was an Associate in Business of the Pharmaceutical Society.

Referring to the late Mr. J. M. Hucklebridge, of Upper Ebury Street, whose death was recorded on the 1st ult., a correspondent writes:—"It is much to be regretted that the late Mr. Hucklebridge did not more publicly interest himself in pharmaceutical matters, as he would have been an authority upon the art of percolation, he having brought that operation to perfection upon nearly every tincture in the B.P. Tincture of opium in particular he was most successful with in treating by displacement, the marc having subsequently been submitted to Dr. J. E. D. Rogers, late Professor of Toxicology at the London Hospital, who reported most favourably upon its complete exhaustion. The percolators used were made by the York Glass Company, from Mr. Hucklebridge's own design. Another point upon which much light could have been thrown was the manipulation necessary for the preservation of leeches; the animal and vegetable life in his aquarium so nicely balanced each other, that the water was not changed for years, yet the loss of one single leech was a rarity. There is also to be seen at 116, Ebury Street, a salt water receptacle filled with artificial sea water, made from an analysis of the same. This has also been in existence for years unchanged, and it is teeming with marine life in a most perfect state of preservation."

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

The Trade Association.

Sir,—I feel convinced that not a few chemists will be deeply grieved by the necessity which calls forth the appeal which has been issued by Mr. Haydon on behalf of the Trade Association.

One can hardly imagine that a trade composed for the most part of men of intellect, judgment and reason, engaged in a business bristling with legislative surroundings, should be so utterly blind to their own interests, and to their need of a special protective agency such as this Association provides, and yet stand aloof from joining its

membership. What is it but practically saying, "Every man is fallible but myself; there is no possibility of my ever being pounced upon by any of Her Majesty's zealous officers for any irregularity, accidental or otherwise; there is no probability of my ever retailing, or dispensing, or prescribing over my counter any drug, patent medicine, or bottle of medicine, the legality or illegality of which could be called in question; no Act of Parliament or Excise regulation exists, or is likely to be propounded, which can in any way affect my interests; no knotty legal question of a technical character upon which a legal opinion might save me much annoyance can possibly occur; not one of these contingencies is ever likely to happen to me? Why then should I subscribe to the Trade Association?"

Again, others say, "It is perfectly true that the Trade Association has done great good in various cases; unjust actions have been brought against several chemists charging them with infringement of certain Acts of Parliament, and this Association has at its own cost defended and protected those chemists, thus saving them untold expense and anxiety. But I shall never need its help, why then should I subscribe to its funds?"

Such are the short-sighted—may I not add intensely selfish?—arguments by which hundreds of educated chemists excuse themselves from supporting this Association. I have myself, when Local Secretary in this town, repeatedly been met with such arguments, and now to-day we see the result of this apathetic indifference in the threatened collapse of the Association.

Is this to be the case? We often hear it given as an argument against supporting the Pharmaceutical Society, that it takes no part in matters of direct trade interests (upon that question I express no opinion); but here is an Association having for its one specific object the direct protection of trade interests, which has repeatedly proved its ability to fulfil that object, and yet the trade at large is ignoring its existence and by withholding its support is doing its best to deprive itself of the benefit of an Association, the need of which may at any moment be experienced by any one of us.

It is greatly to be hoped that the direct effect of the circular issued by Mr. Haydon may be a real awakening in the trade to the importance of at once coming to the rescue, and by a large influx of new subscribers averting the threatened catastrophe, and securing the permanent safety of an Association, the loss of which will otherwise be undoubtedly realized when too late.

154, *Marine Parade, Brighton.* EDWIN B. VIZER.

[*** We have received also some other letters to the same effect.—ED. P. J.]

THE SUPPLY OF POISONS BY OILMEN AND DRUG STORES.

Sir,—I read with interest the letter of your correspondent in the Journal, January 22. I think this question is more important than that of "What is Laudanum?" We have in our town another shop of the drug store type just opened, fitted up exactly as a chemist's shop; in fact, to the eye, it presents the exact appearance of a chemist's shop, only with this difference, there appear the words "Drug Store" after the name. You can obtain paregoric at some of these shops, if not all of them, of course "sine opii," which is a "fraud" to the customer, and I have no doubt poisons are sold where it is safe. Now these ought not to exist. I, with the rest of the trade in the provinces, feel that some action should be taken in this matter, especially as the Trade Defence Association, which has done good work, is about to collapse. We are almost daily as a trade censured by Coroners for our selling poisons, in the face of our being legally qualified to do so, at the same time, oilmen, drug stores, etc., etc., *ad nauseam*, are poaching on our preserves, the situation becoming every day more and more critical. I think if this matter was taken up, either by the trade or the Pharmaceutical Society, it might result in good. I think if your readers could see eight chemists' shops within about five hundred yards, and two stores, and could feel the effects of such, they would rise as one man, and leave the "dry as dust" discussions to face stern realities, which have our claim to attention, as I feel most certainly that instead of ours being a "profession," it will soon be a defunct "trade," except to a few who are able to be in it for amusement and not profit.

Hull. REFORMER.

WHAT IS LAUDANUM?

Sir,—With all respect to Mr. Bell I venture to express the opinion that his quotation from Skeat's 'Etymological Dictionary' does not weaken the testimony of the authorities cited by me.

Dr. Mahn tells us the name laudanum was not invented by Paracelsus, and this statement can be accepted without any prejudice to the derivation given in Hooper's 'Lexicon,' because the question is not who invented it, but what was it derived from. He also states that it existed in Provençal before the time of Paracelsus (*i.e.*, 1493–1541). That being so, what is there absurd in the idea of the Provençal word laudanum being derived from the Latin *laus*, *laudare* or *laudandum*? For, did not the Provençal originate from Latin? As regards the assertion of the name having been transferred from one drug to another, it is only Mr. Skeat who says so, not Dr. Mahn or Webster.

It may seem somewhat bold to express one's opinion in the terms I used, but I must retort. It seems to me still more hazardous to accept without explanation the statements and suggestions contained in that quotation; because it should not be overlooked that the works quoted by me had passed through several editions, their authors were tried men, thoroughly well acquainted with the literature of their respective branches of science, and well known throughout Europe as painstaking writers on materia medica, pharmacy and philology.

As to Mr. Bell's objection that being so ancient they cannot be so trustworthy as the latest philologers, I fail to see the force of it. The earliest I cited was Mathiolus of 1563, whereas Skeat begins by refering to Kersey, of 1715, then to Blount, of 1674, next to Ben Jonson, about 1600, and finally to Pliny, whose Natural History was written more than 1800 years ago, and with which it is clear almost every one of the authorities mentioned by me was known to be acquainted.

It is an error to suppose I entertain any other feeling than that of respect for the name of Dr. Peter Andrew Mathiolus, of Sienna.

With regard to the word "opiate," that certainly is an instance of a name being transferred from one class of preparation to another, as originally it signified only such confections or electuaries as contained opium, but afterwards came to be used for compounds containing no opium whatever, merely the consistency and appearance of the former. In this sense it is still used in French pharmacy.

Middle Road, Roxeth. J. EAGLE.

A. E. Lomax.—CXXXIV., Polygonaceæ. 6. *Pelargonium*, Lher.

Minor asks for information respecting the composition of "Holmes's Paste for Erysipelas."

Diligent Reader.—We are unable to suggest what gas might be indicated under the name.

T. F. Walker.—Apply at the Trade Marks Registry Office, 25, Southampton Buildings, London, W.C. An abstract of the Act of Parliament and rules relating to the registration of trade marks will be found in the Calendar of the Pharmaceutical Society. This registration is not the same as "entering at Stationers' Hall."

R. H. Shields.—So far as we are able to judge, all the articles referred to in the labels, as well as those marked on the "list of Spécialités" sent, would be liable to stamp duty under the definitions in the memorandum recently approved by the Board of Inland Revenue (see before, p. 598).

W. Asten.—Linimentum Terebinthinæ.—Until some authoritative statement has been made respecting the characters of this preparation, we think it undesirable to continue the publication of correspondence on this subject.

"*Subscriber.*"—The amount of lime contained in the water is considerable; but not enough to make it unsuitable for the preparation of ordinary aërated water.

Phenol.—The coloration is probably due to an alteration of the carbolic acid to which the nitrous ether may contribute.

COMMUNICATIONS, LETTERS, etc., have been received from Dr. Saunders, Messrs. Shields, Burton, Truman, Pellew, Jones, Barrett, Grierson, Whitla.

LABORATORY NOTES.*

BY DR. B. H. PAUL.

Although analytical practice does not generally come within the scope of the pharmacist's business in this country to such an extent as it often does on the continent there is reason for believing that occupation of this kind might be made a remunerative adjunct to the more ordinary routine, and in country places especially it would be worth while for the pharmacist to provide in this way for a want that is constantly becoming more general in regard to a variety of technical matters. In any case practical skill in analytical operations is a qualification that is now necessary to every pharmacist for the purposes of his own business, in order to command the confidence of the public and to avoid being interfered with under the provisions of the Food and Drugs Act. It is from this point of view that I am inclined to think that the subjects set down for consideration this evening may be of interest to the members of this Society.

1. The Tests of Quinine Sulphate.

Although some of the facts to which I propose to refer in connection with this subject do not in themselves possess any great novelty, the special attention they have lately received in various quarters gives them a new interest at the present moment.

Among all the salts of cinchona alkaloids quinine sulphate is undoubtedly the most important in every respect, and therefore especial attention should be given to the means of ascertaining its purity. Quite lately it has been contended, that in regard to this character it is the duty of the pharmacist to enforce upon the manufacturer very stringent demands, and from an ethical point of view nothing can be said to the contrary, especially if it should be decided upon therapeutical grounds that it is desirable to use quinine sulphate in a state of absolute chemical purity. But that is a point to be determined by medical authority, and for the present it will suffice to consider what is to be understood by the term purity in this case as a matter of practical pharmacy. In doing so it will be important to bear in mind that however much we may be in a position at the present time to define the particulars which are evidence of the purity of quinine sulphate, it must be admitted that in regard to this salt the term purity has hitherto had only a relative application. With our present knowledge of the various alkaloids occurring in the material which is the source of quinine, it may be taken for granted that quinine sulphate is not likely to be naturally contaminated with cinchonine sulphate, or, indeed, with any other cinchonine salt as an accidental admixture, and hence, for practical purposes, this impurity may be to a great extent left out of consideration. For various other reasons, true quinidine sulphate may also be disregarded in this respect as being an unlikely admixture, and, in a general way, attention may be confined almost entirely to cinchonidine sulphate as being the impurity most frequently present in commercial quinine sulphate. The intrinsic value of the cinchonidine salt is very much less than that of quinine sulphate. Consequently from this point of view alone, independently of therapeutic value, it is very important to ascertain the presence and amount of this impurity in the quinine sulphate of commerce.

When we call to mind the fact that cinchonidine is almost always associated with quinine in the bark from which quinine sulphate is manufactured, and also the fact that up to the year 1844 cinchonidine was not known as an independent substance distinct from quinine, it will be evident that there is, on these grounds alone, very good reason for believing that prior to the date mentioned the article known as quinine sulphate was really a mixture of the sulphates of quinine and cinchonidine. It would be possible to mention in support of this view many circumstances recorded by trustworthy observers, but I will merely refer to the fact lately made known by Dr. de Vrij that the quinine sulphate originally manufactured by Pelletier contained a considerable amount of cinchonidine.

Winckler's identification of cinchonidine, in 1844, was coincident with the introduction of bark from New Grenada, to supply the place of the Bolivian bark that had been previously used for the manufacture of quinine, and the fact that this New Grenada bark contained a much larger amount of cinchonidine than Bolivian bark was, no doubt, the circumstance which led to the identification of the alkaloid. Unfortunately, Winckler gave it the name of "quinidine," and very shortly afterwards the sulphate of this alkaloid was met with in commerce under the name of "quinidine." At the 1851 Exhibition it was shown by Zimmer, of Frankfort, and a prize was then awarded to his firm for its production in a separate form. Probably it had been used long before as an adulterant of quinine sulphate, and as the methods of testing the purity of quinine sulphate in use at that time were not calculated to detect the presence of the cinchonidine salt, there is also a probability that it was often present to a considerable amount in commercial quinine sulphate as an accidental and to a large extent quite unrecognized impurity, originating from the material used. The literature of that period indeed furnishes abundant evidence of this, and several new methods of testing were then suggested for the detection of cinchonidine. None of them, however, were thoroughly effectual, and the official tests given in the various pharmacopœias were all of such a nature that a considerable amount of cinchonidine salt would pass unrecognized. That has, indeed, been the case up to the present time.

It is evident, therefore, that the presence of cinchonidine sulphate in commercial quinine sulphate cannot be regarded as a matter of any novelty, either as an unrecognized accident before 1844, or as a well understood fact since that time; but that, on the contrary, it was a natural consequence of the association of cinchonidine with quinine in all the varieties of material employed for the manufacture of quinine sulphate. The question as to the purity of this salt, apart from actual falsification, has therefore always been a question as to the actual amount of cinchonidine it contained. It is mainly in regard to this particular point that the value and efficiency of the tests applied for ascertaining the purity of quinine sulphate require to be considered, and it is now just ten years ago that I pointed out the defective nature of the test prescribed in the British Pharmacopœia of 1867. I then showed that by the application of the Pharmacopœia test a sample

* Read at an Evening Meeting of the Pharmaceutical Society, Wednesday, February 9, 1887.

of quinine sulphate containing at least 10 or 15 per cent. of cinchonidine sulphate could not be distinguished from one of absolute purity, or containing no more than one per cent., and that while there were some manufacturers who supplied the article in a comparatively high state of purity, that obtained from other sources often contained a large amount of the cinchonidine salt. The existence, even in the past, of such differences in the quality of a medicinal agent so important as quinine sulphate, and the possibility of their recurrence, should certainly induce pharmacists to give attention to this matter, and to verify the quality of their supplies by careful examination, not only for the sake of their own protection, but also for the purpose of enabling them to furnish a personal guarantee as to the purity of this article.

The methods of testing quinine sulphate for ascertaining its purity and detecting the presence of salts of the other cinchona alkaloids are for the most part based upon the relative solubility of those alkaloids in ether or in ammonia, and partly, also, upon the relative solubility of the neutral sulphates of those alkaloids in water. As already mentioned, the problem to be solved, under ordinary conditions, is a simple one, and it may be stated in these terms, What is the amount of cinchonidine sulphate present? The ether test was first applied for this purpose in 1852. It consisted in shaking a weighed quantity of the sulphate in question with ether and ammonia in a test tube, and if the alkaloid set free by the ammonia was completely dissolved by the ether, forming a clear solution, the sulphate was considered to be free from objectionable impurity. But the ether test thus applied is not sufficiently delicate for the purpose required. Freshly precipitated quinine dissolves readily in a very small proportion of ether, and the solution remains quite clear if the evaporation of the ether be prevented. Cinchonidine is also soluble in ether, but to a very much smaller extent. Thus, for example, 10 grains of quinine sulphate treated in this way, with 1 drachm of ether and some ammonia, will give a clear solution; but 1 grain of cinchonidine sulphate gives a very different result when so treated, a large portion of the alkaloid remaining undissolved by the ether. The actual limit of solubility of cinchonidine in ether is reached when the sulphate is in the proportion of about half a grain to the fluid drachm of ether. Hence, it might be expected, that when this test is applied to a sample of quinine sulphate containing 10 per cent. of cinchonidine sulphate, the presence of this impurity would be ascertainable. That is not the case however. When such a sample is tested in this way, the whole of the alkaloid is dissolved, forming a clear solution, and there is no indication of the presence of cinchonidine. The fact is, that an ether solution of quinine dissolves more cinchonidine than an equal volume of ether does. The practical result is that the ether test applied in the manner just described will not in any case indicate the presence of cinchonidine unless its amount is upwards of 10 per cent. at least.

It was partly in this respect that the ether test as prescribed in the British Pharmacopœia, 1867, the French Codex, 1866, and the United States Pharmacopœia, 1870, was defective. In each case also there was the further mistake of directing too large a proportion of ether to be used. Half an ounce of ether, the quantity to be used, according to the B.P., with 10 grains of the quinine sulphate to be tested, is capable of dissolving 2 grains of cinchonidine, and the 5 grams of ether to be used with half a gram of the salt according to the Codex, is sufficient to dissolve 0·0686 gram of cinchonidine, these quantities corresponding in one case to about 20 per cent., and the other to 13 per cent. of cinchonidine sulphate that would escape recognition by the test. So far, therefore, as those official standards were concerned, it is again evident that the purity of quinine sulphate must be regarded as having had up to within a very recent period only a relative significance.

In the German Pharmacopœia of 1872 Kerner's test was adopted, and it has since been adopted in the United States Pharmacopœia of 1880. It is based upon the fact that quinine is much more soluble in ammonia solution than any other cinchona alkaloid. When a cold saturated solution of neutral quinine sulphate, containing only from $\frac{1}{700}$ to $\frac{1}{800}$ of its weight of the salt, is mixed with ammonia solution, the alkaloid precipitated in the first instance is readily dissolved again by adding more of the ammonia solution. If a volume equal to that of the quinine sulphate solution be added the mixture becomes quite clear. When, however, a saturated solution of cinchonidine sulphate is treated in the same manner the result is very different, because cinchonidine is so very much less soluble in ammonia solution than quinine. Here then is a means of distinguishing between these two alkaloids, and the further difference existing between the sulphates of these alkaloids, in their solubility in water at the normal temperature, admits of this means of distinction being applied as a test for the presence of cinchonidine sulphate in quinine sulphate. The way in which this is done may be explained most readily by taking as an example the case of quinine sulphate containing 10 per cent. of the cinchonidine salt, and applying the test as directed in the German Pharmacopœia.

One gram of such a salt will contain 0·99 gram quinine sulphate, and 0·01 gram of cinchonidine salt.

The first step is to separate the two sulphates by means of their very different solubility in water.

For this purpose the sample to be tested is shaken with ten times its weight of cold water, and if the two sulphates were taken up in proportion to their respective solubility in water, the cinchonidine sulphate dissolved would be seven times as much as the quinine sulphate, since cinchonidine sulphate is soluble in about 100 parts of water; while quinine sulphate requires about 700 parts for solution.* That is the assumption upon which Kerner's test was founded, and if it were correct, the solution obtained by shaking 1 gram of quinine sulphate containing 10 per cent. cinchonidine sulphate with 10 c.c. of water would contain 0·0143 gram quinine sulphate and 0·1 gram of cinchonidine sulphate. If such a solution were really obtained under the conditions mentioned, Kerner's test would be a very delicate one. But that is not the case. The solution of the

* The solubility of neutral quinine sulphate is given somewhat differently by authorities, and it is not always quite the same for different samples. Taking the range of variation above mentioned the quantities contained in 10 c.c. of the solution will be as follows—

For a solubility of 1 part in	10 c.c of the solution will contain gram
700 parts of water at 60° F.	·0143
755 ,, ,, ...	·0132
800 ,, ,, ...	·0125

sulphates is not determined altogether by their respective solubility, and for various reasons it does not take place at the normal temperature in these proportions so readily as might be expected. The consequence is that in applying this test to quinine sulphate containing cinchonidine sulphate only a portion of the latter salt is dissolved, and the portion which is not dissolved escapes detection. This fact was pointed out by me ten years ago, in the paper which I read at one of these evening meetings; but as the test is described in the German and the United States Pharmacopœias it has not received sufficient attention. Practically considered, the result is that Kerner's test is not much better than the ether test already described, although it would be a very delicate one if rightly applied.

It is altogether useless to apply so delicate a test for cinchonidine, unless in making the solution to which ammonia is applied that alkaloid is really dissolved out of the sample to be tested. This is not done when cold water is used. Whether it be due to the slow action of cold water upon cinchonidine sulphate, or to the existence of a double salt, the result is the same, part of the cinchonidine remaining undissolved and thus escaping notice. I may here mention that I think there is some reason for believing part of the cinchonidine may be present in a free state, as it frequently happens that quinine sulphate has a decided alkaline reaction. If this be the case the insufficiency of Kerner's test in such a case would be quite intelligible.

The same test is adopted in the French Codex, and the conditions I have shown to be necessary are to some extent provided for by a slight modification intended to meet the difficulty that has just been mentioned. That consists in warming the mixture of quinine sulphate and water by immersing the tube in warm water, and then cooling the solution to a temperature of 15° C. before adding ammonia to the filtered liquid. It has been found, however, that mere warming is insufficient to ensure the solution of all the cinchonidine salt that may be present in a sample of quinine sulphate, and that consequently the application of the test in this way cannot be relied upon to afford trustworthy indications of the purity of quinine sulphate. For that purpose it is essential that the quinine sulphate tested should either be dissolved in boiling water, or at least heated to the boiling point with nearly enough water to dissolve it at that temperature. It is only in this way that the whole of the cinchonidine sulphate can be dissolved and brought into a condition to be recognizable on the subsequent addition of ammonia.* The Commission appointed by the Pharmaceutical Society of Paris to inquire into this subject has, after some months of investigation, also arrived at the same result, and therefore recommended that the mixture of quinine sulphate and water should be heated to the temperature of 60° C. But that is not sufficient to ensure the detection of all the cinchonidine salt that may be present, nor do I think that it is in any case, from an analytical point of view, a mode of procedure sufficiently precise to furnish trustworthy results as to the actual amount of cinchonidine sulphate. For various reasons, economical or therapeutical, it may be advisable or expedient to recognize a certain limitation of the purity to be demanded in quinine sulphate; but that would be most appropriately done by specifying the amount of cinchonidine salt that is to be allowable. Such a practical regulation of the matter does not, however, constitute any reason for making analytical methods less precise and analytical results less accurate than is consistent with the knowledge at our command. Any test that provides for overlooking some portion of a substance to be detected must be distrusted as unsafe.

In the present British Pharmacopœia the facts that I have previously pointed out have now been taken cognizance of and in accordance with them an improved modification of the ether test is adopted for the testing of quinine sulphate. Here the impossibility of obtaining correct results when operating directly upon the sulphate to be tested is overcome by having recourse in the first instance to a fractional solution of the salt by heating it with water to the boiling point, and then, after cooling and recrystallization of the quinine sulphate, applying the ether test to the cold mother liquor. By this means the greater part, if not all of the cinchonidine salt will be dissolved, while the proportion of quinine sulphate remaining associated with it in solution will be so minimized as to admit of the presence of cinchonidine being detected by the formation of a crystalline deposit either immediately or after the lapse of some hours.

Taking a sample containing 10 per cent. of cinchonidine, boiling 10 grains of it with 5 fluid drachms of water, then cooling to 60° F., and filtering, such a solution is obtained. To get a good result the solution should be evaporated to about one-fifth its volume before being shaken with ether and ammonia, and then the presence of cinchonidine will be distinctly indicated. Even 1 per cent. of cinchonidine sulphate can be detected in this way with certainty,* and it is very easy to tell whether any sample of quinine sulphate comes within the limit of purity fixed by the Pharmacopœia of "not much more than 5 per cent."

In regard to the testing of quinine sulphate the British Pharmacopœia is now decidedly in advance of other pharmacopœias. The ether test as there applied is more to be relied upon than Kerner's ammonia test, even when a boiling temperature is applied in making the solution, because the manipulation is more simple, and the cinchonidine can be actually weighed instead of being estimated from the quantity of ammonia solution required to dissolve it. There are also possible sources of error in the ammonia test which do not apply in the other case. Perhaps the best testimony to the excellence of the modified ether test is, however, to be found in the circumstance that very shortly after the reading of my paper here it was adopted and specially recommended by so high an authority on this subject as Dr. Hesse, who published with that object a paper in the *Archiv der Pharmacie*, describing a mode of applying this test which has been commonly referred to since as Dr. Hesse's test.

But to return to the test of the British Pharmacopœia. So far as concerns the details hitherto mentioned the principles to be observed are correctly applied; but I think it is unfortunate that the addition of acid should have been directed in making the solution, for except in so far as perfect neutralization is concerned, every drop of acid added proportionately

* Even then more than one recrystallization will generally be requisite.

* When the amount of cinchonidine is small it is requisite to leave the closed tube for twelve hours or longer for the formation of the crystals to take place.

invalidates the result by introducing into the mother liquor so much the more quinine, and thus, for the reason already mentioned, reducing the delicacy of the test for cinchonidine. Another objectionable feature of this test is the treatment of such a large volume of liquid with ether and ammonia. Five ounces of the solution will dissolve at least half an ounce of ether before there is any separation of ether to dissolve the alkaloid, and in that way a liquid will be produced which is itself a solvent of cinchonidine to such an extent as to interfere with the indications of its presence. The proper mode of operating would be to evaporate the mother liquor of the crystallization to a small bulk before treating it with ether and ammonia, and then the result of the test would be much more distinct and accurate.

2. Determination of Caffeine.

The method adopted for this purpose, and described in the *Pharmaceutical Journal* a few weeks ago, by myself and Mr. Cownley, has since then been applied to the examination of a number of different samples of coffee from various sources, and we have found that in accordance with the view we then suggested as being probable, the amount of caffeine in coffee berries is a tolerably constant quantity. For the samples examined, we are indebted to the kindness of Messrs. Patry and Pasteur, who very obligingly provided us with material representing the produce of different countries where coffee is grown upon the large scale. In these further analyses, for carrying out which I am indebted to Mr. Cownley, the coffee berries have first been dried at 212° F., since it was found very difficult to reduce them to powder when in the air-dried condition. The figures in the following table, therefore, apply to the dried raw berries, and the results previously published, have been corrected so as to allow for the amount of moisture in the berries.

Kinds of coffee.	Moisture per cent.	Caffeine. Berries dried at 212° F. per cent.	Caffeine. Air-dried berries. per cent.
Coorg	8·0	1·20	1·10
Guatemala ...	8·6	1·29	1·18
Travancore ...	10·0	1·29	1·16
Liberian	8·0	1·30	1·20
Liberian	8·0	1·39	1·28
Rio	9·1	1·20	—
Santos Brazil..	9·0	1·29	—
Manila	6·6	1·20	—
Ceylon	6·2	1·24	—
Perak	7·3	1·22	—
Costa Rica ...	7·2	1·24	—
Pale Jamaica..	8·7	1·21	—
Mysore	8·0	1·28	—
Jamaica	9·0	1·28	—

It is evident from the results quoted in this table that the discordant statements hitherto published in reference to the amount of caffeine in coffee must be ascribed to defective methods of analysis, and that, in reality, the determination of the amount of caffeine in a sample of coffee by the method we have described would be one of the most conclusive data to rely upon in any question as to the adulteration of coffee.

3. Cocaine Hydrochlorate.

In a recent number of 'Ephemeris,' Dr. Squibb has put forward a statement in reference to the condition in which this salt should be employed in medicine and pharmacy, that may be considered rather remarkable as coming from him. He proposes that the cocaine as extracted from the coca leaves should be converted into hydrochlorate, and that this salt should be reduced to a dry state by evaporating the solution with constant stirring until a granular crystalline mass remains. Such a product would probably always contain a certain proportion of uncrystallizable material, which Dr. Squibb thinks is physiologically equal to the crystallizable portion, and he recommends that the whole should be mixed together for use in medicine, because the separation of the uncrystallizable portion would entail considerable loss. Having lately had occasion to operate upon a large quantity of crude cocaine, as it is now imported from South America, my experience of this article has led me to disagree with the opinion expressed by Dr. Squibb, as to the propriety of allowing uncrystallizable hydrochlorate to be mixed with the crystallizable salt. I find that there is no difficulty in obtaining the salt in a finely crystalline condition, quite colourless and quite free from odour. It is, indeed, produced in this condition by several manufacturers, and for many of the purposes to which it is applied this appears to be the only suitable form of the salt.

[*The discussion on this paper is printed at p.* 655.]

DRUGS AND DIGESTION.*

BY ROBERT G. ECCLES, M.D.

(*Concluded from page* 591.)

In a former paper upon peptonization your essayist declared that the tinctures tried up to that time seemed to retard no more than the alcohol they contained. This has since proved to be a grave mistake. Only a few had been tried, and they under the influence of comparatively large quantities of pepsin. Up to that time, too, the method had been to digest a given time and weigh the remaining albumen. This plan was subject to such grave perturbations that it was finally abandoned for the better one of completing the digestion and taking the time consumed as a standard. A large number of tinctures were submitted to this method with the following results. The control time was again two hours. One gram of each was added to the 50 grams of fluid.

Tinctures.

	h.	m.		h.	m.
1. Chloride of iron	over 10	0	25. Digitalis . . .	3	35
2. Iodine co. .	over 10	0	26. Physostigma .	3	35
3. Chloride of iron (tasteless) .	over 10	0	27. Colocynth co. .	3	30
4. Guaiaci .	over 10	0	28. Modif'd Warb'rg	3	30
5. Guaiaci am.	over 10	0	29. Avena sativa .	3	30
6. Lupulin .	over 10	0	30. Santal . . .	3	30
7. Belladonna . .	9	5	31. Gentian co. . .	3	30
8. Warburg's . .	8	50	32. Sanguinaria . .	3	30
9. Cannabis ind. .	8	50	33. Cinchona simp. .	3	30
10. Opium . . .	8	15	34. Nux vomica . .	3	20
11. Benzoin co. . .	6	45	35. Cascarilla . .	3	20
12. Benzoin simp. .	6	10	36. Senega . . .	3	20
13. Verat. virid. .	5	30	37. Capsicum . .	3	10
14. Cubeb	5	30	38. Hops	3	0
15. Buchu	5	30	39. Gentian . . .	3	0
16. Aloes and myrrh	5	30	40. Orange peel . .	3	0
17. Valer. of am. .	5	30	41. Galls	3	0
18. Hyoscyamus .	5	20	42. Senna	3	0
19. Asafœtida . .	4	45	43. Lobelia æther .	3	0
20. Tolu	4	45	44. Krameria . .	3	0
21. Kino	4	10	45. Quassia . . .	3	0
22. Myrrh . . .	4	0	46. Valerian . . .	3	0
23. Catechu . . .	3	45	47. Aloes	4	0
24. Colchicum root	3	35	48. Colchicum seed .	3	0
			49. Cinchona co. .	3	0
			50. Stramonium .	2	55

* Read before the Brooklyn Pathological Society, Nov. 11, 1886. From the *New York Medical Journal.*

	h.	m.
51. Cardam. simp.	2	45
52. Cardam. co.	2	45
53. Lobelia	2	45
54. Squills	2	45
55. Rhubarb co.	2	45
56. Cinnamon	2	45
57. Ginger	2	40
58. Cantharides	2	40
59. Lavender	2	40
60. Ipecac. co.	2	30
61. Poke	2	30
62. Rhubarb	2	30
63. Aconite root	2	30
64. Aconite leaf	2	30
65. Lem'npeel (fresh)	2	25
66. Opium, camphorated	2	20
67. Colombo	2	15
68. Angustura	2	10
69. Cochineal	2	10
70. Virg. snakeroot	2	10
71. Conium	2	10
72. Arnica	2	10
73. Dilute alcohol	2	5

On another trial with ½ gram each of those that failed to complete digestion in the ten hours, the following results were had:—

	h.	m.
1. Tincture of chloride of iron	over 10	0
2. „ iodine co.	9	35
3. „ chlor. iron (tasteless)	6	50
4. „ guaiaci	6	10
5. „ guaiaci ammon	6	10
6. „ lupulin	5	50

Tincture of the chloride of iron did not show just how thoroughly it retarded until the quantity was cut down to 2 cg., or 1 part in 2500. Here, then, is the worst tincture in the whole list, and it turns out to be the very one that theory has led physicians to almost universally prescribe with meals. Fortunately the usual dose is so small that it can do no great amount of harm. But why let it do any? Is it not just as well to administer it between meals, and allow our pale anæmic patients the advantage of strength from their food as well as a richer oxygen supply in the blood? If we must give a tincture of iron with the meals then we had better use Creuse's tasteless. Even it retards to an injurious extent, and would be better given between meals. Some of the tinctures that are rarely, if ever, administered internally have the least retarding effect.

The principal organic bodies used in medicine and surgery and not related directly to those already given constitute the next table. With every one of these 15 cg. was the amount used, and two hours constituted the control time.

Organic Substances.

	h.	m.
1. Beta naphthol	4	50
2. Santonin with 2 grams alcohol.	4	45
3. Chloroform	4	40
4. Menthol	3	40
5. Nitrite of amyl	3	30
6. Croton chloral	2	45
7. Chloral hydrate	2	40
8. Vanillin	2	40
9. Antipyrine	2	15
10. Concent. sulph. ether	2	15
11. Powdered gum arabic	2	15
12. Sweet spirit of nitre	2	15
13. Acetic ether	2	15
14. Benzole	2	15
15. Salicin	2	5
16. Ethyl alcohol	2	0
17. Methyl alcohol	2	0
18. Paraldehyde	2	0
19. Urea	2	0
20. Milk sugar	2	0
21. Cane sugar	2	0
22. Glycerin	2	0
23. Santonin without alcohol	2	0

The last eight all came out of the bath with the control experiment, thus showing that there was no retarding effect. No. 23 being insoluble was corrected by No. 2, where it was put into solution with alcohol. With six of the other seven it took six trials to discover their retarding effect. Urea caused a delay of twenty minutes when raised to 30 cm. Methyl alcohol with 3 grams delayed digestion one hour and thirty minutes beyond the control time, paraldehyde with the same amount was ten minutes behind this, and ethyl alcohol half an hour still longer. When 8 grams of white sugar were added to the 50 grams of digestive fluid a delay of one hour and five minutes over the usual two hours occurred, and when the same amount of sugar of milk was put in it took twenty minutes more than this. It would almost seem from these results that every article used in medicine had some little retarding power that would reveal itself on using it in large enough percentage. White sugar had the least of any of those tried. Milk sugar, so commonly mixed with pepsin to form the saccharated, is of no earthly advantage in it, and is really an injury to its value. The same is true of glycerin, where it is to be put to use at once. Six grams of glycerin in a 50 gram mixture retard half an hour beyond the control time. As an antiseptic to protect the pepsin from bacteria its utility is unquestionable. Common or ethylic alcohol in half the amount delays twice as long, so that a wine of pepsin is not so scientific as a liquid pepsin, although it is not so bad as some investigators have tried to make us believe. The usual dose of wine of pepsin, diluted with the contents of the stomach after a meal, will reduce the alcohol to considerably less than 1 per cent. When in this proportion its effects are inappreciable, and besides this the alcohol must all rapidly leave the stomach and allow the pepsin to act unaffected. This is probably what occurs where people are in the habit of drinking beer or wine with their meals. After stimulating the peptic glands a little it rapidly diffuses itself through the system, and as it has no permanent ill effect upon the digestive ferment that at once assumes its proper duties. Along with the organic compounds of the last table a trial was made of two compound cathartics and two "after-dinner" pills in separate bottles. They came out together fifteen minutes after the control bottle, showing that their effects upon the digestive fluid are but slight. What their presence in the stomach might do by producing slight nausea and inhibiting the action of the digestive glands is another question that can only be answered by experiments upon patients. Of the fluid extracts but fifteen were tried. All of these except rhubarb came out on the first trial when 1 gram was used. It afterwards came out in five hours when reduced to ½ gram. Control time, two hours.

Fluid Extracts.

	h.	m.
1. Aconite	2	20
2. Valerian	2	30
3. Taraxacum	2	30
4. Licorice	2	30
5. Gentian	2	40
6. Ergot	2	40
7. Colchicum root	3	10
8. Digitalis	3	20
9. Wild cherry	3	30
10. Buchu	3	30
11. Cascara sagrada	3	30
12. Buckthorn	3	30
13. Guarana	3	50
14. Hyoscyamus	3	50

We come now to the consideration of inorganic substances and their effects upon digestion. It is no doubt unnecessary to remind you of the fact that no peptic digestion is possible without some acid, and that therefore all alkalies, alkaline carbonates and such forms of matter as are acted upon by hydrochloric acid are contra-indicated when digestion is going on, and must never be prescribed with pepsin. To order bicarbonate of sodium and pepsin in the same prescription displays lamentable ignorance on the part of any physician, and yet it is frequently done. As well might you fasten two horses of equal strength back to back, and, by whipping them up, expect work to be done as to hope for any benefit to your patient from such a combination. If an excess of sodium is given and acetic fermentation is going on, of course the patient will experience an advantage from taking it, but he would have had still greater benefit if the pepsin had not been given with it. As an illustration of the retarding effect of a drug because of its consuming the acid, iron reduced by hydrogen will answer. This one was quite a surprise when first discovered, although it should not have been so, as the inference *d priori* of its action is simple. The longer the iron is kept in contact with the acid the more it retards. If put to digesting at once the addition of an extra supply of acid hastens the work. Fifteen cg. delayed digestion three hundred and ninety minutes after the two hours of the control experiment were up. By raising the acid strength to 0·4 per cent. the same amount only delayed two hundred and ten minutes.

The following list is that of the worst retarders yet found. Only 5 mg., or 1 part in 10,000, were necessary to produce the delay mentioned. The control time is already subtracted in this and all subsequent tables. The time is given in minutes only :—

	Minutes.
1. Molybdate of ammonium	190
2. Molybdate of sodium	180
3. Permanganate of potass	130
4. Chloride of platinum	60
5. Potassio mercuric iodide	60

The next list comprises those that allowed digestion to finish after delaying the indicated time when 1 cg., or 1 part in 5000, was used. The two hours of control time are subtracted :—

	Minutes.
1. Ammonio - ferric alum	330
2. Ferricyanide of potassium	320
3. Ferrocyanide of potassium	260
4. Sulphate of iron	130
5. Bichromate of potassium	130
6. Chromate of potassium	60
7. Sol. of perchloride iron	50
8. Salicylate of lithium	30
9. Chloride of gold	20
10. Bichloride of mercury	15
11. Sulphate of sodium	15
12. Sulphate of potassium	15

The following were tested from 150 up to 50 mg., and when of the latter strength they delayed as follows :—

	Minutes.
1. Ammonium sulphite	460
2. Magnesium sulphate	330
3. Iron and potass. tart.	290
4. Antimony and potass. tart.	100
5. Mercuric nitrate	80
6. Cadmium iodide	50
7. Sodium hyposulphite	20

The next long list is composed of such non-organic drugs as digested the submitted albumen in the time named, plus the two hours of control time, when 15 cg. were added to the 50 grams. The proportion was therefore 3 parts to 1000.

	Minutes.
1. Chloride of ammonium	320
2. Chloride of calcium	250
3. Chloride of sodium	200
4. Chloride of antimony	160
5. Chloride of potassium	90
6. Chloride of lithium	60
7. Bromide of iron	360
8. Bromide of ammonium	200
9. Bromide of lithium	120
10. Bromide of sodium	100
11. Bromide of cerium	90
12. Bromide of potassium	60
13. Iodide of potassium	200
14. Iodide of arsenic	190
15. Iodide of sodium	180
16. Iodide of ammonium	170
17. Iodide of lead	60
18. Iodide of calcium	5
19. Nitrate of sodium	450
20. Nitrate of potassium	390
21. Nitrate of strontium	380
22. Nitrate of uranium	310
23. Benzoate of sodium	160
24. Benzoate of ammonium	160
25. Benzoate of lithium	140
26. Benzoate of potassium	110
27. Sulphide of potassium	650
28. Sulphate of ammonium and alumin.	750
29. Sulphate of copper	720
30. Sulphate of magnesium	690
31. Hypophosphite of manganese	80
32. Hypophosphite of sodium	60
33. Hypophosphite of potassium	40
34. Chlorate of sodium	280
35. Chlorate of potassium	200
36. Acetate of sodium	30
37. Acetate of ammonium	30
38. Sulphocarbolate of zinc	140
39. Sulphocarbolate of sodium	80
40. Phosphate of iron	60
41. Phosphate of sodium	30
42. Salicylate of sodium	690
43. Salicylate of potassium	360
44. Valerianate of ammonium	60
45. Valerianate of zinc	30
46. Ammon. citr. of iron	410
47 Ammon. citr. of bismuth	90
48. Sulphite of sodium	330
49. Citrate of iron, U. S.	60
50. Oxalate of cerium	60
51. Lactophosphate of calcium	10
52. Biborate of sodium	10
53. Arsenate of sodium	10
54. Cyanide of potassium	5

A glance over this list shows that the sulphates are the most active inhibitors of digestion. Among the alkaloidal salts the same was the case. Why sulphate of quinine ever came to be so universally prescribed in preference to the much better chloride is hard to tell. The same is true of sulphate of morphine. In the chlorides there is more of the active principle to the same weight, they are much more soluble in the gastric juice, and they retard digestion less. Next to the sulphates the nitrates are the great retarders. The bromides average lower than the chlorides, while the latter are about even with the iodides. Bromide of iron ranges high, like many of the iron non-organic salts. Dialysed iron and the solution of pernitrate of iron retarded respectively one hundred and fifty and one hundred and ten minutes when 15 cg. were used, which is lower than the run of their class. The salicylates are far above the benzoates, and the chlorates hinder much more than than chlorides. The general run of all agrees very well with the activity of their acids, according to a preceding table. The next list comprises those having the least retarding power of any tried. When 15 cg. were used no effect could be perceived. The amount was therefore double, thus making 3 parts in 500.

1. Acetate of potassium	280
2. Citrate of potassium	90
3. Phosphate of calcium	60
4. Tartrate of potassium	50
5. Rochelle salts	20
6. Acetate of lead	5

It has been observed during this investigation that antiseptics average high as retarders, and an approach is made by them in this power that runs nearly parallel with their germ-destroying power. Potassio-mercuric iodide, the most potent germicide known, was found to hold back digestion one hour when only 1 part in 10,000 parts was used. Bichloride of mercury required but 1 part in 5000 to retard fifteen minutes. While there are substances not known to be germicides that retard still more, still it is somewhat curious to find this class range so high and at the same time occupying positions toward each other that suggest the order of their germ-destroying power. The molybdates seem to lead everything else as inhibitors, and they are the very best known precipitants of peptone. Homœopathists should make some "provings" upon the salts of molybdenum and use them as cures for dyspepsia. They would certainly have similar results from the drug as from the disease.

COMMERCIAL JALAPIN AND JALAP RESIN.*

BY EDMUND WHITE,
Bell Scholar.

Having several times met with the statement that the jalapin and jalap resin of commerce were not prepared from the official jalap derived from *Exogonium purga*, but from the roots of other convolvulaceous plants. I was

* Read at a meeting of the School of Pharmacy Students' Association, Thursday, January 20.

induced to enter upon some investigations on those two substances with the object of testing the accuracy of the statement I have just referred to.

The resin of the Pharmacopœia is directed to be prepared by exhausting jalap in No. 40 powder, by maceration and percolation with rectified spirit, adding water to the tincture thus produced and distilling off the spirit. The residue is removed while hot to an open dish and allowed to cool. The supernatant liquor is now poured off and the resin washed two or three times with hot water and dried in a stove.

Jalapin being unofficial one would be prepared for a good deal of variation in the article sold under this name. It is usually stated to be prepared by adding water to a tincture of jalap until a slight turbidity remains, then digesting with animal charcoal, evaporating the decolorized tincture to dryness, and washing the residue with hot water to remove gummy and saccharine matter and finally drying in a stove. It occurs in commerce in powder.

The convolvulaceous plants to which I have referred as the reputed source of jalapin and jalap resin are:—*Ipomœa simulans*, the dried root of which is known as Tampico jalap, and *Ipomœa Orizabensis*, from which is derived the variety of jalap known as male or woody jalap or Orizaba root. The latter is now seldom, if ever, met with in large quantities.

The resin obtained by means of alcohol from Vera Cruz jalap was examined by Mayer and found by him to consist really of two resins, one which he named convolvulin, constituting about 90 per cent. of the official resina jalapæ, and another present in much smaller quantity, to which the name of jalapin is given.

The resins occurring in the roots of *Ipomœa simulans* and *Ipomœa Orizabensis* have been said by Hanbury to consist entirely of jalapin. Evans, however (*Pharm. Journ.*, [2], x., p. 220), states that the resin from these two plants is only soluble to the extent of one-half in ether.

Now both convolvulin and jalapin are soluble in alcohol, but ether forms a ready means of separating the two, convolvulin being quite insoluble in ether, but jalapin readily soluble.

It is rather unfortunate, and confusing also, that the principal resin of Vera Cruz jalap should have received the name of convolvulin, while the less important one is known as jalapin, but these two names are now so well established that any attempts to reverse or alter them would only lead to greater confusion.

The formula of convolvulin is $C_{31}H_{50}O_{16}$; when pure, it is colourless, odourless, and tasteless; brittle when dry; melting at 150° C. Its melting-point is, however, considerably lowered by the presence of small quantities of moisture. It dissolves in aqueous solutions of alkalies, forming a convolvulinate of the base. By the action of warm dilute nitric acid ipomeic and oxalic acids are formed; ipomeic acid was at first considered to be a peculiar acid, but it has now been identified with sebacic acid. By dilute sulphuric acid or emulsin convolvulin yields glucose and convolvulinol, which is regarded as the anhydride of convolvulinolic acid.

The formula of jalapin is $C_{34}H_{56}O_{16}$. It will thus be seen to be homologous with convolvulin, from which it differs by the addition of $3CH_2$. Its decomposition products are also similar to those of convolvulin and by the action of dilute nitric acids upon it, ipomeic and oxalic acids are formed.

The point to decide then is, do commercial jalapin and jalap resin consist of convolvulin and jalapin, or of jalapin only? I say, *commercial* jalapin, because it is generally understood that the trade article represents the purified active principles of the official Vera Cruz jalap; but, as I have mentioned before, the resins obtained from that source consist mainly of convolvulin, true jalapin being only present to the extent of from 4 or 5 to about 10 per cent.

The investigations were carried out in the following manner:—

An apparatus was arranged for continuous percolation. A weighed quantity of resin, in fine powder, mixed with about three times its bulk of sand was placed in the percolating tube. This sand, in order to purify it, was previously treated with hot hydrochloric acid, then washed, dried, and sifted; pure ether was poured on to the mixture of sand and resin, and allowed to percolate until a quantity judged sufficient for exhaustion had collected in the flask below. The apparatus was now fitted together and heated on a water-bath, the percolation being allowed to continue until a small quantity of the ether dropping from the percolator left no residue by evaporation on a watch glass. The ethereal percolate having been poured out into a tared beaker the flask was carefully rinsed out with more pure ether, the washings being added to the contents of the beaker. This was now evaporated to dryness and the residue dried at a temperature of 100° C. until it ceased to lose weight. The product thus obtained corresponds to the jalapin of Mayer and Kayser.

To extract the convolvulin alcohol was next poured into the percolator, the same precautions being observed as with the ether. It was found, however, that the residue required drying for a longer time in order to obtain a constant weight. The beakers after removal from the drying oven were placed to cool under a bell-jar over sulphuric acid in order to prevent reabsorption of moisture while cooling. When alcohol failed to remove the whole of the material introduced into the percolator, the sand, of course, excepted, boiling distilled water was passed through it, and the portion removed by the water estimated in the usual way.

The amount of moisture present was calculated by drying a weighed portion of the powdered substance on a tared watch-glass for a hour and a half at a temperature of 100° C., and then weighing again.

By these means were obtained the figures which I have arranged in a tabular form showing the percentage composition of the two drugs as met with in commerce.

I examined eight specimens of jalapin and six of jalap resin, and obtained results which with four exceptions show that they are derived from true jalap. The specimens were drawn from various sources, the series being made as representative as possible of the commercial articles.

All the jalapins were in fine powder, and nearly white, specimens C. and E. having a very slight tinge of stone colour. From the figures yielded by analysis it would seem as if all but one had been derived from the root of *Exogonium purga*. One feature to be noticed was the absence of aqueous extractive. Both the ethereal and alcoholic residues were pale yellow, or nearly colourless and transparent when viewed in thin films. The ethereal residues, which, perhaps, represented nearly pure jalapin, had an irritating odour when hot, but this disappeared on cooling, and was succeeded by a rather pleasant coffee-like odour. They were all soluble in solution of caustic potash or soda, and gave with strong sulphuric acid, first a red and then a deep purple colour. In consistency they were stiff and tenacious, and even if dried for a long time could not be rendered quite hard. This is one of the characters of jalapin.

The percentage of jalapin in A. and D. will be seen to be rather less than that usually stated to be present in true jalap resin. This may be due to the fact that in order to obtain jalapin as colourless as possible, it is washed with a large volume of water, and by this washing a little of the jalapin, which is very slightly soluble in water, might be removed. Specimen "H." was purchased in 1877 from a well-known wholesale house; it is evidently not the resin of the true jalap, but consists of Mayer's jalapin and was probably derived from Tampico jalap.

Passing now to the alcoholic residues: they were

brittle when dry, thus affording a great contrast to the residues obtained by the evaporation of the ethereal percolate. They were soluble in solutions of the fixed alkalies; odourless and nearly tasteless (pure convolvulin is quite tasteless). When chewed they adhered to the teeth, and were slightly acrid in the throat. The amount of moisture present was inconsiderable, averaging from 2 to 5 per cent. It would appear, therefore, from these results that the so-called jalapin was not, chemically speaking, jalapin, but consisted, mainly, of convolvulin.

Turning our attention to the table of resins it will be seen that Nos. 1 and 2 only will correspond to the British Pharmacopœia tests. Nos. 1 and 2 resembled each other very much in physical characters. They were brittle and easily powdered, translucent at the edges and stronger in odour than the jalapins. No. 1 contained traces of aqueous extractive, probably owing to it having been incompletely washed.

No. 3, which shows such a high percentage of aqueous extractive, was nearly black in mass, tough and difficult to powder, The percentage of jalapin is not higher than it should be. The aqueous extractive was reddish-black, and brittle.

No. 4, which yielded such anomalous results, was brittle and easily powdered, and resembled to a great extent in appearance Nos. 1 and 2. The portion dissolved by the water was reddish-black and brittle when quite dry.

No. 5 was brittle and easily powdered, but very dark in colour. Slight traces of aqueous extractive were present.

No. 6, which yielded nearly half its weight to ether, had characters very similar to those of Nos. 1, 2 and 4.

The analysis of those six samples cannot be considered to have given satisfactory results, inasmuch as only two of them, Nos. 1 and 2, answer to the test required of the true jalap resin. No. 3 has evidently been unskilfully or carelessly prepared, but the proportion of jalapin is not higher than that sometimes found in jalap resin. Nos. 4, 5 and 6 yielded results which are very difficult to account for. Their composition can only be explained on the assumption that they were either a mixture of the two resins or that the resins of *Ipomœa simulans* and *I. Orizabensis* are not of constant composition. The percentage of moisture in the resins was from 3 to 6 per cent. The ethereal residues resembled those obtained from the jalapins in being plastic and tenacious, but were of a reddish-brown colour. The odour was also very similar, but somewhat stronger.

The alcoholic residues were brittle, brownish in colour, and translucent. They were nearly tasteless, and had an odour resembling that of the resin from which they were obtained, but much fainter.

Composition of "Jalapin" in 100 parts.

	Ethereal extract.	Alcoholic extract.	Aqueous extractive.
A	3·5	94·8	none
B	4 3	91·5	,,
C	4·9	90·6	,,
D	3·3	92·6	,,
E	6·7	89·2	,,
F	6·8	87·9	,,
G	7·3	87·8	,,
H	all soluble	none	,,

Composition of "Jalap Resin" in 100 parts.

No.	Ethereal extract.	Alcoholic extract.	Aqueous extractive.
1.....	7·8	88·2	traces
2.....	7·2	89·2	none
3.....	8 4	72·4	16·6
4.....	77·8	16·6	3·1
5.....	25·6	72·0	traces
6.....	46 0	50·4	none

MILKY JUICE OF CERTAIN EUPHORBIACEÆ.*

BY G. HENKE.

Hitherto euphorbone had not been obtained in a pure state, even Flückiger, who proposed the name, was unsuccessful. The author treated finely powdered euporbium in the cold with light petroleum of 60° to 70° boiling point; this treatment being repeated as long as anything was dissolved. The solutions obtained were mixed, filtered, and allowed to evaporate spontaneously. The sides of the evaporating vessel became coated with beautiful, transparent, crystalline needles of euphorbone, whilst the remainder of the residue consisted of a yellowish, crystalline, warty mass. Repeated treatment with light petroleum gives a pure product finally, but is wasteful; it is better to dissolve the yellow mass in ether after removing the petroleum by heating on the water-bath; on adding alcohol until a faint turbidity appears, filtering and allowing to remain, a yellow, resinous mass separates. The liquid on evaporation leaves a snow-white, butter-like mass which gives brilliant needles on crystallizing from a sufficiently dilute solution of light petroleum. *Euphorbone* thus prepared melts at 67° to 68°, its composition was found to be $C_{20}H_{36}O$. Its rotatory power dissolved in chloroform was $[\alpha]_D = +15{\cdot}88°$. Its crystals are persistent in the air, tasteless, and are neutral in solution. It is very soluble in light petroleum, chloroform, ether, alcohol, benzene, acetone, and 90° vol. per cent. alcohol, less soluble in more dilute alcohol. It is unaffected by dilute acids, sodium carbonate, ammonia, potash, and soda, and by alcoholic zinc chloride solution. It is soluble in 10,000 parts of hot water. Cold anhydrous acetic acid does not affect it; when heated at 150° to 200° a solution is obtained from which a yellowish precipitate is thrown down on diluting with much water, this precipitate has the properties of unchanged euphorbone. Bromine acts violently on the compound, producing a yellow, resin-like, non-crystallizable mass. Hot nitric acid dissolves euphorbone, and from the solution an amorphous, nitrogenous compound can be obtained. A granular oxidation product was obtained by long boiling with potassium dichromate and sulphuric acid. On heating euphorbone with phosphoric anhydride, heptane, octane, xylene and small quantities of other aromatic hpdrocarbons were obtained. The residue from the preparation of euphorbone, when extracted with alcohol, yielded two resins, one soluble and the other insoluble in ether; their reactions are detailed. The detection of malic acid, gum, and other substances in the residue and the extraction therefrom are described. The pure euphorborium was found to contain:—Euphorbone, 34·60; resin soluble in ether, 26·95; resin insoluble in ether, 14·25; caoutchene, 1·10; malic acid, 1·50; gum and salts precipitated by alcohol, 8·10; gum and salts not precipitated by alcohol, 12·30; salts and organic substances soluble in ammonia, 1·20 per cent. Somewhat similar results were obtained in the case of juices of other plants of the euphorbia class.

PRESERVATION OF FLOWERS.

The *Chronique Industrielle* states that flowers may be preserved, with all their brilliancy and freshness, in the following way:—In a well-corked bottle, dissolve six drachms of coarsely cracked, clear gum copal, mixed with the same weight of broken glass, in 15½ ounces (by weight) of pure rectified sulphuric ether. Soak the flowers in this mixture, take them out slowly, and expose them to the air for ten minutes; then immerse them anew, and again expose them to the action of the air. Repeat this operation four or five times. The flowers thus treated will keep for a long time if care be taken not to handle them too much.—*Journ. Royal Micros. Soc.*

* From *Arch. Pharm.*, [3], xxiv., 729—759. Reprinted from the *Journal of the Chemical Society*.

The Pharmaceutical Journal.

SATURDAY, FEBRUARY 12, 1887.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

DEATH BY POISON.

THE publication of the annual report of the Registrar-General again offers an opportunity of taking a retrospective glance at the records of those deaths ascribed to poison, which have an especial interest for pharmacists by reason of the fact that it is commonly assumed the articles which in such cases are the cause of death are obtained through their hands. That assumption is to a large extent incorrect, under the conditions actually existing, and in view of the possibility of a legislative measure relating to the sale of poisons being introduced into Parliament by the Government it will not be inappropriate to take this opportunity of illustrating the extent to which death by poison, either accidental or by suicide, has been caused by poisons of those kinds which can be obtained from extra pharmaceutical sources. The year 1885, to which the report now published applies, was remarkable for the small ratio of violent deaths as compared with any preceding years of the period during which these reports have been issued. The total number of such deaths was 17,268, and of these 14,939 are classed as being due to accident or negligence, and 2007 as suicidal. There has been a great reduction in the deaths from accident, and the total mortality from suicide, which had been gradually increasing in recent years, was lower than in any year since 1878. From the classification of the deaths by accident and suicide according to particular causes it appears that out of the 14,939 under the general head of accident or negligence 343 are recorded as due to poison, and out of the 2007 under the head of suicide 280 are recorded as being due to poison. The total number of deaths by poison during the year is, therefore, 623, or rather less than 3·7 per cent. of the total deaths by accident, negligence and suicide. Of the deaths by suicide 13·95 were caused by poison, but of the deaths by accident or negligence only 2·29 are recorded as having been due to poison. So far as the public safety is concerned in connection with the sale of poisons, it is, therefore, satisfactory to find that as compared with other causes of death by accident or negligence, neither the actual number nor the relative proportion of deaths thus caused by poison is considerable. In the case of suicide, as might be expected, the proportion of deaths due to poison is larger; but even in this case it is in fact one of the causes to which the smallest number of deaths is due. Among the deaths by suicide from poisoning, the number of males was about 75 per cent. in excess of that of females, and in the cases of death by accident or negligence it was upwards of 80 per cent. in excess, though in this latter case the relation may be more accidental.

Since the cases of deaths by poisoning from accident or negligence are those which present the greater interest in connection with any question as to the public safety, it will be convenient to examine in the first place what are the articles that have been most frequently the cause of death in this way. As usual, the narcotic preparations occupy the most conspicuous place as having been the cause of the greatest number of deaths. They comprise opium, laudanum, morphia, soothing syrup, cordial, paregoric and chlorodyne, to which no less that 108 out of the total number of 343 deaths are ascribed. The class of substances which stands next in order, as having after narcotics been the cause of death in the greatest number of instances, comprises articles which are not for the most part poisons by Act of Parliament; such as the mineral acids—sulphuric, nitric and hydrochloric acids—and carbolic acid, which have been the cause of death in 38 cases. The more deadly poisons, such as strychnine, prussic acid, aconite, belladonna, cyanide of potassium, nux vomica, etc., taken altogether, are accountable for a very much smaller number of deaths, 16 in all. The remaining cases of poisoning under this head comprise 20 that are ascribed to alcohol, chloroform and chloral, 24 that are referred to chemical products such as caustic alkalies, phosphorus, bromide of potassium, and lucifer matches; 99 ascribed to arsenic, mercury, lead, copper and zinc; and 33 to miscellaneous articles, some of which are not described.

Among the cases of death by suicide from poison, the large number of 88, or 31·4 per cent. of the whole, is reported as having been caused by the mineral acids, carbolic acid and oxalic acid. Next in order comes the class of narcotic poisons, opium, laudanum, morphia, chlorodyne, paregoric, soothing syrup, etc., to which 53 cases of death are attributed. Of the remaining 139 cases, 49 are attributed to belladonna, prussic acid, oil of almonds, cyanide of potassium and aconite, 2 to chloroform, 20 to strychnine, nux vomica and vermin killers, and 43 to kinds of poison that have not been stated. In addition to these cases of death by poison three cases are recorded of murder of children under five years of age by poison, where narcotic preparations and a poisonous liniment were employed. These statistics will serve to show the direction in which legislation may be needful in regard to the sale of poisons.

THE CHEMISTRY OF THE CINCHONA ALKALOIDS.

THE necessity of publishing the proceedings of the evening meeting unavoidably prevents the insertion this week of a paper received from Dr. HESSE, in which he points out some further defects of the chromate method suggested by Dr. DE VRIJ for the determination of quinine. In regard to this subject Dr. DE VRIJ has been unfortunate, for, though he may be admired for his chivalrous attachment to the herapathite method long after most chemists had ceased to trust it, there is reason to fear it was the means of leading him into error in some respects, before he eventually perceived the necessity of giving it up. This is especially the case in regard to the overlooking of cinchonidine that is to be expected with the herapathite method of determining quinine, as shown by Professor FLÜCKIGER'S pupil SCHIMOYAMA. In some of the analyses published by Dr. DE VRIJ, there is a remarkable absence of any indication of cinchonidine. The enthusiasm with which he has also lately advocated the chromate method appears to have been somewhat premature, according to the observations of Dr. HESSE, and a further study of the chromates of cinchona alkaloids will be necessary before the method can be applied with certainty. This is clearly shown by the case of quinidine chromate, which decomposes under the influence of direct sunlight almost as rapidly as tinder would take fire in the focus of a burning glass. It appears, therefore, that Dr. DE VRIJ should not object to criticism in the manner he has done lately in a Dutch journal, but rather remember that in regard to this subject "there is much to be learned, which practice "only can teach; and it is surely better for us all to "recognize this fact, and not allow such difference of "opinion as we may feel respecting a matter as yet "uncertain, to interfere with courteous communica-"tion of sentiment and co-operation as far as pos-"sible."

While writing of this subject we may refer to the recent communication by Dr. HESSE as to the nature of the crystals formed in a solution containing quinine and cinchonidine as one that has a very great interest. He regards these rhombic crystals not as cinchonidine, as was formerly supposed, but as a compound of that alkaloid with quinine, represented by the formula $C_{20}H_{24}N_2O_2 + 2C_{19}H_{22}N_2O$. The same fact appears to have been noticed by Mr. VAN DER SLEEN, who has also inferred the existence of other compounds of the two alkaloids simultaneously with Dr. HESSE.

It is certainly remarkable that the compound first described by Dr. HESSE appears to possess great tenacity of existence, and to maintain this character even in its saline combinations so as to seem almost to set a limit to the separation of quinine from cinchonidine, for Dr. HESSE has obtained a double sulphate in which the two alkaloids bear the same ratio to each other as in the above-mentioned compound. Though it is not very long since cinchonidine escaped from the protean condition in which it remained for several years, the observations of Dr. HESSE almost suggest the question whether we are really yet acquainted with cinchonidine and its salts, or only with compounds of which that alkaloid forms but a constituent part. In any case the question raised is an important one, and it will require to be examined with care and impartiality.

The conclusions arrived at by Dr. HESSE are based upon polariscope observations only, we believe, and although there is every reason to suppose that those observations have been made with the precision that usually characterizes his work, polariscope data are not quite so satisfactory as evidence in such a case as the actual separation of the alkaloids chemically. This appears to be the point that now calls for investigation in order to settle the question at issue satisfactorily. Evidently if Dr. HESSE'S views are confirmed the determinations of cinchonidine sulphate on the basis of the crystals obtained from ether, such as those referred to by Dr. DE VRIJ last March,* will have to be reduced by at least one-third of their amount on that account alone.

From the Registrar-General's returns of the Births, Deaths and Marriages in England during the year 1885, which has just been issued, it appears that the deaths registered in that year, out of an estimated population of 27,499,041, numbered 522,750, and were in proportion of 19 persons to every 1000 living. With the exception of the death rate of 1881, which was 18·9 per 1000, this is the lowest that has yet been recorded, showing a continuation of a marked decline in the death rate, which commenced about the year 1860. The mean rate during this last quinquennial period, 1881-85, has been only 19·3 per 1000, and the maximum 19·6 per 1000, whilst the lowest death rate recorded in any year previously to this quinquennium was 20·3 per 1000.

* * *

The Junior Pharmacy Ball took place at Willis's Rooms on Wednesday evening last, and was, as heretofore, numerously attended. At supper the toast of the evening, "Success to the Junior Pharmacy Ball," was proposed by the President of the Pharmaceutical Society, Mr. M. Carteighe, who referred to the services of Mr. W. H. Kerr, the Honorary Secretary, in connection with the Ball. The President of the Chemists' Assistants' Association, Mr. Millhouse, responded to the toast. From the large attendance it seems certain that the Committee will have a handsome surplus available for the Benevolent Fund.

* * *

A meeting of the Chemical Society will be held on Thursday next, February 17, when papers will be read on "The Influence of Temperature on the Heat of Dissolution of Salts," by S. U. Pickering, and "Researches on the Laws of Substitution in the Naphthalene Series," by Dr. Armstrong.

* * *

The next meeting of the School of Pharmacy Students' Association will be held on Thursday, February 17, when Mr. W. H. Ince will read a paper on "Atoms," and Mr. F. J. C. Bird will give a report on Practical Pharmacy.

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At a meeting of the Chemists' Assistants' Association, to be held on Wednesday evening, the 16th inst., a paper on "Pharmaceutical Soaps," by C. Thompson, F.C.S., will be read.

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* See *Pharm. Journ.*, xvi., 784.

Transactions of the Pharmaceutical Society.

EVENING MEETING.

Wednesday, February 9, 1887.

MR. T. P. GOSTLING, VICE-PRESIDENT, IN THE CHAIR.

An Evening Meeting of the Society was held on Wednesday last, at 17, Bloomsbury Square. The chair was taken at eight o'clock by the Vice-President (Mr. T. P. Gostling). The proceedings commenced by the reading of a paper entitled :—

LABORATORY NOTES :—1. THE TESTS OF QUININE SULPHATE ; 2. DETERMINATION OF CAFFEINE ; 3. COCAINE HYDROCHLORATE.

BY DR. B. H. PAUL.

The paper is printed at p. 645, and gave rise to the following discussion :—

The VICE-PRESIDENT said it was very gratifying to hear Dr. Paul state that the test for sulphate of quinine given in the British Pharmacopœia was the best which could be adopted. The subject was a very important one to pharmacists, not only for their own satisfaction in dispensing pure articles, but in order that they might save themselves from frivolous prosecutions under the Sale of Food and Drugs Act.

Professor ATTFIELD said that what the meeting had heard that evening was of course extremely interesting, as being a *résumé* of the literature of the analytical work in connection with quinine, and no one was better qualified than Dr. Paul to give such a *résumé*. One was reminded anew in connection with the difficulties respecting the detection of one alkaloid in the presence of others, of the fact that one could never rely upon the solubilities of two substances, when they were mixed together in a particular menstruum, being the same as the solubility of each substance taken separately in the same menstruum. Throughout the whole of analytical chemistry, one met with difficulties occasioned by the non-recognition of that fact, not only in connection with alkaloids, but in connection with inorganic substances. It was well known that one could never depend upon what looked like promising processes for separating sulphide of arsenium from sulphide of antimony if reliance were placed upon the solubilities which applied to each of those substances separately. It was the same with regard to the allied alkaloids of cinchona bark. As to the addition of acid in the present Pharmacopœia test it was inserted by the highest authority. Nevertheless he could assure pharmacists generally, in respect to the suggestions made by Dr. Paul, that if he continued to have the honour of being reporter in connection with the production of a future pharmacopœia, no work of pharmacists should be passed over for the want of being brought before the proper authority. He was very glad to hear Dr. Paul speak of the highly advanced position of the present British Pharmacopœia as compared with those of other pharmacopœias.

Mr. WATSON WILL wished to ask Dr. Paul a question with respect to the alleged volatilization of caffeine. Dr. Paul stated that there was no loss of caffeine in roasting coffee. Roasters of coffee had stated that there was a considerable percentage of loss, and if printed authority was to be taken the loss was about 18 per cent. The usual yield was about 98 pounds of roasted coffee to 1 cwt. of berries. In his own experiments he had failed to detect any loss of caffeine in roasting.

Professor DUNSTAN said that the subject referred to by the last speaker was one of considerable importance. The statements on the subject had been extremely conflicting, but about seven years ago Bernheimer published the result of an investigation of the products of roasting coffee, and he showed that only about a quarter per cent. of the caffeine was present, and that the greater portion of the substance volatilized was palmitic acid, caffeol, which was a methyl derivative of saligenin, and other bodies. Several experiments were made, but in no case was the amount of caffeine volatilized found to be higher than one quarter per cent.

Mr. WATSON WILL asked Professor Dunstan whether Bernheimer's work was later than that of Tennik and König, who had recorded the volatilization of a higher percentage.

Professor DUNSTAN said that Bernheimer had summed up the previous experiments, which reported that larger amounts were volatilized.

Mr. WATSON WILL said that he believed that those statements were quite erroneous.

Professor ATTFIELD said that perhaps Dr. Paul would state in his reply the limits of the natural proportion of caffeine in coffee, and whether in the matter of limits it resembled the non-fatty material in milk, which was about 9·3 per cent., but was liable to vary to some extent, for which reason a lower limit was taken in testing samples of milk in connection with the Food and Drugs Act.

Mr. COLLIER said that Dr. Paul had mentioned that a portion of cocaine did not crystallize well as hydrochlorate. It had been asserted lately that cocaine possessed toxic properties. He had, however, known it used in solutions of considerable strength, but he had never come across any case of that kind. Nevertheless, he had been told by other persons that they had observed its toxic properties in their own practice. The cocaine which he had dispensed had always been well crystallized, and he had never observed any bad effects from its use. Perhaps the toxic effects might be due to the presence of some other body.

Mr. GRAVILL said that during the last few days he had made a collection of nine samples of hydrochlorate of cocaine from different sources. He had examined whether these samples contained any large percentage of amorphous cocaine. His experience, like that of Dr. Paul, had been that some of those samples which were crystallized gave indications of mere traces of amorphous alkaloid, whereas those that were simply granulated contained a considerable amount of amorphous alkaloid. One or two samples gave distinct indications of their hygroscopic nature. In particular one sample of cocaine contained, he should say, not less than 50 per cent. of amorphous alkaloid.

Mr. SEWARD said that from a dispenser's point of view he had a large quantity of cocaine passing through his hands. It was used principally in eye cases, and sometimes it was used for dental purposes. He had found that a 3 or 4 or 5 per cent. solution had to be freshly prepared when required, and that it could not be depended upon the day after it was made. He had been wondering whether the deterioration was due to a change from the crystalline to the amorphous condition. He had found that for dental operations the virtue of the cocaine seemed to be maintained longer, but yet after a few days fresh preparations had to be made. If the preparation used for eye cases was not sufficiently fresh it caused a purulent discharge. Within the last few days he had had a specimen which had a strong mousy smell; that was a granular preparation, but he had not had a chance of examining it. He had come to the meeting with some hope that he might get an explanation of that odour. He believed that Dr. Paul had said that the amorphous alkaloid had a similar smell. He should like Dr. Paul to tell him whether he might regard the smell in the granular preparation, to which he had alluded as being due to the presence of a large percentage of the amorphous alkaloid. Upon smelling the sample now exhibited by Dr. Paul he found that it had a smell of the same nature as the specimen to which he had alluded, but in his own specimen the smell was much stronger.

Dr. PAUL, in reply to Dr. Attfield, said that the figures representing the amount of caffeine in coffee varied from

1·2 to 1·3 per cent. in about 10 or 12 of the samples of coffee analysed. There was only one exception, in which the amount was 1·39 per cent. That was Liberian coffee. Strange to say, Liberian coffee appeared to show a higher percentage than any other kind. As to the loss of caffeine in roasting, he had made several experiments on small quantities, and these indicated that there was either no loss of caffeine by volatilization, or an exceedingly small loss. Statements as to such a loss had, however, been made positively and very circumstantially. Some years ago the writer of a paper published in the *Pharmaceutical Journal* proposed that the caffeine so volatilized should be collected by the coffee-roasters for the purpose of being utilized. A little reflection, however, would very soon satisfy one that the caffeine was not likely to be volatilized at the temperature applied in roasting, for it existed in the coffee berry in a non-volatile state in combination with caffetannic acid; and it was only when liberated from that state of combination that it could be volatilized, and that by heating it to a higher temperature than was applied in roasting coffee. With regard to cocaine, it was chiefly in consequence of Dr. Squibb's remarkable note in 'Ephemeris' that he had referred to the subject that evening. The samples shown happened to be accidental residues of some experiments on a large scale, and he had brought them for the sake of showing that both cocaine and its hydrochlorate could be obtained in a well crystallized form without any considerable waste of material. In this form it was entirely free from smell and colour, and presented itself in a form which appeared to be the proper one for its use in medicine. The other material with which it was associated was a gummy uncrystallizable alkaloid, which, when converted into hydrochlorate, made a still more objectionable hygroscopic salt; and he thought that it ought to be excluded from use in pharmacy. The smell referred to by some of the speakers was one highly characteristic of some samples of hydrochlorate, and it was always an indication of the presence of the uncrystallizable salt.

Coffee Husks and Catha Edulis.

Mr. Allen said he had been entrusted by Mr. Redhouse with two specimens. That gentleman had for many years resided in Turkey and other parts of the East, and he had continually evinced his desire to improve their knowledge of eastern materia medica. A short time ago Mr. Redhouse wrote to his friend the Consul at Jedda, with regard to coffee and another matter, and in reply he had received a letter from the Consul in which occurred the following passage:—

"I send you by this mail per sample post, a bag containing a small quantity of the dried 'gisher' or shell of the coffee berry, so largely consumed both here and in the Yemen for coffee. Also, by same means, a quantity of the dried 'quāt' so much chewed in the Yemen. This last has been forwarded to me by our Vice-Consul at Hodeidah, who says:—'In Yemen they always chew gāt green and fresh, but whenever they proceed to the Hedjaz for Haj, or go to some other place where gat is not obtainable, they do not fail to provide themselves with a quantity of the gāt herb previously dried. The Arabs of the Yemen never make nor have made a decoction from gāt to drink.'"

So far as he (Mr. Allen) could find there was no record of the coffee husks being used as a beverage. It was a singular thing that the Arabs should discard the seeds altogether, and use only the husks for drink. There was no aroma in the husks. He found that the "kat" had been described in an interesting paper by Mr. Hanbury, in the *Pharmaceutical Journal*, [1], xii., p. 269. The "kat" was really the *Catha edulis*. The top shoots were probably cut off in a fresh state and brought to the market. They were very eagerly bought by the natives, both rich and poor. The men went into the bazaars or exchanges, and drank water and energetically chewed the herb, and thus got into a pleasant state of exhilaration. It would be interesting to ascertain whether these leaves contained an alkaloid or glucoside. In most text-books it was stated that the *Catha edulis* was used for making a drinking decoction as well as for chewing, but in the consul's letter it was distinctly stated that the Arabs do not make a decoction from it. He had found in the text-books mention made of a coffee which was made from the external parts of the berry. This was called Sultan's coffee and was never imported into the West.

Poison Cabinet.

Mr. Abbott exhibited a model of a poison cabinet, which he said was of American invention. Its working was partly mechanical and partly electrical. The cabinet was so constructed that only one bottle could be out of place at one time, and the first bottle taken out must be restored to the shelf before another bottle could be removed. The invention, he said, had been recently perfected and patented in America.

Mr. Passmore asked wherein this cabinet differed from one brought forward by Mr. Young, of Warrington, at least fifteen years ago, and described in one of the early volumes of the present series of the *Pharmaceutical Journal*.* That appeared to be practically the same invention as the present cabinet.

Mr. Abbott said that he had not heard of the invention to which Mr. Passmore referred. American patents were not granted until the patent authorities had thoroughly investigated whether the invention had been in any degree anticipated, and if it had been so anticipated a patent was refused. He would make it his business to see whether the invention of fifteen years ago was similar to the present one. Of course, it was possible that this idea had been anticipated.

Specimens Exhibited.

Dr. Paul called attention to a sample of margosa oil recently brought to England from Bombay, and sent for examination by Mr. Charles Christy. It was remarkable for being exceedingly bitter. The oil was obtained from the seeds of the nim tree (*Azadirachta indica*) one of the drugs of the Indian Pharmacopœia, and was valued as an anthelmintic.

Mr. Holmes said that the remarks made by Mr. Allen suggested some important points. The physiological action of coffee undoubtedly differs from that of tea in several points, yet the value of these beverages is generally attributed to the caffeine they contain. He believed that the leaves of *Catha edulis* had been examined by Professor Schorlemmer, but he had not been able to procure a copy of his paper on the subject. He had been informed, however, that caffeine had not been found in the leaves, and the exhilarating properties of the leaves must therefore be due to some other principle. If this were the case with *Catha edulis*, the cause of the differences between coffee and tea appeared to him to be worthy of further investigation. With respect to the margosa oil, it possessed a remarkable alliaceous odour which he had not observed in the bark of the tree, specimens of which were in the collection of Hindoo materia medica in the Museum of the Society. In reference to the specimens which he had placed before the meeting, the tree trunks at the back were those of the cinchona tree, from Ceylon, principally *Cinchona officinalis*, *Cinchona succirubra* and a cinchona hybrid, apparently between the *C. officinalis* and *C. succirubra*. Some of the specimens showed that bark had been renewed by shaving it off instead of removing alternate strips. The large collection of bottles on the table contained specimens from the Cape of Good Hope Court of the late Colonial Exhibition. They represented the remedies used by the natives of the country, and by the colonists. Some possessed very little virtue, and others were used as substitutes for drugs used in this country. Among these were some castor oil seeds, the product of *Ricinus lividus*. These were smaller than the seeds usually met with

* *Pharm. Journ.*, [3], vol. i., p. 870.

in commerce. There were also specimens of gum arabic. The price of Soudan gum had lately risen considerably, and consequently gum had been sought for elsewhere. The gum usually imported from the Cape was the product of *Acacia horrida*, and yielded a weaker mucilage. A specimen of this gum was on the table. But recent importations from South Africa were of much better quality, and of these he was able, through the kindness of Messrs. Hale and Son, to place on the table four specimens which had been sold lately at prices varying from £8 10*s.* to £11 2*s.* per cwt. This gum might perhaps be the produce of the "kameel doorn" (*Acacia Giraffæ*), which was stated by Pappe to afford a good gum, but to grow beyond the limits of Cape Colony. In any case the product of the last-named tree was deserving of the attention of colonists. The Curator next referred to the root of *Rafnia amplexicaulis*, which was used as a substitute for liquorice, and then to dried bitter orange peel, which he remarked was usually prepared in the colonies in quarters instead of in strips, as preferred in this country, and sufficient care was not taken to dry it of good colour. The specimen of *Bubon Galbanum* was interesting on account of the name having been given to the plant by Linnæus on the supposition that it yielded the officinal galbanum. It, however, appeared to possess diuretic properties like celery. There were three specimens of bush tea, derived respectively from *Cyclopia genistoides*, *C. latifolia* and *C. Vogelii*. One or more of these were examined some time ago by Professor Church (*Chem. News*, xxii., 2), and subsequently by Mr. H. G. Greenish (*Pharm. Journ.*, [3], xi., 549, 569), but neither of these chemists had found any theine in it; yet the tea was used at the Cape as a cheap substitute for China tea, the usual price being 4*d.* to 6*d.* per lb. The leaves on being chewed were found to possess a pleasant tea-like flavour. Several of the native remedies used at the Cape of Good Hope appeared to be worthy of chemical and physiological investigation. Of these the following might be mentioned:—*Leonotis Leonuris*, which was stated to possess somewhat narcotic properties; *Melianthus major* and *Arctopus echinatus*, both highly valued in skin diseases. *Teucrium africanum*, which had an intensely bitter taste, was used as a tribal remedy for snake-bite, and appeared to possess antiseptic properties. *Lichtensteinia interrupta* appeared also to possess similar properties. *Toxicophlœa Thunbergii* and a few other plants had also been pointed out by Dr. Andrew Smith, of the Lovedale Mission, as worthy of investigation. Specimens of these plants were placed on the table. The Curator next directed attention to a series of eucalyptus and other essential oils received from the Royal Commissioner for the Queensland Court. Two of these, *E. citriodora* and *Backhousia citriodora*, closely resembled in odour oil of verbena, and several seemed capable of use in perfumery or the scented soap manufacture. The very fine collection of essential oils on the table, including many of extreme rarity, such as oil of myrrh, matico, pepper, etc., had been presented to the Museum by Messrs. Schimmel and Co., of Leipsic. This collection comprised altogether sixty specimens. The specimens of *Strophanthus hispidus* placed on the table included specimens of the pods and seeds of the two varieties now in commerce. The greenish-brown seeds were those at present in use. The white, more densely hairy, seeds were reputed to be still more poisonous and were not, he believed, employed at present. The specimen of an arrow poisoned by *Strophanthus* had been lent by Messrs. Burroughs and Wellcome. It would be observed that the poison, which was made to adhere by the use of the mucilaginous sap of a Tiliaceous tree, was placed immediately behind and not on the barb. The specimen of a fasciated stem of *Daphne Mezereum* had been sent by Mr. H. H. Pollard, of Ryde, in the hope that it might prove interesting to any students of botany who might be present. Three interesting specimens had been contributed by Mr. D. Kemp, of Bombay. One of these was the volatile oil of baphulli seed (*Pastinaca grandis*). Another was that of *Nardostachys Jatamansi*, which was supposed to be the spikenard of Scripture; it had in the undiluted state a disagreeable odour of valencen, but when diluted was somewhat pleasant. The third specimen was the essential oil of daroo wood, which was stated by Mr. Kemp to give a flavour like that of old rum to alcohol. The Curator believed this was the first time the oil had been shown in this country. The botanical source of the wood was not known at present.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly meeting of the Council of this Society was held on Wednesday, February 2, in the rooms, No. 11, Harcourt Street, Dublin, at three o'clock.

The President (Mr. William N. Allen) in the chair.

The other members of the Council present were, the Vice-President (Mr. Draper), Dr. Evans, Mr. Ray, Mr. Grindley, Mr. Simpson, Mr. Wells, Mr. Beggs, Mr. Hayes, Mr. Hodgson, Dr. Collins and Professor Tichborne.

The Vice-President said he was obliged to speak for the President, who was suffering from sore throat. The father of their late President, Mr. Brunker, had just recently died at an advanced age; and he was sure that, under the circumstances, the absence of Mr. Brunker would be excused.

The Registrar, Mr. Ferrall, read a letter from Sir William Kaye, forwarding copies of two orders of the Privy Council of the 3rd ult., one approving of an amended regulation respecting examiners, adopted by the Council of the Society at a meeting on October 6, 1886; and the other directing that the reports of Dr. Duffey, the Visitor of the Examinations of the Society, shall in future be made annually, instead of quarterly, after the examinations.

The amended regulation respecting the examinations was as follows:—

> "That Regulation No. IV., Examiners, be amended so as to read:—'The Council shall elect fit and proper persons to be examiners—to conduct such examinations as are directed by Clause 21st, Pharmacy Act (Ireland), 1875, in each of the divisions of examinations, viz.:—I. Latin, English, Arithmetic, and Rudiments of Chemistry and Botany (this examination to be known as the Preliminary examination). II. Materia Medica and Botany. III. Pharmaceutical and General Chemistry. IV. Practical Pharmacy, Reading and Translating of Prescriptions, and the British Pharmacopœia.'"

Mr. Grindley: It is a pity that we cannot have Dr. Duffey's reports quarterly.

Mr. Hayes thought it was better that they should be made annually. A great many radical suggestions had been made by Dr. Duffey, and it was not desirable that changes should be made every quarter.

Mr. Simpson: He has made some very valuable remarks, and we have adopted a good many of his suggestions. If we had his reports quarterly they would be more beneficial.

The Vice-President: My opinion is that his reports are very valuable to the Society, and if they are preceded by such a long interval as a year, they will cease to have the same value that they would have if made quarterly. I can only express my regret that the authorities have seen fit to alter the period of publication from tri-monthly to annually.

Mr. Hodgson said that he and other members of the Council with whom he had spoken were of opinion that an annual report from Dr. Duffey would not be of much value. On the other hand, remarks and criticisms from

him at the end of three months would have weight and be adopted.

Mr. Wells: Would you propose that we should try to get an alteration of the period now fixed?

The Vice-President: No: with the simple expression of opinion that has been now given I think the matter may drop.

Mr. Hayes: They are following the precedent of the English Society.

The President: No, there is no definite time for reporting in the case of that Society. The Visitor reports when he wishes; sometimes not for two or three years.

A letter was read from Mr. Bremridge, the Secretary of the Pharmaceutical Society of Great Britain, returning thanks for a presentation of a copy of the Society's Calendar for 1887.

A letter was received from Mr. John Smith, enclosing certificates of having passed examinations (second class) held under the Science and Art Department in inorganic, theoretical and practical chemistry. The letter asked that these certificates should be accepted as qualifying the writer to present himself at the examinations for the licence.

Dr. Evans: This gentleman is an assistant of mine. I showed these papers to Professor Tichborne, and he recommended that they should be accepted by the Council.

The President: We do not know whether he attended three-fourths of the lectures of the course.

Dr. Evans: He informs me that that is the rule at those examinations, and that he did.

The President: Where did he pass the examinations?

Dr. Evans: I could not answer that.

Mr. Grindley said the Council only accepted certificates from the following schools:—The Caermichael College, the Cecilia Street School of Medicine, the Ledwich School of Medicine, the Queen's Colleges of Belfast, Cork and Galway, the College of Science, the College of Surgeons, and Trinity College.

The President: And the South Kensington Government School of Science.

Mr. Haynes: What we require is attendance at courses of practical chemistry. He says in his letter that he attended three-fourths of the lectures.

The President: But he does not say "at a school recognized by the Society." There is no school mentioned in the certificates, and no evidence that he was at the South Kensington Government School of Science. I think he ought to be asked if he was a pupil there.

Dr. Evans: I will find out all about it, and he will write to you.

The President: We do not want to prevent the gentleman from coming up. We only want to carry out our regulations.

On the motion of the President, seconded by Mr. Wells, the Registrar was directed to write to Mr. Smith, informing him that the certificates which he had sent in did not conform to the regulations of the Society.

The reports of the Preliminary and Licence examinations were submitted. The first showed that eight candidates had presented themselves, all of whom had passed, and the second showed that ten candidates had presented themselves, of whom the following passed:—Messrs. Joseph T. P. Buahagon, William S. Duggan, Frederick W. Hatton, George A. Henry, Patrick J. Lyons, John P. Timmon, and Thomas White.

On the motion of Mr. Wells, seconded by Mr. Grindley, the reports were adopted.

A report of the Examinations Improvement Committee came on for consideration. The first resolution contained in it was as follows:—

> "That the present system of marking has been adopted by the Council for the guidance of the examiners, but it is clearly understood that they shall have in conference and jointly a discretionary power to pass a candidate whose general information and intelligence appear to justify such a course, though he may not in some one subject have attained to the standard laid down."

Mr. Wells: Does that mean that if a candidate is very bad in any one branch the examiners will nevertheless have the power of passing him?

The Vice-President: What is intended is that a good all-round man may be passed although he may have been found fault with by some one examiner in one thing.

Mr. Hayes: If two examiners think he ought to pass will he pass?

The Vice-President: Certainly.

Mr. Hayes: I think the recommendation is a very fair one.

Mr. Wells: Would two examiners under that rule have the power of passing a man?

Dr. Collins: You may be sure that the three examiners will not pass a bad man. But if a candidate answers well in the generality of subjects, although he may not be quite up to the mark in some one thing, then it would be a right and proper thing that the examiners should consult together and see whether they could not pass him, even though he might be deficient by two or three marks. Although the Medical Council have no printed regulation of this kind I know they strongly advise that in the examinations held under their authority the examiners should consult.

The Vice-President: You may take it that the three examiners, on consultation, will be certain to arrive at a right conclusion.

Dr. Evans: I think it a dangerous thing for us to be interfering with our examiners. We get the best men we can for that office, and although we may let them know our wishes, we should take care not to dictate to them.

Mr. Wells: Must the three examiners agree to pass the candidate?

The Vice-President: Yes.

Mr. Hayes: It is better not to have a hard and fast line, but to leave the matter to the discretion of the examiners.

The recommendation of the report was then put from the chair, and unanimously agreed to.

The remaining matter for consideration was a recommendation of the report that the following draft of a letter to the Privy Council, containing observations on Dr. Duffey's report on the October examinations, should be adopted by the Council:—

"I am directed by the Council of the Pharmaceutical Society of Ireland to forward for the information of the Lord Lieutenant and Privy Council of Ireland the following observations on the Report of the Visitor on the Examinations of October, 1886:—

"As regards the Preliminary examinations, the chief point adverted to by your Visitor, viz.,—the disuse of the present chemical and botanical text-books, and the substitution for them of a general indication to the student of the range of subjects upon which he will be examined, had been already raised by the examiner himself, and although the alteration has not yet been made, a committee of the Council has the suggestion under consideration. To this Committee also will be referred the further suggestion that the examination should include elementary chemical physics.

"Passing to the examination for the Licence, although the Council does not interpret Regulation II. (Examiners) in the same way as does your Visitor, and does not consider a consultation of examiners as 'imperative,' it nevertheless feels, that in doubtful cases, such a consultation is desirable, and has (its view being shared by the examiners themselves) passed a resolution directing the adoption of this course. The Council is at the same time gratified to note the opinion of the Visitor that the system of marking which it has so carefully considered, and which is based upon that adopted by the English Society, 'tells in most cases in the interest of the candidate.'

"The Council is in entire accord with your Visitor in observing the deficient instruction in chemistry, and the evidences of excessive 'cramming' which are presented by many candidates for its licence, and feels that the only way in which these evils can at present be dealt with, and successfully met, is by keeping up at least to its present standard an examination which he defines as 'very properly searching and strict.' For even at the risk of reducing the number of candidates, it prefers that those who obtain through it the title of pharmaceutical chemist shall be something more than 'mere mechanical compounders and salesmen.' Its sense of the duties imposed upon it by the Pharmacy Act, and a regard for the public safety, supports it in this view.

"The Council entirely concurs with your Visitor as to the necessity of some alteration in the at present accepted arrangements for the attendance of students in its recognized laboratories, and, did its financial position permit, would willingly encourage and aid the formation of a School of Pharmacy in connection with the Society.

"In connection with this subject the Council regrets that the Royal College of Science is practically useless to candidates for the licence of the Society, in consequence of the laboratory not being open in the evenings.

"If arrangements could be made for giving evening instruction in that institution, the Council has no doubt that it would be largely availed of by pharmaceutical students."

The President said there were ten distinct points in Dr. Duffey's report, and the letter dealt with them all.

The draft letter was unanimously adopted.

Some financial business was then disposed of, and the Council adjourned.

Provincial Transactions.

TORQUAY CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting of this Association was held on Wednesday, the 26th ult., the President, Mr. E. Smith, F.C.S., in the chair.

The evening was devoted to the discussion of "Dispensing Difficulties," such as emulsions with a large quantity of saline matter, pill masses with an excess of liquids, and chemically incompatible mixtures.

The prescription that evoked the most discussion was the following:—

℞	Acidi carbolici	gr. xij.
	Sp. æth. nit.	℥j.
	Syr. aurantii	℥ij.
	Aquæ	ad ℥iij.

M. fiat mist. ℥ij ter in die.

It was dispensed with Calvert's No. 1 carbolic acid and neutral spirit of nitre. The mixture changed colour in the course of a few minutes, and at the end of two or three hours was of a brown colour with a black or dark brown deposit. It was found that this change resulted whatever precautions were adopted. In the course of discussion the theory was advanced that the change in colour was due to the formation of rosolic acid.

Votes of thanks to the Chairman and to the Secretary for his trouble in collecting the prescriptions closed the proceedings.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The seventh meeting of the ninth session was held in the Pharmaceutical Society's House, 36, York Place, Edinburgh, on the evening of Wednesday, January 26, at 9.15. In the absence of the President, the chair was taken by Mr. C. F. Henry, ex-President.

The minutes of the last meeting having been read and approved, the Chairman called upon Mr. A. Crichton Mitchell to deliver a lecture on "Some of the Relations between the Chemical and Physical Properties of Bodies," of which the following is a short abstract:—

Some of the Relations between the Chemical and Physical Properties of Bodies.

BY A. CRICHTON MITCHELL.

This title was chosen in order to give freedom, in the whole subjects of chemistry and physics, to take up any questions which might be of interest to the members as pharmacists.

The first question dealt with was that of *Surface-Tension.*—The action of molecular forces as exhibited in the superficial layer of liquids was explained. The principal characteristic of these forces is that they are only sensible at insensible distances. In liquids this surface-tension tends to reduce the superficies to the smallest possible under the assigned conditions. Several well-known phenomena were then alluded to as illustrating this principle, *e.g.*, the sphericity of raindrops, the process employed for the manufacture of small shot, and the phenomena presented by soap bubbles. An explanation was also given of the frothing of pharmaceutical infusions, and its removal by alcohol, and also of the action of oil in preventing waves from breaking into surf.

Solution.—In connection with solution the first matter taken up was that of supersaturated solutions, and it was shown that their continuance in the liquid state was due to absence of a certain condition, whose presence caused immediate crystallization; the necessary condition being the presence of a nucleus round which the crystallization might be started. Recent researches on the formation of fog, mist and rain were here touched upon.

The case of solution accompanied by change of temperature was next dealt with. It was shown how, in order that a solid should pass into the liquid state, energy had to be supplied to the system, and in the case of solution attended by a lowering in temperature this energy was obtained from the solvent in the form of heat.

This single example opened up the whole subject of thermochemistry, of which recently developed science a short sketch was then given. Its two postulates were the conservation of mass (otherwise known as the indestructibility of matter) and the conservation of energy. In the material system of which cognizance was here taken, there were two species of changes, (1) a change in the form and distribution of matter composing the system, and (2) a change in the form and distribution of the energy composing the system. The object being to measure definitely certain changes of energy, the material system experimented upon had to be started in a certain definite state; and had to be ultimately obtained in another certain definite state, and between these two, the change of energy of the system had to be measured. By the principle of the conservation of energy, it made no difference what path, so to speak, was pursued in passing from the one to the other.

Thermochemical notation, and the definitions of the unit of heat, the heat of solution, etc., were then explained; and some application of thermochemical principles closed the references to this question.

Refractive Index of Liquids.—In a homogeneous medium light travels in straight lines, but in passing from one medium to another of different density it undergoes refraction. For any liquid the value of n (obtained by dividing the sine of the angle of incidence by the sine of the angle of refraction) is constant; this quantity is termed the refractive index of the liquid. The molecular refractive power of any liquid was defined to be the value of $\frac{n-1}{d} P$, where n = refractive index, d = density, P = molecular weight. For isomeric bodies, the molecular refractive power is the same. This was instanced by the case of butyric acid and acetate of ethyl. Also, the molecular refractive power of a definite compound, and of a mixture of the same percentage composition, is the same. For if three molecules of methyl

alcohol and one molecule of amyl alcohol be mixed, a mixture is obtained which has the same percentage composition and the same molecular refractive power as ethyl alcohol.

In a homologous series, the refraction equivalent (*i.e.*, the value of the expression $P\frac{n^2-1}{d}$) increases by about 7·6 for each CH_2 added. With other series, the members of which differ by C, H_2, or O, it is found that the molecular refractive power increases equally for every C added; the same holds for H_2 and O. The actual members (mean values) are as follows:—

For each C added, the molecular refractive power increases 5·09.

For each H_2 added, the molecular refractive power increases 2·4.

For each O added, the molecular refractive power increases 2·85.

The lecture was illustrated by experiments, of a simple yet appropriate nature, on surface tension, solution, etc.

On the motion of the Chairman, seconded by the President, a hearty vote of thanks was awarded to Mr. Mitchell.

Some queries were then read by the Secretary, and it was agreed to hold them over till next meeting.

The meeting was then closed.

LIVERPOOL CHEMISTS' ASSOCIATION.

The seventh general meeting of the thirty-eighth session was held at the Royal Institution on Thursday evening the 3rd inst. The President, Mr. A. C. Abraham, F.C.S., in the chair.

The notes of the previous meeting were read and confirmed, and the following donations announced:—Current numbers of the *Pharmaceutical Journal*, from the Society; *Canadian Pharmaceutical Journal*, from the publisher; *British and Colonial Druggist*, from the publishers; *Pharmaceutical Record* of New York, from the publishers; 'The Ephemeris,' vol. iii., No. 1, from Dr. Squibb, Brooklyn; 'Proceedings of the American Pharmaceutical Association, 1886,' from the Association; 'General Index to the Year-Book of Pharmacy,' 1864 to 1885, from the Conference.

A vote of thanks was unanimously accorded to the respective donors; and the President then called upon the Honorary Secretary to read Mr. Norman Tate's paper on "Salol," Mr. Tate being unavoidably absent. In this paper the author referred briefly to the introduction of salol by Professor Nencke about three years ago and to the therapeutic study of it by Dr. Sahli (see *Pharm. Journ.*, [3], xvi., 1005; xvii., 273, 507, 527, etc.), who obtained results showing that the compound possesses very valuable antirheumatic, antipyretic, and antiseptic properties. The author stated that some experiments he had made and others he was still continuing indicated that salol is very efficient as an antiseptic, and much superior in this respect to salicylic acid and the salicylates. Its use had been suggested for impregnating bandages and wool intended for surgical dressings, as it adheres more readily than salicylic acid. Mr. Tate then referred to the methods for preparing salol which have been described in this journal recently (see before, pp. 507, 527,).

At the close a short discussion followed, and a vote of thanks to Mr. Tate was proposed by Mr. A. C. Abraham, seconded by Mr. J. S. Ward, and carried unanimously.

The President then read a note on "Tincture of Strophanus."

At the close a discussion followed, and a vote of thanks, proposed by Mr. E. Davies, and seconded by Mr. W. Wellings, was unanimously accorded to the President for his paper.

MANCHESTER PHARMACY STUDENTS' ASSOCIATION.

The third meeting of the above Association was held in the Pharmaceutical Laboratory, Owens College, on January 25.

The minutes of the previous meeting having been read and confirmed, Mr. W. Spencer Turner proceeded to give an interesting paper on "The Botany of Shade Hill Market."

Mr. Turner's paper may be condensed thus:—He pointed out the great use of such places as Shade Hill Market to students who are not able to get to the country for flowers, etc, to dissect. He stated that the year's "flora" of Shade Hill included not less than about 250 species, including about 150 English wild flowers, representing 46 natural orders. The English flora* consists of 93 orders, *i.e.*, 73 exogens, 15 endogens and 5 conspicuous cryptogams, and, of course, in selecting flowers for sale, those with some marked character of appearance or popularity are first chosen, so that a collection obtained from a market only includes specimens of scientific interest when they happen, also, to be popular. The abundance of the supply during the later spring, summer and autumn months makes common flowers very cheap. Daffodils, wallflowers, etc., appearing by cratefuls, and flowers mixed and arranged in bunches for sale are exposed in hampers, and the display seen in the early morning is worth getting up at six o'clock to see, and 2*s.* 6*d.*, well spent, will provide subjects for many an hour's work. Mr. Turner concluded by distributing and explaining the structure of some flowers he had bought that day, such as hyacinths, wallflowers, violets, spiræa, cauliflower, Christmas roses, Brussels sprouts and banana. He also exhibited some mounted wild flowers.

At the close of the evening a numerous collection of drugs from the Indian and Colonial Exhibition was shown, upon many of which Mr. William Elborne made comments.

The next meeting will be held on February 24.

Proceedings of Societies in London.

ROYAL INSTITUTION OF GREAT BRITAIN.

Suspended Crystallization.†

BY PROFESSOR JOHN MILLAR THOMSON, F.C.S.

(*Concluded from page* 603.)

The following table gives the results of many experiments on the action of isomorphous and also of dissimilar substances on supersaturated solutions of each other:—

Isomorphous Sulphates on Magnesium Sulphate.

Substance in solution.	Substance added.	Result	Remarks.
$MgSO_4.7H_2O$	$ZnSO_4.7H_2O$	Active	Crystallization induced at once, the crystals forming long needles.
,,	$NiSO_4.7H_2O$	,,	
,,	$CoSO_4.7H_2O$	,,	Crystallization induced after some time, the crystals forming attached to the nucleus.
,,	$FeSO_4.7H_2O$	,,	
,,	$MgSO_4.7H_2O$	,,	
,,	$NiSO_4.6H_2O$	,,	Crystallization induced after some time, the crystals attached to the nucleus generally being truncated needles.
,,	$FeSO_4.xH_2O$	,,	
,,	$CoSO_4.xH_2O$	,,	

* As given in 'Lond. Cat. Brit. Plants.'

† Read, Friday, May 14, 1886.

Dissimilar Bodies on Magnesium Sulphate.

Substance in solution.	Substance added.	Result.	Remarks.
$MgSO_4.7H_2O$ . .	$MgK_2(SO_4)_2.6H_2O$	Inactive	
,, . .	$Na_2SO_4.10H_2O$	,,	
,, . .	$Na_2S_2O_3.5H_2O$	,,	
,, . .	NaCl	,,	
,, . .	Glass	,,	

Isomorphous Salts on Sodium Sulphate.

$Na_2SO_4.10H_2O$.	$Na_2SeO_4.10H_2O$	Active	Crystallization immediate.
,, .	$Na_2CrO_4.10H_2O$	,,	Crystallization immediate.

Dissimilar Bodies on Sodium Sulphate.

$Na_2SO_4.10H_2O$.	$MgSO_4.7H_2O$	Inactive	
,, .	Na_2SeO_4	,,	
,, .	$Na_2S_2O_3.5H_2O$	,,	
,, .	$Na_2HPO_4.10H_2O$	,,	
,, .	KCl	,,	
,, .	NaCl	,,	
,, .	$KClO_3$	,,	
,, .	$NaI.4H_2O$	,,	
,, .	Glass	,,	

Chrome Alum and Iron Alum on Common Alum.

$AlK(SO_4)_2.12H_2O$	$CrK(SO_4)_2.12H_2O$	Active	The chrome alum solution was prepared by saturating at 70°, and then allowing it to crystallize in the bulb tube.
,,	$FeK(SO_4)_2.12H_2O$	,,	

Bodies of the same form or belonging to the same system, but not similarly constituted on Alum,

$AlK(SO_4)_2.12H_2O$	NaCl (cubes)	Inactive	
,,	FeS_2 (cubes)	,,	
,,	Fe_3O_4 (octahedra)	,,	

Hydro-disodic Phosphate and Hydro-disodic Arsenate.

$Na_2HPO_4.12H_2O$	$Na_2HAsO_4.12H_2O$	Active	Crystallization immediate and very rapid.

When two salts that are not isomorphous are in a supersaturated solution together a separation of one or other of the salts may be effected within certain limits. Thus in a mixture of sodium sulphate and nickel sulphate, the former may be crystallized by touching with a crystal of the salt, and in allowing the mixture to remain at rest for a few minutes the liquor containing the nickel sulphate may be entirely poured off from the crystals of sodium sulphate.

A similar phenomenon may be seen by preparing in a long glass cylinder two supersaturated solutions one above the other, the lower one being sodium thiosulphate dissolved in its water of crystallization, the upper one sodium acetate dissolved in a quarter its weight of water. When the whole has cooled down under a stopper of cotton wool a crystal of sodium thiosulphate may be introduced; this will pass through the acetate solution without solidifying it, but will cause the immediate solidification of the thiosulphate solution.

The following phenomena may be seen in experiments carried out on mixtures of dissimilar salts.

A. When the mixture consists of two salts which are not isomorphous.

(1) Sudden crystallization may take place, gradually spreading through the solution on the addition of a nucleus, causing a deposition of the body belonging to the nucleus only.

(2) That when sudden crystallization takes place, causing the deposition of both salts, there is a preponderance of the salt of the same nature as the nucleus.

(3) That the nucleus may remain growing slowly in the solution, becoming increased by a deposition of the salt of the same nature as the nucleus.

B. When the mixture consists of two isomorphous salts.

(1) Sudden crystallization may appear, giving a deposition of both salts, apparently in the proportions in which they exist in solution.

(2) That when slow crystallization takes place, the nucleus increases by a deposition of the least soluble salt, showing that in mixed supersaturated solutions a gradation of phenomena may be experienced, passing from those shown in the crystallization of a true supersaturated solution to those shown in the crystallization of an ordinary saturated solution.

Passing from the action of nuclei on supersaturated solutions of mixtures of dissimilar salts, it is interesting to examine the action of the different constituents on supersaturated solutions of double salts. The following table gives the results of certain experiments with such double salts.

Substance in solution.	Nucleus added.	Result.
$HgCl_2(NH_4Cl)_2,3H_2O$.	$HgCl_2$ (prismatic)	Active.
,,	$HgCl_2$ (deposited from hot solution).	Both active and inactive.
,,	NH_4Cl	Inactive.
$HgBr_2(NH_4Br)_2,3H_2O$	$HgBr_2$ (deposited in the cold).	Active.
,,	$HgBr_2$ (deposited from hot solution).	Both active and inactive.
,,	$(NH_4)Br$	Inactive.
$HgI_2(KI)_2$	HgI_2 (needle-shaped crystals).	Active.
,,	KI	,,
$AlK(SO_4)_2,12H_2O$ . .	$Al_23(SO_4),18H_2O$	,,
,,	K_2SO_4	,,
$NaNH_4HAsO_4.4H_2O$	$Na_2HAsO_4,12H_2O$	,,
,,	$(NH_4)_2HAsO_4,Aq_2$	,,

From these experiments it will be seen that in the case of the double salts formed by the halogen acids, certain of the component salts are capable of inducing crystallization, but in the case of the salts formed from acids of higher basicity the component salts are incapable of causing that particular disruption of the solution.

Having now treated this question experimentally, it may be of advantage to examine it shortly from a theoretical point of view to see if any explanation may be offered at least with our present knowledge of the sudden changes from liquid to solid.

At the present time it would be rash to attempt a complete answer to the questions—

(*a*) What fully takes place when a salt dissolves.

(*b*) Why some salts always separate out when their hot solutions are cooled: and conversely why certain ones remain dissolved under the same conditions.

In order that a salt may dissolve in water we must suppose some attraction between the molecules of the salt undergoing solution, and the molecules of the water. With most salts, the power of the water to dissolve them is increased with rise of temperature, and this rise in temperature means increase in the active movement of the water and the salt molecules, and therefore greater

facility for them to come near enough to one another for their mutual attractions to be exerted.

Then why do not all salts dissolve more in hot than in cold water? all do not do so, as you have seen in my diagram during lecture. This leads us to following up the completion of this attraction, namely, the combination of the water and the salt molecules which I have alluded to in my lecture under the term hydration.

We must suppose that some hydrates exist at a higher temperature than others, and this is borne out by experiment. In the case of salts whose hydrates exists only at the lower temperatures, the effect of raising the temperature would be merely to increase the vibratory movements, and so shake asunder the water and salt molecules, the dehydrated salt naturally separating out, and, therefore, we could not expect more to go into solution by merely heating the liquid.

With regard to the second point. We must remember that there exists a strong attraction between the individual molecules which compose the salt. Taking, then, the case of a salt like potassium chlorate, which in the solid state contains no water attached to it. We dissolve it in hot water, and on cooling, much of the salt separates out. We can suppose that the attraction of the water for the salt and the active movement produced by the rise in temperature overcome this attraction of salt molecule for salt molecule, but as the solution cools, this exercises its full force, and crystallization ensues.

Now, taking the instances where the salt remains in solution even after cooling, but in much larger quantities than can be obtained by treating the solid salt with water at that temperature; this being what I have called "suspended crystallization."

Let us consider the case of sodium sulphate as perhaps the most familiar instance. You have seen a large volume of that salt suddenly solidify on the introduction of the proper nucleus. Now why did not that salt behave like the potassium chlorate instead of remaining in solution in the liquid after cooling?

It has been suggested that this *super*-saturated solution is merely a saturated solution of the anhydrous salt. That may or may not be so. If it be the case, we can suppose that the molecules of the salt and water are prevented from arranging themselves in their normal order and proportions, and so there is a kind of strain throughout the liquid. This can only be overcome by something which will disturb the molecules sufficiently to bring about the necessary rearrangement.

Taking the instance of the suspended solidification of water cooled below its freezing point; we know that only the disruptive effect of shaking is required; but with sodium sulphate in water and many others, no amount of shaking, as we have seen, is sufficient. Some stronger force is required; this stronger force is found so far as we know at present only in the attraction for the salt of the body itself, or of some substance having the same crystalline form and a similar chemical composition, as has been already shown.

I say advisedly at present, because in my opinion it has not yet been conclusively proved that no form of what we should call simply mechanical disturbance may not bring about sudden crystallization in these so-called supersaturated solutions. Indeed, there is an interesting experiment which seems to foreshadow such a possibility. By dropping a single carefully washed crystal of alum into a supersaturated solution of that salt, we notice a very interesting phenomenon. The whole surface of the solution is covered with small crystals separated by definite and considerable intervals, and it appears as if the mere mechanical disturbance produced by the first crystal attracting to itself similar molecules had caused the union of other molecules to form crystals in the remoter parts of the liquid. This is, I think, a very interesting case, which if studied with other similar instances may throw additional light on the causes of such crystallization. If we suppose that the salt exists in solution as a hydrate, that is, in actual combination with water, we can imagine that each individual molecule of the hydrate attracts each other one, and is attracted by it equally; so if one molecule were to move towards another, it would be restrained by its neighbour, and that in its turn by those near it, and so a state of equilibrium would come about. But, whatever may be the condition of the salt in solution, the same cause, namely, the attraction of similar molecules, appears always to render the equilibrium unstable.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting was held on Thursday, February 3, Mr. E. White occupying the chair.

A paper on the Quality and Purity of Commercial Specimens of Cacao Butter, by Mr. E. H. Barritt, was read by the Secretary.

The author first enumerated and described the various tests that had been proposed by different authorities for the detection of adulterations in ol. theobromæ, and then gave the results of his examination of eight trade samples. These gave melting points varying from 30° to 34° C., and specific gravities ranging from 0·874 to 0·921, while the taste and Ramsperger's ether solubility test pointed to impurity in two of the specimens, and possibly a third, the remaining five being very satisfactory.

The paper was followed by a discussion, in which the Chairman, Secretary, Messrs. Braithwaite, Eastes, Bird, and Beach took part.

The Reporter on Analytical Chemistry, Mr. J. G. Tingle, then read a report on "Some Recently Suggested Analytical Methods," describing:—1, a method of detecting corrosive sublimate in calomel by means of soap, guaiacum and ether; 2, a method of standardizing solutions of iodine by saturating with H_2S and titrating the HI produced with decinormal alkali, using methyl orange as indicator; 3, a test for small quantities of hydrocyanic acid; 4, a method of separating Mn, Co, Ni, and Zn from Fe by K_4FeCy_6 in ammoniacal solution with tartaric acid; 5, tests for the purity of olive oil; 6, methods of separating various metals by means of oxalic acid.

The report gave rise to a discussion, in which the Chairman, Messrs. Bird, Short and Eastes joined.

After a short discussion on the applicability of methyl orange as an indicator of neutrality in the preparation of the strong solution of acetate of ammonium, the meeting adjourned.

Review.

CHEMICAL LECTURE NOTES, taken from Professor Curtman's Lectures at the St. Louis College of Pharmacy. By H. M. WHELPLEY, Ph.G., Quiz Master of Chemistry and Pharmacognosy in the St. Louis College of Pharmacy.*

This work seems to have been intended by the author for the use of students in pharmaceutical and medical colleges, but its utility for that purpose seems rather questionable; certainly, it could only be found useful to students when read in conjunction with some other manual containing much fuller detail and explanation; it seems, in fact, more suitable as a remembrancer than for any other purpose.

It consists of a compilation of facts, and, in many cases, of mere headings suggestive of facts, such as would be used by a lecturer to refresh his memory and suggest the subjects to be explained in his lectures, being, in fact, a full syllabus of Professor Curtman's lectures, slightly enlarged, and illustrated by figures and diagrams.

To a student who has already attended courses of

* St. Louis, Mo. H. M. Whelpley. Small 8vo. Pp. i–iv., 1–143.

lectures on the subjects herein treated of, the work would prove very handy in reminding him of the facts, etc., he had learnt; but to the student actually attending lectures it would be calculated to prove a temptation to omit taking notes for himself, and no ready-made book of notes, however good it may be, can be of such use as personally taking notes during the lecture, and afterwards transcribing them in a neat and systematic manner.

The first half of the book treats of chemical physics, and embraces a large number of facts, which are, in many cases, pictorially illustrated, but which are crowded together without any explanatory matter, so that a great proportion of them would be unintelligible to a student without a supplementary explanation. The general properties of matter, absolute and specific gravity, pneumatics, hydrostatics, cohesion, adhesion, heat, light, electricity and magnetism form the subjects of this part of the book. The second half is devoted to inorganic chemistry, treating only of the non-metallic elements; one or two organic substances, such as ethylene and acetylene, are also included. This portion also contains plenty of facts, but, as in the first part, there is the same want of connective and explanatory matter; in fact, it exactly resembles an ordinary note-book where facts and headings of subjects are jotted down in the most condensed form possible. As notes for lecturing from they would be admirable, and they are also well adapted for reference, as they contain a large number of data not generally found, such as tables of indexes of refraction, relative conductivity for heat and electricity, boiling points at increased and diminished pressure, etc., etc. But the advisability of a student attempting to store his mind with so many isolated facts, rather than with more general principles, is very questionable.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

The Future of Pharmacy.

Sir,—In the Journal of January 29 there appear some letters by Sheffield fathers in pharmacy, opposing your ideas as expressed in the "leader" of January 22.

Mr. Cubley commences by asserting that the Pharmaceutical Society has hitherto been supposed to have for its special object "the care of the public safety." Now it ought to be patent to everyone who can reason from facts, that no one can care for the public safety so well as the public itself. The public takes good care to look after itself; and any assumption of this responsibility by a Society, whilst evidencing a most sublime conceit, tends to interfere with the working of the natural causes which have slowly developed existing social conditions and made individuals, on an average, fittted to their present surroundings. In so far as care for self-preservation is delegated to others, just in equal degree will the individual lose the power of looking after himself. As I take it, the Society is but a superior kind of trades union, formed for the protection of its members in cases where they are unable to protect themselves, with the additional functions of striving to promote their culture and improve their status. Mr. Cubley then makes much of the case of inside competition—the deficient tincture of opium. Overlooking the doubt as to whether the State has any real right to confer a monopoly of the sale of poisons upon any class, whatever its qualifications, I think we may safely apply the rule of the "survival of the fittest" in this instance, and ask, "Is the vendor of diluted tinctures usually one of our high-class pharmacists, or is he not rather one who has a hard struggle to make all ends meet, and does his business appear to prosper in an increased ratio as compared with that of the other or not?" Replies to these questions should suffice to allay any unworthy fears as to the possibility of ignorance and selfishness triumphing over knowledge and duty.

As regards legislation, I feel, sir, that your standpoint is the right one, and that every individual pharmacist must be a law to himself. Until this is the rule, and everyone performs the miscellaneous details of his business in certain ways because it is right that they should be so done, apart from any considerations of law, we cannot expect to see anything like ideal pharmacy. Corrupt members cannot, when joined together, make a perfect body, and I fear much that many of our shining lights look more to the "main chance" than to the justice of all their acts. The outcries against "Food and Drugs Act" prosecutions would be fewer if all were conscious that everything they sold had answered the proper tests when applied by themselves. Carelessness, no less than dishonesty, is deserving of punishment in such cases as these, and a discerning public will see to it that worth is rewarded.

I would protest against Mr. Cubley's reference to the "younger members" as representing the ideas of any but a self-seeking few. I, a student, on behalf of true students generally, refuse to recognize such as being of us, and object to their foolish exclamations being made use of to further the aims of those who would burden us with more legislation, and so interfere with our liberty of action in the future.

With regard to Mr. Ward's contribution, in so far as he opposes your arguments, I think he is most decidedly wrong, and the future progress of pharmacy will be much checked if the judgment of the majority of those practising the are is so biassed that they fail to see the firmness of your position. One would have thought that to a local secretary it would certainly be of the very least importance what other traders might sell under the names of medicinal preparations, and that he, conscious of the superiority of those which he supplied, all made strictly according to his beloved B.P. (with all its synonyms) and agreeing with its tests in every respect, could afford to live down such mean opposition. Anyhow, "protection" in trade is altogether out of date, and those who fear wholesome competition had better stand aside and make room for others who, relying upon the knowledge that their wares are of the best, and that they always give honest value, can hold their own against all comers. As to paregoric *minus* opium, if the public desires such, it will have it in spite of all the Council meetings in the world, with their prosy and doubtfully worded resolutions. It is simply a question of "supply and demand," which legislation cannot influence.

I doubt whether the stipendiary would feel badly crushed by Mr. Ward's *naïve* criticism of his decision, or whether the poorer classes would be altogether overwhelmed by his pathetic appeal on their behalf, coupled with the cry for "synonyms." Can he really vouch, from personal knowledge, that when members of these classes visit qualified pharmacists, they are treated with due consideration and always receive articles of the quality demanded? Do they get "simple justice?" Or is it not a fact that many presumably intelligent and scientific members of our "profession" stoop to the mean practice of diluting for the sake of extra profit, and that the "poorer classes" suffer most by the fraud? I know it to be but too true that pharmacists are not invariably honest and straightforward in their dealings with the public, and until they find "salvation" in this respect, and are less influenced by the desire for pecuniary profit, we need not look for much genuine advancement.

To sum up, it ought to be clearly seen that legislation is useless to depend upon, and that the Pharmaceutical Society cannot work good if its members persist in evil. Education too, with or without "curriculum," will fail to raise our position socially if ethical considerations are ignored. Information honestly acquired and applied, joined with an ever-prevailing sense of justice, will effect the desired results. Anything short of this will not avail, for "miracles do not happen."

Sheffield. A Sheffield Student.

The Proposed Legislation.

Sir,—It was with much regret I read in the *Pharmaceutical Journal* of February 5, that our Council had determined to approach Parliament on the curriculum scheme. If I remember right, the Visitor on behalf of the Privy Council reported that the present Minor exam-

nation was sufficient for the safety of the public. In the face of this I do not see why the Council should proceed with the contemplated Bill, which, in my opinion, will prove of no service in mitigating the evils from which we are suffering. If it intends legislation at all, and there is great need for this, let it frame a Bill for restricting dispensing and the sale of poisons to chemists and amending the clause which enables corporate bodies to dispense and carry on the business of a chemist. A measure of this kind would have the goodwill of our profession; but I am inclined to think a majority of chemists will be against the proposed curriculum legislation, and as our Council should represent our views, I should suggest that a vote be taken amongst all chemists, and let the issue determine the future action in the matter.

MAJOR.

OILMEN AND THE SALE OF POISONS.

Sir,—As a young member of the Pharmaceutical Society, I was pleased to see a letter from Mr. Cocker in the issue for January 22, calling attention to the utter carelessness of oilmen in the supply of dangerous liquids like oil of vitriol, etc. The case cited by Mr. Cocker is an everyday one in many districts, and I think there should be a remedy for such things. Why should one who has no qualification be allowed to endanger lives in this way? I was very pleased to see that Mr. Cocker very properly remonstrated, and explained the danger to the person and labelled the bottle; but I think he might have improved his procedure by first removing the old nitre label before putting his oil of vitriol and poison label on: for supposing his label came off in one piece (as they will do often if too much liquid is used for sticking, and which is not squeezed out well), then if any accident occurred, reference would at once be made by some wise coroner to the unfortunate brother chemist whose name was on the nitre label.

This sticking one label over the other is a disgrace to chemists; for it is very general. I have taken off one bottle as many as seven labels, one on top of another. I think chemists will do well to at once discontinue this habit which is manifestly unfair to their brother chemists, and is certainly unworthy of one bearing a name that wants raising in the estimation of the general public, and not lowering, as such acts must assuredly bring about.

Bromley, Kent. WILLIAM BAXTER, JUN., M.P.S.

PHARMACY AND CO-OPERATIVE STORES.

Sir,—I enclose an extract cut from a trade journal, which speaks for itself.

"The Pharmacy Board of Victoria have, on appeal to the Supreme Court, established the principle that companies there cannot carry on the business of pharmacy."

That is what I term practical legislation on behalf of pharmacists, and if that principle can be established in Victoria, surely the same can be done here in England. Practical help of this kind will do more for the interests of the Pharmaceutical Society and for chemists than all the talk about the necessity for advanced knowledge, and the consequent stringency of the examinations. I do not object to the increase in the curriculum, for the greater the advance in that direction the better for the profession and for the general public; but I feel confident that, until more help and protection are given to their interests by the Society, chemists will not do more than they are compelled in the way of examination.

Weymouth. R. ELWELL NAISH.

THE DISPENSING OF ERGOT.

Sir,—Will you kindly inform me if I was justified in refusing to supply extract of ergot under the following circumstance?—

"Liquid Extract of Ergot ½ an ounce.

"—— ——, L.R.C.P. & M.R.C.S.

"*Urgent.*"

The above was written on a card (not the medical man's). Not knowing the bearer, the doctor or the doctor's signature, I refused to serve it and was threatened by the bearer of the card with legal proceedings should anything occur to the patient; if it cost a thousand pounds to get me convicted, he would.

I did not serve the extract until a prescription was written. I was then told by the medical man, if anything happened to his patient he should hold me responsible.

Now, sir, was I to blame or the doctor? Should the medical man not have written a prescription, or have sent an order written on his own card in the first place?

If retailers of scheduled poisons are to be held responsible for the lives of doctor's patients, when simply carrying out the meaning of the Poison Act, the sooner it is known the better.

374, *Old Kent Road.* ALBERT PELLEW.

"PEPSIN AND PROPEPSIN."

Sir,—I should like, if you will permit me, to endorse from experience the result of experiments by Dr. Podwissotzky on the formation of pepsin, as noticed in "The Month."

Some time since, when experimenting on the exhaustion of pigs' stomachs by means of glycerine and hydrochloric acid, it was noticed that when the same stomachs were subjected to two successive macerations with different lots of the same menstruum, the solution which resulted from the second maceration was much more active than that from the first; quite the opposite of what might be expected were the pepsin all present as pepsin in the fresh stomach.

In my paper published in the Journal of December 18, I fear this reason supports Liebig's theory of the formation of pepsin by the destruction of epithelium, thinking that this destruction went on with certain limits showing the maceration process. Dr. Podwissotzky's theory, however, seems to fit the facts without appealing so much to the imagination.

Apart from its physiological interest, the commercial bearing of this fact must be obvious, and, therefore, the thanks of your readers are due to you for calling attention to it.

74, Market Place, Sheffield. G. A. GRIERSON.

CERA ALB. AND CERA FLAV.

Sir,—In a note upon the above subject appearing in your issue of December 11, 1886, p. 481, certain melting points are given on my authority, as showing that white wax can be obtained commercially having a melting point intermediate between that of authentic samples of yellow.

It was unfortunate that I should have given definite figures under the circumstances, as I had been compelled to use a thermometer of which I expressed a doubt, and which I now find to have been high. The correct temperatures at which transparency is reached in my samples should be—2 at 143°; 2 at 144°; 1 at 145°; 2 at 146°; commercial white (pure) at 144°; Californian at 147°.

The last was prepared by myself many years ago from honeycomb, I believe long before the artificial manufacture of comb was begun. It is now practically white.

I trust you will find room for the correction.

Liverpool. A. C. ABRAHAM.

W. H. J.—The Local Secretary for Bristol is Mr. J. Stroud, Chesterfield House, Ashley Hill.

W. J. C.—The yellow coloration is due to a slight acidity of the benzoated lard, which in the new B.P. is provided for by the addition of some potassium carbonate.

Linimentum Terebinthinæ.—We have received several letters on the subject of this preparation, but pending an authoritative declaration as to what its character should be, we do not think any useful purpose will be served by their publication.

F. E. Sturmfels.—We are unable to comply with your request, except in the portion of the Journal devoted to advertisements.

Chemicus.—The solubility of quinine salicylate is 1 in 330.

Ellis Jones.—The precipitate referred to by Mr. Macdonald was most likely caused by an excess of phosphoric acid.

F. W. Sandy.—The result was probably due to the formation of phosphate of iron, resulting from excess of phosphoric acid.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Howie, Hesse, T. Frost, Thompson, Gilmour, Pattison, Verax.

THE CHROMATE TEST OF QUININE SULPHATE.

BY DR. O. HESSE.

According to de Vrij, in testing commercial quinine sulphate by means of his chromate test the other cinchona alkaloids that may be present should remain in the mother liquor from the quinine chromate. The experiments that I have made with quinine sulphate containing hydroquinine and cinchonidine have, however, shown that de Vrij's statement is not quite correct. It is true that neutral chromates of hydroquinine and cinchonidine are more readily soluble in water than the quinine chromate, but they also possess the property of crystallizing out together with quinine chromate. Owing to this circumstance it happens that a mixture of quinine and hydroquinine sulphates containing up to 8 per cent. of the latter salt behaves exactly the same as quinine.

As regards cinchonidine sulphate it is true that quinine sulphate containing 0·3 per cent. of cinchonidine sulphate will give a mother liquor which, on evaporation, after having been made alkaline, yields a slight precipitate. It is also true that the quantity of the precipitate so obtained is greater in proportion as the amount of cinchonidine sulphate is augmented; but this increase in the quantity of the precipitate has no constant proportion to the cinchonidine present, since a varying quantity of this crystallizes out with the quinine chromate. Moreover, the precipitate obtained is not cinchonidine, or at least for the most part, but a compound of seven molecules of cinchonidine with one molecule of quinine, not as I formerly supposed (see before, p. 486)* the compound, $C_{20}H_{24}N_2O_2.2C_{19}H_{22}N_2O$, which de Vrij would have obtained in testing the sulphate by his new test. The former compound, it may be mentioned, can be obtained by dissolving the latter in hot dilute alcohol; on cooling large brilliant rhombohedrons separate, which have a composition represented by the formula, $C_{20}H_{24}N_2O_2.7C_{19}H_{22}N_2O$, containing 13·6 per cent. quinine and 86·4 per cent. of cinchonidine. By analysis I have obtained 13·7 per cent. quinine and 86·3 per cent. cinchonidine.

The presence of quinine in the precipitate which de Vrij took to be cinchonidine is the reason why the amount of cinchonidine is sometimes apparently found to be higher than it really is. In most instances, however, the result obtained is too low, notwithstanding the presence of quinine in the precipitate.

When the sulphate contains but little more than 0·3 per cent. of cinchonidine, the chromate obtained also contains cinchonidine. If the amount of cinchonidine is considerable in the quinine sulphate, it may happen that the air-dried chromate, when shaken with ammonia and ether will not only yield the compound $C_{20}H_{24}N_2O_2{\cdot}2C_{19}H_{22}N_2O$, but will also contain more water of crystallization than corresponds with the correct formula of the pure green chromate.

The general result of my experiments therefore proves the justice of the opinion previously expressed by me, that the cinchonidine in quinine sulphate cannot be correctly determined by means of the chromate method.

* The above communication was already written when I received from Mr. van der Steen the reprint of a paper (from the *Indische Mercur*, No. 5, 1887), in which this chemist mentions the compound, $C_{20}H_{24}N_2O_2 7C_{19}H_{22}N_2O$, as having been obtained by him under other conditions than those mentioned above. I may also add that in 1884 I had maintained, in replying to de Vrij in the *Pharm. Weekblad*, that the cinchonidine separated from an ether solution containing quinine contained about one-third its weight of quinine, but whether it was a compound or only a mixture of the two alkaloids could not then be determined.

PHARMACOPŒIAL TESTING.*

BY BARNARD S. PROCTOR.

Pharmacopœial testing may have various different objects, and the nature of the qualitative and quantitative examinations will naturally vary according to the views of the compilers.

In page xiii of Preface we find it said "The Pharmacopœia having for its object, not so much the selection as the definition of substances which the physician prescribes, and which are required to be kept at one safe and uniform standard of strength and composition." And further on we are told the descriptions are "intended to enable those who are engaged in the administration" [of the articles described] "to determine the identity and test the purity of such as are met with in commerce."

What are we to understand by the words "Those who are engaged in the administration" of medicines? Surely not the mothers or the nurses; surely not the public analysts, or the manufacturing chemists.

The literal acceptation of the words would indicate the former; the examination of the processes would in many instances imply the latter—that the processes were to be used by professional chemists with laboratories and analytical apparatus always ready for use, if it were not for the loose statements and clumsy mixing together of weights and measures which so frequently occur.

Take for example the first chemical in the Pharmacopœia, vinegar. We are told that 445·4 grains requires about 402 grain measures of volumetrical solution of soda for neutralization. Why take this odd number of grains, including a fraction exact to the tenth of a grain, and then tell you it requires "about" so much soda? The reason is apparently that we may take a fluid ounce, which according to the B.P. statement should have this weight.

But the specific gravities indicated show that the fluid ounce may vary from that weight, however accurately it may be measured, and furthermore a measure that would enable any one to estimate it with that exactitude probably does not exist, unless it be in the office of the official standards.

It is equally absurd to inform us that "about 402 grain measures of volumetric solution of soda correspond to five grains and forty one-hundredths per cent. of real acid." About so much soda is equal to an exact quantity of acid defined to the hundredth of a grain!

This is a muddling together of loose and exact terms which would be discreditable to a candidate for the Minor examination. Which member of the Committee of Council is responsible for this ill-considered and slovenly work?

No one! No one would have written it in a work for which he was to be individually responsible. It was the work of a corporate body, and corporate bodies have not a part suitable for casti-

* Read before the North of England Pharmaceutical Association, Feb. 10.

gation. It is useless, therefore, to spend blows upon the unkickable. Let us give our attention rather to what should have been done.

The Committee should have maturely considered what line it intended to take and then worked consistently upon that line.

It may be desirable that definitions should be given which would be suitable as standards for the makers to aim at, and guides to the public analysts and the magistrates in their findings when samples are submitted to them.

If that were the object held in view by the Pharmacopœia Committee, the definition of vinegar remaining as it is, the characters and tests might fairly have been reduced to the statement:—"It should not contain less than 5 per cent. or more than 6 per cent. of real acetic acid ($HC_2H_3O_2$) and not more than 0·1 per cent. of sulphuric acid. It should be free from copper, lead, and other poisonous metals."

Neither manufacturers nor analysts require to be told anything about fluid ounces or their weight. Nor is it important to tell them the specific gravity for it does not indicate either correct strength or purity. The official strength and purity being defined within certain limits, they know how to ensure the same or to ascertain it without being told anything about volumetric soda, chloride of barium, or sulphuretted hydrogen. And if the public analysts felt that these particulars were addressed to them, their sentiments would be something about little boys teaching their grandmothers.

If, on the other hand, the desire of the compilers was to give such characters and tests as would enable pharmacists to keep close watch upon the quality and strength of such preparations as they buy ready-made,—and this I contend is the legitimate object which they should have kept in view from beginning to end,—the code of tests might have been greatly simplified and rendered more useful by being more usable.

The definition of vinegar being left as it is at present given—"An acid liquid prepared from malt," etc.—the pharmacist does not require to be told that it is a liquid of a brown colour and peculiar odour. He most likely knows what vinegar smells like, and if he does not the statement that the odour is peculiar is not much help to him. It is no use telling him the specific gravity, which is not an important index to anything. It is no use telling him that a fluid ounce may weigh exactly 445·4 grains, as it may weigh exactly something else. If the pharmacist wanted a fluid ounce he would take it by measure; regardless of whether it was exactly that weight or not. And if he wanted exactly that weight he would weigh that quantity exactly, regardless of whether or not it measured the fluid ounce. It would, however, be useful to indicate to him how he might readily determine whether or not any given sample of vinegar was of legitimate strength and purity. To the professional analyst, who has his volumetric acid and alkali always standing in the burettes ready for use, a volumetric examination is a very simple matter; but to the average pharmacist, even among examined men, the volumetric appliances are not in daily use, and if the examination of the vinegar has to depend upon them it will generally remain unperformed, though it might be undertaken if it required no more formidable operation than the dispensing of one or two ordinary mixtures. This might be done in the case of vinegar by saying that "a fluid ounce should dissolve 18 grains of carbonate of magnesia, but should fail to dissolve an additional grain." This would accomplish the examination by the use of the simplest appliances always at hand, and with all the accuracy which can be necessary for an article dispensed by fluid ounces, or taken by spoonfuls. Commercial vinegars are often much stronger than this, but as the official dose is from 1 drachm to 1 ounce, and the domestic dose is as much as you like, there seems very little occasion to give it any very strict definition.

By the adoption of any such test as that I have suggested the inconsistencies and absurdities before noticed would be removed from the Pharmacopœia, and the testing with chloride of barium and sulphuretted hydrogen might remain as at present, though if the compilers could condescend to give useful and intelligible information they might say, "vinegar usually contains a little sulphuric acid; 1 fluid ounce of vinegar precipitated by 1 grain of chloride of barium, and filtered, should not give any further precipitate with more of the chloride of barium, and the absence of copper and lead should be indicated by the vinegar giving no precipitate with sulphuretted hydrogen."

I have spoken at some length about the testing of vinegar, simply taking it as an illustration of what might be said or done with regard to many other medical materials. The Pharmacopœia Committee would not have shown any lack of judgment had it omitted the testing of vinegar altogether. It is of no medical importance.

The carbonate of magnesia test might be adopted with equal advantage and greater utility to the testing of nitric, hydrochloric, and some other acids. And there are many other cases where chemicals which are naturally variable might have the latitude of their variation defined within desirable limits by the method exemplified in the case of sulphuric acid in vinegar, where all the latitude to be allowed must be covered by a given quantity of a common reagent.

I anticipate sundry objections to adopting this mode of working. First, the essentially rough estimation of fluid ounces or drachms measured in pharmaceutical graduates. And the question,—If the carbonate of magnesia is to prove that the acid is of right value, what is to prove that the carbonate of magnesia is not deficient? First, with regard to the measures. If fluid ounces and drachms are sufficiently accurate for the compounding and dispensing of medicines, it cannot be of great importance that their percentage of active matter should be determined with any greater refinement. And I should not suggest the estimation by ordinary graduates of any analytical quantities except where the material under examination was habitually used by the same. Now regarding carbonate of magnesia. Why do I select carbonate of magnesia? And what other chemicals can we select for use in this way?

To test the neutralizing power of an acid with a base which is variable in quality would be futile; but we may select certain chemicals which, from the nature of the processes used in their production, are little liable to accidental impurity, and which from the lowness of their price, or from the ease with which adulteration would be detected, are not liable to sophistication. Carbonate of magnesia is one of

these substances; it is cheap and habitually found in commerce almost absolutely pure and constant in composition. Being practically insoluble and tasteless, colourless and odourless, the great bulk of impurities are excluded. Being free from hygroscopic and efflorescent or volatile properties, it is free from other risks of variation, and taken altogether it is a substance which we should willingly take as a type of what would be satisfactory purity and uniformity in pharmaceutical products.* If we compare the alkaline carbonates, potash is irregular from its hygroscopic quality and soda from its efflorescence in its crystalline state, and its hygroscopic property in its dried state; ammonia from its continual variation is quite out of the question. The bicarbonates of soda and potash are not sufficiently constant in the proportion of carbonic acid and water to be trustworthy. I therefore select carbonate of magnesia, and with it may be tested, in the manner I have described, the majority of the acids where the B.P. directs the use of volumetric soda.

In May, 1883, Dr. Quain, as Chairman of the Pharmacopœia Committee, sent me the circular requesting pharmaceutical aid in the revision of the Pharmacopœia. I now quote from one of the letters in reply, which I addressed to that Committee:—

"The line of duty of the pharmacist towards the work is to aid in making the remedies in the hands of the physician forces of precision. The failing of the pharmacist is apt to be his over-attention towards the appearance of his preparations or their attractive qualities, and I fear I must add the failing of the medical profession is in being led away by the glowing recommendations of 'nice preparations' or 'valuable combinations,' the exact nature of which is undefined. Most of my suggestions will be guided by the following considerations:—

"1. That a drug should have a known degree of therapeutic activity.

"2. That a drug is not better for being above its normal standard of activity.

"3. That preparations should have the elements of constancy in their nature; if possible, their constancy should be greater than that of the crude drug from which they are prepared, and they should be little liable to change by keeping.

"4. That simple forms are, as a rule, better than those more complex, and useless constituents are better omitted.

"5. That in all cases the attractive qualities should be subordinated to those of more practical importance, namely, activity, constancy and permanence.

"6. That preparations which are essentially wanting in the elements of constancy should be discouraged in use by being excluded from official recognition.

"7. That the strength and purity of preparations or crude drugs should be defined, where practicable, within certain narrow limits. Thus if animal charcoal be spoken of as nearly pure, the allowable amount of its ash should be defined: and if the normal strength of powdered opium is 10 per cent. of morphia it should contain not less than 9·5 and not more than 10·5 per cent."

Having thus suggested to the Committee what I considered to be above all things the important aim, the reduction of the materia medica to forces of precision, I followed with nearly a hundred suggestions of detail, with that aim as my most prominent object. A fair proportion of these have been acted on, but there are yet many others which I think might have been adopted with advantage.

Among other things I suggested the propriety of abolishing the mixed use of fluid ounces with volumetric grains by measure. I should be very glad if the Committee could see the folly of the old instructions, or the wisdom of making new rules which should be consistent either in the weights and measures customarily used by analysts, or better still, leave the professional analyst to take care of himself, and give the instructions in such form that they could be readily worked at the dispensing counter.

Among chemicals which can be depended upon as being sufficiently pure for standards, the Pharmacopœia recognizes several. Dry carbonate of soda, produced by heating to redness a pure bicarbonate, being the standard upon which are founded all volumetric determinations of acids and alkalies.

You are required to produce your volumetric solution of oxalic acid (B.P., page 493) by making it of such a strength that 1000 grain measures are exactly neutralized by 53 grains of the dry carbonate of soda, and it looks a little absurd to see that the purity of the carbonate of soda is to be indicated by 53 grains of it exactly neutralizing 1000 grain measures of volumetric oxalic acid (B.P., 366). This is reasoning in a circle. The authorities dare not tells us that they have based anything so important as alkalimetry and acidimetry on the purity of a commercial chemical. They leave us to find that out. In fact, they try to conceal it by apparently checking both reagents while they virtually check neither, but simply assume that a bicarbonate of soda, which indicates little or no chlorides or sulphates with the usual tests, will yield a mono-carbonate pure enough to be the standard for all acids and alkalies.

Bichromate of potassium is assumed to be pure if free from sulphates and chlorides—no pretence at cross testing occurring either in the Appendix or body of the work. It is an anhydrous salt and not hygroscopic; it is easily prepared pure, and is cheap enough to be no temptation.

Iodine is another commercial chemical that is virtually trusted as a standard if it gives no indication of cyanide of iodine, and leaves no fixed residue. But in this case, as in the carbonate of soda, we have the circular reasoning. The Appendix instructs us to make a volumetric solution of hyposulphite of soda of such a strength that 1000 grain measures of it shall be the equivalent of 12·7 grains of iodine (B.P., 490), and the body of the work directs us to prove the purity of our iodine by seeing that 12·7 grains of it requires for complete decoloration 1000 grain measures of volumetric solution of hyposulphite.

If we turn to calcium hypophosphite we find it said "5 grains boiled for ten minutes with a solution of 12 grains of permanganate of potassium yields on filtration a nearly colourless solution" (B.P., 87). This is a simple and ready test more likely to be used than if the volumetric apparatus were re-

* 20 grains of carbonate of magnesia as taken from the shop bottle when dried at 212° F. lost 0·5 gr. It regained 0·3 by a day's exposure to the air, and in a week regained the 0·5 originally lost. 20 grains of dry carbonate of soda gained 0·75 in three days and 1·0 in a week.

quired. The purity of the permanganate is apparently assumed. Perhaps it might be assumed, but it is not; for on turning to page 331 we find 5 grains of the permanganate require for decoloration a solution of 44 grains of granulated sulphate of iron, and unless you have proved this your examination of the calcium salt would have no official recognition. But the matter does not end here. Is your granular sulphate of iron trustworthy? In fact it is a salt quite likely to vary. Commercially it is frequently damp and if dried it has some tendency to effloresce and also to oxidize. However, the Pharmacopœia provides for that contingency, and directs you not to trust to the granulated sulphate of iron unless you have proved that 41·7 grains of it require exactly 500 grain measures of the volumetric solution of bichromate of potassium before it ceases to give a blue precipitate with ferricyanide of potassium.

So when you wish to test your hypophosphite of calcium think of the poor old woman whose pig would not get over the stile. The bichromate of potassium will not prove the granular sulphate of iron, the granular sulphate of iron cannot prove the permanganate, the permanganate cannot prove the hypophosphite of calcium, and we have no physic for our poor old patient to-night.

This is not the only instance in which the compilers of the Pharmacopœia lead us a dance after results which is somewhat like following will-o'-the-wisp. Arseniate of soda is to be tested with acetate of lead, but the acetate of lead is only to be trusted if it has been tested with oxalic acid, and the oxalic acid must be proved by the dry carbonate of soda.

One might think that the Pharmacopœia Committee had been larking with us were such a thing possible.

> The shades of pharmacy repose
> Deep in red woods,* and at fields green.†
> The sober light no longer glows,
> Will-o'-the-wisp instead is seen.

It would not be difficult to draw up a considerable list of chemicals which we habitually find in commerce in a condition closely approaching purity; quite sufficiently close to theoretical purity to permit of their being used as standards of comparison for those which are essentially variable, or not evidently constant in chemical value.

Before I enumerate examples of these I must emphasize two important points; first, the distinction to be drawn between the cases where the impurity is a simple subtraction of activity and the cases where the impurity is itself an active agent for good or ill. In the former case 3 or 4 or 5 per cent. of impurity may be a matter of very little moment. In the latter case 3 or 4 or 5 parts in ten thousand may be of serious consequence. Take for example strong solution of perchloride of iron. It may contain 3 or 4 or 5 per cent. of oxide of iron, hydrochloric acid, or water as impurities or diluents of its normal activity, but that is of no moment, while the presence of arsenic in the proportion of 3 or 4 parts in ten thousand would totally condemn the article. When I say that 3 or 4 per cent. more or less than the theoretical quantity of iron is of little moment, I say it advisedly. I say it because it is true, even though some of my quixotic friends may feel horrified at such heresy. The B.P. says the specific gravity shall be about 1·42, and a fluid drachm shall yield between 15 and 16 grains of peroxide of iron by precipitation with ammonia.

As regards the precipitate I consider this is good pharmaceutical standardizing. In fact much better than in the case of solution of persulphate of iron, where the precipitate yielded by a fluid drachm is defined to the hundredth of a grain; that is to say a fluid drachm shall yield 11 grains and 44 hundredths.

On the other hand, the gravity of the perchloride liquor is not satisfactorily defined,—"about" so much is a loose expression, we do not know how much latitude is allowed. It is better to define it strictly between certain bounds. Instead of saying about 1·42 say between 1·41 and 1·43, and then we have a strictly defined liberty. Where the permissible latitude is strictly defined, the boundaries are more likely to be respected than they would be if the loose expression "about so much" is used; and if the reasonable latitude is allowed where it is permissible, the absolute injunctions are more likely to be respected when they are important.

We respect the requirement that the test for arsenic shall yield no white crystalline sublimate, and feel the justice and reasonableness of putting this impurity on a totally different footing from those which are simply adding to or subtracting from the theoretical potency to a small and definite extent.

Keeping these circumstances in view, a number of chemicals which we know are not absolutely pure may be quite satisfactory for testing purposes.

Good brands of bicarbonate of soda if heated to redness yield dry carbonate of soda of almost absolute purity. This is the usual standard, not only in the B.P., but in commercial analysis, by which acids are determined, and from an acid so standardized, all alkalies in turn are estimated, but as it has a slight hygroscopic quality it requires to be freshly ignited if accurate work is looked for.

Common commercial oxalic acid is usually so nearly pure that it might be used as a standard for pharmaceutical use without purification, and a single recrystallization is sufficient to put it beyond all question for our purposes, that is for standardizing pharmaceutical products.

Chloride of barium is also a common cheap chemical, commercially very pure; but had it been far from pure in most cases in which it is used that circumstance would be of little moment. Take the vinegar test for example. One grain of chloride of barium precipitates all the sulphuric acid in 1 ounce of vinegar, and if the chloride of barium contained 10 per cent. of impurity it could not make more difference in the test than about 1 part of sulphuric acid in 10,000 of vinegar.

In many other cases the impurity of the chloride of barium would make no difference at all to the result. And in some few cases, such, for example, as the testing of aromatic spirit of ammonia, it would make more difference to the result, though even in that instance the vitiation of the result arising from 10 per cent. of impurity in the barium salt would only falsify the relationship between the carbonate and caustic ammonia present to an extent which would have no practical importance. But again I have to say chloride of barium of commerce is nearly pure $BaCl.2Aq$, or ($BaCl_2 2H_2O$).

Chloride of ammonium is another of the commonly

* Red woods, *i.e.*, autumnal tinted.

† At fields *green*, *i.e.*, in the spring time of life.

pure chemicals; it has so little applicability that I need not have noticed it but for the sake of pointing to the security which sublimation gives. The common sal ammoniac frequently has a yellow streak from a trace of chloride of iron, and it may contain other chlorides, for all chlorides are volatile, but from the nature of the process of manufacture the traces of impurity are usually very small, and if used as a means of estimating silver—the only purpose in connection with the present subject for which we are likely to use it—these traces would be of little moment, while the granulated chloride, which is usually supplied as pure, would be less reliable. It is usually moist, and would require drying before a given weight of it could indicate a definite quantity of silver.

Common commercial iodine is a chemical very nearly pure; it usually contains a trace of water, and a trace only of fixed impurity. The cyanide, which is sometimes spoken of as an impurity, and is guarded against in the B.P. by the sublimation test, I have never seen. The resublimed iodine of trade may be regarded as a high standard of purity for such comparisons as are required in pharmaceutical testing. The cross testing and circular reasoning, which I just now noticed, are uncalled for as well as useless.

Common hyposulphite of soda, at a penny per pound, is so nearly pure as to be fit for all the B.P. testing required of it, without forming a volumetric solution to be titrated with iodine. Select a good clean crystal, scrape off as much as you require for your operation, and you will have it up to about 98 per cent. of its theoretical value. Do you think I am guilty of laxity in saying two or three per cent. of deficiency is of no moment? The hyposulphite is used for the testing of chlorinated lime and chlorinated soda. What does the B.P. say about solution of chlorinated lime? It says it should yield not less than about 2 per cent. of available chlorine, and adds, "When the solution of chlorinated lime is made with the best chlorinated lime and is quite fresh it may yield about 3 per cent. of available chlorine." That is, it may be 50 per cent. above what they adopt as standard. But what about the standard? It assumes that we shall not habitually make our solution from the best material or not have our solution in good condition. But the B.P. kindly gives us permission to have it made of the best and well kept. If all this latitude be permissible—30, 40 or 50 per cent.—why this elaborate preparation of volumetric solution and 1000 grain burette?

If the solution is of sufficient importance to require any titration at all, I think it should be with a narrower limit than here allowed. I should say a fluid drachm in an ounce of water with 20 grains of iodide of potassium and 2 drachms of hydrochloric acid should retain a yellow colour on adding 10 grains of hyposulphite of soda, but the colour should be removed on adding 2 grains more of the hyposulphite.

I have now probably said enough about the testing of the inorganic materia medica, for my present object is only to indicate the lines upon which a reform should proceed; but before concluding I wish to say a few words upon the testing of spirit of nitrous ether.

It is essentially a variable article, variable from the difficulty of preparing and the difficulty of preserving the article when obtained. In these respects the present B.P. has made distinct progress, but is yet open to criticism. The fact that the Inspector of Food and Drugs recently paid a visit to a number of us in connection with this article gives it an additional interest at the present moment, and I shall show you the B.P. process of testing in operation. I had repeatedly made examinations of spirit of nitrous ether by the old method with solution of chloride of calcium, with most unsatisfactory results, but I had no practical acquaintance with the present process till my attention was directed to it through conversation with the city analyst at the time the first lot of samples were submitted to him. The inspector had not supplied him with a sample from my shop, so I gave him one illustrating the condition in which it might be expected to be found under fair ordinary circumstances—that is, I had not examined it, but bought it as B.P. from a good source, it was not less than a month old, it was taken from the shop shelves as it would have been for any retail customer, and the shop bottle was about two-thirds full. This he reported to me to be up to B.P. requirements. So far satisfactory; but it left me with the determination to put up a nitrometer, and look after my spirit of nitre myself by the B.P. process, unless I could devise a better. The nitrometer now on the table is the instrument which I extemporized at the time; you observe it is such as could be extemporized out of the materials to be found in any chemist's shop. It consists of three glass syringes. The syringe to hold the gas I graduated into fluid drachms to facilitate the working with pharmaceutical measures, the connections are feeding bottle tube, and the wooden support is a specimen of my carpentry. The pinch cock is the only part specially purchased for the purpose. The first fault I find with the B.P. in this case is, that it adopts a test for which it does not give the necessary instructions for carrying out, but refers us to the pages of the *Pharmaceutical Journal* to see how it is to be performed. Next I consider the process much too special and elaborate to be resonably required of the average pharmacist. Thirdly, with all its special apparatus and solutions, its note of temperature and barometric pressure, a considerable and ill-defined latitude is allowed. When freshly prepared it is required to yield "seven times its volume of nitric oxide gas, and even after it has been kept some time"—it has always been kept "some time,"—"and the vessel containing it has occasionally been opened, it should yield not much less than five times its volume of the gas." How much is "not much?" Perhaps four is not much less than five, but if that interpretation is legitimate why not say definitely, "it shall yield not less than four volumes, and not more than seven volumes of nitric oxide gas." If four volumes is too low, say four and a half, or say five; but let it be a definite minimum and a definite maximum. I am quite content that all reasonable allowance should be made, but I protest against this pretence of refinement and accuracy in requiring barometric and thermometric observations, and then concluding with such laxity as is involved in the expression "not much less than five."

I think we may assume that in the statement that it shall yield when fresh seven volumes of gas we are to understand seven volumes, and neither more nor less, though that might be a nice point for the lawyers to decide if anyone were put on trial for an

overstrength, and such a thing does not seem improbable in the light of the experience of our public analyst, who has had samples varying from one to eleven volumes of gas.

I will now give you a demonstration of the B.P. process for testing spirit of nitrous ether, and then a demonstration of another process, which from its simplicity has some recommendations as a process for the dispensing counter. Before the introduction of testing spirit of nitrous ether by the nitrometer, which I must say is much to Mr. Allen's credit as a process for the public analyst, several other modes had been tried which depended upon the same reaction, notably Mr. Dott's method, liberating the iodine by this reaction, and estimating the amount liberated by titrating with hyposulphite. This I believe will not be found quite so accurate as Mr. Allen's, and not much less complex. It forms, however, a guide to what I think should be an acceptable process to pharmacists generally.

Solution No. 1.

℞	Sodii hyphosulph.	gr. iv.
	Sodii chloridi	gr. xl.
	Potassii iodidi	gr. xx.
	Aq.	fʒij.

Solve.

Solution No. 2.

℞	Spirit. ætheris nitrosi	fʒij.
	Acid. sulph. dil.	fʒj.

Misce.

Place the former solution in a small dish, a two-ounce ointment pot is suitable.

Pour into this fʒiss. of the No 2 solution and stir till the effervescence has passed off. The mixture should be free from iodine colour. If not so the spirit of nitre is stronger than should be used. If no iodine remains free after the effervescence has passed off, add fʒss. more of the No. 2 solution (total fʒij.). This should now produce a permanent brown colour if the spirit of nitre is up to its normal strength. But if a second addition of fʒss. (total fʒiiss.) is required, it is below its normal, but not unfit for use; but if this second fʒss. fails to produce a permanent brown colour, the spirit of nitre is too weak to be sanctioned.

This method of operating would require no apparatus but what every dispenser has always at hand, and no operation but what he is daily performing. It would take very little time and cost almost nothing. It would allow a reasonable latitude with a limit of strength as well as a limit to weakness, and the latitude is not greater than the B.P. allows. If a number of tests are to be made, it may be further simplified by having No. 1 solution made in bulk, so that fʒiij. shall exactly represent the four grains of hyposulphite; but I have not yet had experience enough to say how long the solution would be reliable; probably in a neutral or alkaline state it may keep unchanged for a long time.*

It may appear that in suggesting a rougher and readier mode of examination I am proposing to progress backwards; this, however, I cannot acknowledge. It is better to be consistent within practically useful limits than to have a mixture of useless refinement and unnecessary laxity. I do not suggest latitude so great as some already tolerated by the B.P. I do not desire that anyone should have his chemicals one whit less perfect than he now aims at or accomplishes. But I do desire that the tests of the Pharmacopœia should be such as the pharmacist might be reasonably expected to put in frequent operation, and such as would readily give him the assurance that his chemicals were safe from exposing him to penalties; or, if his chemicals were not so, that he should readily detect the fact.

I do not propose any laxity regarding the presence of impurities which might be of consequence to the patient, or any variation which might be detected by anything short of a chemical examination. In fact, the greater latitude that I would allow for the sake of having tests workable by the ordinary pharmacist with the appliances to be found on his dispensing counter only admits of variations the size of a gnat, compared to the camels which go down the throats of our patients by spoonfuls.

The Pharmacopœia gives us the example of latitude in chloride of lime solution being permissible 50 per cent. over its standard. In spirit of nitrous ether being allowed 30 or 35 per cent. below its standard. In carbonate of potash having about 16 per cent. of water, a small but indefinite latitude being allowed. In bromide of potassium being allowed a small but well-defined and reasonable latitude, as expressed in the statement that 10 grains require not less than 838, and not more than 850 grain measures of nitrate of silver solution for complete decomposition. It is because the definiteness of the requirement in one case is better than the indefiniteness of the other, that I am wishful to see the statements made general of what theory requires, and what in practice we may permit.

If it is not sufficiently evident how scientific accuracy can be combined with the less strict definition of pharmaceutical requirements, I may explain by taking in illustration the case of citric acid. The Pharmacopœia defines it as being $H_3C_6H_5O_7,H_2O$. This is a precise statement of the proportion of every element it contains, and includes hypothetical arrangements enough to satisfy the desires of those who must have a theory of its constitution. We have hydrogen apparently performing three functions, and oxygen two. If we strike out the volumetric test, and say 37 grains of citric acid in 2 ounces of hot water make a clear solution with 24 grains of heavy carbonate of magnesia, but fail to dissolve an additional grain, we have all the latitude and all the exactitude which is desirable to insist upon for pharmaceutical use.

I am also wishful that the good example shown by the United States Pharmacopœia should be followed, in making general the statements of what is sought to be established by such of the tests as are not of every-day application. Under "Black Antimony," in the B.P., we are informed that the appearance of a crystalline sublimate in one of the processes of testing would indicate the presence of arsenic, though this is not by any means a very obscure point. If it is not beneath the dignity of a Pharmacopœia Committee to explain its object in this case why should it not also explain that the object of

* As a demonstration of the working of this process, four samples of spirit of nitrous ether were tested in the course of a few minutes, two of which had previously been tested by the nitrometer, giving confirmatory results with the new working method, and two which had been procured by the Secretary for examination at the meeting. One of these, marked ·850, gave the iodine colour with the first additional fʒss. of No. 2 solution (total fʒij), and was pronounced of good quality. The other, marked ·845, gave a strong iodine colour with the fʒiss. of No. 2 solution, and was pronounced over strength. This on a subsequent examination with the nitrometer gave 9 volumes of gas.

testing acetic acid with zinc and HCl is the detection of sulphurous acid?

Why not tell us what is the impurity likely to be present in meconic acid, which would give a precipitate with a solution of iodide of potassium and iodine? Why not tell us what impurity in phosphoric acid would be detected by a solution of albumen, and what other impurity is sought for by testing with perchloride of mercury and heat? Though nitric acid is well known as a test for albumen the converse application of this reaction is not so common as to make an explanation undesirable. The United States Pharmacopœia does not use this test, but includes the mercuric chloride test, and attaches the explanation that it indicates the presence of phosphorous acid.

It will necessarily be long before any alteration can be made in the modes of pharmacopœial testing, and it is desirable that the subject should, in the mean time, have the attention of those most interested in it, and have a full expression from them of what would be a useful help to them in their endeavour to do their duty towards the physician and his patient. I do not suppose I shall live to see my views carried out; but if others agree with what I have indicated, there is little doubt that a free expression of opinion would meet with respectful consideration from the authorities.

During the revision of the B.P. for the 1867 edition, I suggested that the resin of scammony from the root should take the place of the native product in colocynth pill and extract. Dr. Quain in reply, said, "The variety of opinion is something remarkable. I have just been in communication with Mr. Squire, here, who urges that the resin of scammony should be excluded." The Pharmacopœia Committee of that date compromised the matter between Squire and Proctor by giving the resin of scammony a place in the compound extract of colocynth and retaining the virgin scammony in the pill. It might suit the policy of the Queen's Chemist to have a costly drug, though it might have no advantage over a cheaper one, except that of enabling him to have a finer quality than the common run of chemists. So long as virgin scammony was the only official form, the supply was not sufficient to meet the demand, and the common run of chemists could not all get it as fine as Mr. Squire. But the resin having in my hands and in my interior proved itself equal to the other, my sense of what is good for the greatest number impelled me to advocate its general adoption, and this common-sense view at last gained the day, and the resin of scammony is now, in the 1885 edition, permissible in all cases, except the rare one of emulsion of scammony.

Now it is upon precisely parallel grounds that I advocate the modification of our official testing, and the adoption of what is practically good and within the compass of the common run of chemists who have intelligence enough for the ordinary operations of pharmacy and ambition enough to wish to do their duty well.

I do not wish to deprive the scientific man of the pleasure of boasting his superiority. There is always room for the exercise of superior talents, and where the public appreciates science the scientific man will have his reward without the necessity of creating difficulties and pit-falls for the poorer brethren who may be less favoured in their prospects of reaping a pecuniary harvest from scientific culture.

METHYLAL.*

BY B. W. RICHARDSON, M.D., F.R.S.

At the meeting of the British Association for the Advancement of Science, held at Norwich, in 1868, I brought out for the first time the chemical fluid called *Methylal* as an anæsthetic and hypnotic, and at a meeting of the same Association at Exeter, in 1869, I again drew attention to it in order to make it useful in practice.†

Methylal is a colourless fluid of specific gravity 0·855; its vapour density is 38°, taking hydrogen as unity; and boiling-point of 42° Cent., 107·6° Fahr. Its solubility in blood is one part in three; its composition is $C_3H_8O_2$. It is made by distilling methylic alcohol with sulphuric acid in the presence of peroxide of manganese, but it requires several re-distillations before it can be obtained in the pure state, for which reason it is at present a very expensive compound. The first specimens with which I experimented were made in my own laboratory; later specimens have been made for me, with much care, by my friend Mr. Williams, the well-known operative chemist.

When methylal is quite pure it is almost tasteless, but bites the tongue, and owing to its low boiling-point quickly evaporates. The odour of it is fragrant, and not very powerful. The pure vapour creates no irritation on being breathed.

After long exposure to the vapour of methylal, in an atmosphere containing not less than 35 per cent. of the vapour, warm-blooded animals may be made to pass into a sleep which, once established, is deep and prolonged. In my first researches the sleep so induced lasted for intervals of two and even three hours, but I believe now that this long narcotism was due to the presence of acetone, from the methylal not having been sufficiently purified. Last year with a perfectly pure specimen, made by Mr. Williams specially for my work, I endeavoured to anæsthetize two dogs with methylal in order to enable Mr. Mavor, the veterinary surgeon, to operate upon them painlessly. After half an hour's inhalation of the vapour narcotism was not produced. The fluid was then injected hypodermically in one animal to the extent of an ounce dose, upon which a gentle sleep, or rather intoxication, followed, but with no sufficient anæsthesia to allow of painless operating.

In my report of 1869 I showed that methylal, which is very soluble in water, could be administered by the mouth when diluted with water, or by hypodermic injection, and I have prescribed it occasionally, as a mixture several times. I usually begin with a fluid drachm dose, mixed either with glycerine or syrup of orange flowers and distilled water. Example:—

Methylal, pure	℥vj.
Syrup of orange flowers	℥iv.
Distilled water	℥vj.

Mix. To make a solution of 6 ounces; of which let 1 to 2 fluid ounces be taken in a wine-glassful of water as directed. The dose may gradually be increased to twice the above quantity or more.

In action, as a medicine, methylal lies between alcohol and anhydrous ether. It quickens the action of the heart with reduction of arterial pressure; it makes the respirations slow and deep; it induces a tendency to sleep; and, it is a sedative to pain, but not to a very deep degree. On the whole it would be best to keep it in the group of anodyne antispasmodics, in which I originally put it. It causes very little muscular excitement and no vomiting, but after long inhalation of its vapour it produces a free flow of saliva. As it mixes well with alcohol and with ether it might be administered with either of these agents; and it might also be given with amyl nitrite for the relief of colic, asthma, angina pectoris or tetanus; but before it can come into general use it must be reduced in price.

* From the *Asclepiad*, No. 13.

† 'Reports of the British Association for the Advancement of Science,' vol. xxviii., pp. 183-4, Norwich meeting; and vol. xxix. p. 406, Exeter meeting.

Signor Personali, who has recently been experimenting with methylal, seems to have arrived at results similar to my own; but he adds that it may be used as an ointment or liniment for external application. It is true that it mixes fairly with oil and with lard; but as it boils at 107° Fahr. I cannot see how it can be of any service for external use, except in causing a slight local anæthesia by cold, from evaporation.

THE SULPHUR INDUSTRY OF THE UNITED STATES.*

BY HARRY C. MYERS.

The mineral deposits of the great West have for many years attracted a great deal of attention, both in the United States and abroad. Besides the common minerals and compounds that chemists acknowledge as existing, there are beds of pure white kaolin, mineral wax or ozokerite, borax, petroleum, bituminous coal veins forty feet thick, rich sulphur deposits, etc. Sulphur, I believe, is not recognized by text-books as existing to any extent in the United States, and yet, in the Territory of Utah, there is beyond doubt the richest and largest known sulphur deposit in the world.

It would seem by the extent and purity of *this* deposit, however, that at some remote period the sulphur must have poured out in a molten mass and flowed like lava into the valley beneath. This enormous deposit was located in about 1870 by the Government Surveyor, and is situated two hundred miles south of Salt Lake City, between the counties of Millard and Beaver on Cove Creek.

The deposit is about two thousand feet square, and shafts have been sunk in different places from thirty to sixty feet deep without reaching the bottom of the deposit; the depth is as yet unknown. It is easy to see by using these figures and multiplying by the weight of a cubic foot of sulphur, which is over a hundred pounds, that this deposit contains easily ten million tons of sulphur. The poorest ore yet found in this locality contains 40 per cent. sulphur, and is almost black in colour; but as the 90 per cent. ore is inexhaustible the poorer ores are disregarded. These ores were analysed at Case School of Applied Science by a familiar process and found to be absolutely free from arsenic and antimony, which cannot be said of the imported Sicily sulphur. The sulphur in this deposit is in strata, measuring from eleven to twenty-two inches in thickness, and as it is a surface deposit it is worked much like the quarrying of stone. It is then refined by a new process, which consists of melting the sulphur, forcing and straining it through a cylinder by the heat and pressure of steam, and as the ore is only contaminated with lava sand, it is very easily separated.

In many parts of this deposit the vapours are still rising and the deposition is continuous. In sinking shafts the vapours are so intense that several workmen are required, for one man is soon overcome and another one must take his place; and often, birds and small animals enter the sulphur pits for shelter and are soon overcome and suffocated. In 1872, a party of business men endeavoured to find the extent of this deposit. On camping out the first night, their tents were filled with vapours and they were nearly suffocated; next day they started to sink a shaft, again the vapours drove them away and they had nothing to show for their trouble except a pair of sore eyes apiece. On their return they reported the discovery of the infernal regions in active operation. The way in which this deposit was discovered is a rather peculiar one: it was noticed at a certain time in the year, when the foliage of the trees was just beginning to appear, that wherever a tree was growing near a sulphur deposit it was greener and more advanced than the trees about it; knowing this fact, a single person was enabled to discover and locate fourteen deposits. This advanced growth was probably due to the warmth of the rising vapours. Soon after the discovery of these beds, some English capitalists sent over experienced men at a great expense, who, being ignorant of this fact, failed to make a single location.

A few years ago sulphur was discovered in Mount Humboldt, Nevada, which was 98 per cent. pure, but it proved to be only a "pocket" and was soon exhausted. Rich deposits were also discovered in New Mexico as well as in California and Colorado; in fact, at the Exposition at New Orleans, nearly all the western States reported sulphur deposits and exhibited specimens of the ore, but owing to lack of railroad facility or extent of the ore these deposits have not been operated to any degree.

The high rates of freight in the West have been a great drawback to the mining industries, and have compelled us to borrow of our neighbours when we have abundance at home. This is the case with our sulphur industries. We now import nine-tenths of our sulphur from Sicily. The ore there is taken from the bed of an extinct crater, several hundred feet below the surface, and is carried to the surface upon the backs of children. The ore does not average above 20 per cent. It is then partially refined and shipped to us as "crude sulphur;" this is done to avoid the duty on the refined article, and as it is shipped *free* as ballast it makes a cheap article with which American high-priced labour and freights will hardly allow of competition.

The great demand for sulphur is, of course, for the manufacture of sulphuric acid, and it would seem at first sight that it would be necessary to ship the western sulphur to the East and supply this demand, in order to make the enterprise a profitable one; this, plainly enough, would eat up the profits. But such is not the case, the demand for sulphur in the West is enormous and is steadily increasing, and will continue to increase as long as the population increases and new industries are started in operation. Sulphur is used largely in the West, espepecially in Colorado, New Mexico, and Texas, as a "sheep dip." This "dip" is composed of sulphur and an alkali, and is used for cleansing the sheep and destroying a kind of itch that is common in that locality. The carrying out of this cleansing is compelled by law. Little towns in the West, that are hardly noticeable on the maps and are almost unheard-of, purchase annually from five to ten carloads of sulphur. This sulphur is then sold to the various ranches in the vicinity and used as described. Sulphur, again, is largely used in restoring old vineyards, especially in California and that vicinity. It is also used in a variety of smaller ways that are well known in the East. The imports of this article in 1878 were 48,102 tons, and in 1886 were 117,538 tons, showing an increase of over sixty-nine thousand tons in the importation in eight years, and in the next eight years the increase of course will be much greater unless we bring our western sulphur into the market; and it will be brought into the market and will compete with the Sicily trade, just as sure as American energy and enterprise continues to be what it has been in the past.

* From the *Am. Journ. Pharm.*, January.

MANUFACTURE OF OIL OF SASSAFRAS.*

BY THOMAS C. HARRIS.

In some of the interior counties of North Carolina may be seen, in operation, many primitive establishments for the manufacture of the oil of sassafras and oil of pennyroyal. The apparatus used in this work is so exceedingly rude and primitive as to appear ridiculous to most observers; but the product is of good quality, and constitutes a profitable industry. For these oils the usual style of "still" may be briefly described as a short trench in the ground, ending in a low flue or chimney. Over this trench is placed a closed wooden box, having a sheet-iron bottom, and an auger-hole on top, through which water is poured. An ordinary barrel stands endwise on top of the steam-box, and has several holes bored through

* From the *Popular Science News*, November.

its bottom, and also through the top of the steam-box, allowing steam to pass freely up through the barrel. A lute of clay is used to close the joint between the lower end of the barrel and the steam-box, as well as the cover of the barrel. Instead of a "worm," a tin pipe immersed in a trough of cold water is used; and a steam connection with the barrel is generally made by an elbow branch of wood, bored out with an auger. The sassafras tree (*Sassafras officinale*) grows abundantly in this section (Raleigh, N.C.), especially on worn-out lands, where it is usually found in dense thickets of small shrubs. The root is dug and washed free of dirt, and, after being chopped short and bruised with a hachet, is ready for the "still."

When the barrel is filled with the roots, and the cover made tight with clay, the process of distillation goes on rapidly. The steam passes through the mass of bruised roots, and is condensed by the tin tube into a mixture of distilled water and oil, and runs into a glass vessel set to receive it. Being of different densities, the oil and water rapidly settle into two strata, and one can be decanted from the other. It is said that the operator of such a "still" can pay all running expenses and make a clear profit of three dollars per day.

The same outfit is used in the production of the oil of pennyroyal (*Hedeoma pulegioides*), which grows abundantly in the woods in many counties.

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R. Reynolds	2	2	0
A. Richardson	0	5	0
P. Ridley	0	2	6
John Robbins	5	5	0
W. R. Roberts	0	5	0
Prof. C. Roberts-Austen, F.R.S.	2	2	0
J. Robinson	0	10	6
R. A. Robinson	3	3	0
Sir H. E. Roscoe, M.P., F.R.S.	1	1	0
Thomas Rowntree	1	1	0
H. Rowson	1	1	0
Warren de la Rue, D.C.L., F.R.S.	5	0	0
A. F. and L. F. Sainsbury	1	1	0
G. W. Sandford	5	5	0
W. D. Savage	1	1	0
John G. Sangster	1	1	0
William Sarsfield	1	1	0
Sir Edwin Saunders, F.R.C.S.	2	2	0
Savory and Moore	5	5	0
G. F. Schaeht	3	3	0
R. H. Semple	1	1	0
A. Senier, M.D.	1	1	0
James Sharp	1	1	0
J. C. Shenstone	1	1	0
W. A. Shenstone	2	0	0
J. W. Shepherd	1	1	0
J. Sherwin	0	2	6
Shirley and Son	1	1	0
F. W. Short	1	1	0
Louis Siebold	1	1	0
H. Silverlock	2	2	0
Thomas Slater, jun.	1	1	0
Smith and Co.	3	3	0
John J. Smith	0	10	6
Samuel A. Smith	1	1	0
William Smith	1	1	0
William Smith	1	1	0
W. F. Smith	0	10	6
Southall Bros. and Barclay	5	5	0
William Southall	1	1	0
W. F. Southall	0	5	0
C. Spencer	1	1	0
Thomas Spencer	0	10	0
John Spiller	1	1	0
J. Spilsbury	1	1	0
A. H. Squire	5	5	0
Peter W. Squire	5	5	0
F. Stacy	0	5	0
E. C. C. Stanford	2	2	0
R. S. Starkie	1	1	0
J. Stoeken	5	5	0
John Stroud	0	10	6
C. E. Stuart	0	10	6
J. R. Summers	1	1	0
Francis Sutton	1	1	0
Charles Symes	3	3	0
Symes and Co.	3	3	0
W. H. Symons	3	3	0
G. S. Taylor	3	3	0
A. E. Tanner	2	2	0
T. Terry	0	10	0
H. Thomas	0	10	6
Horace Thomas	1	1	0
H. A. Thomas	2	2	0
H. Parry Thomas	0	5	0
R. Thomas	0	2	6
T. Rees Thomas	0	5	0
C. Thompson	0	10	6
G. Thompson	0	2	6
G. A. Thompson	0	10	6
H. A Thompson	2	2	0
J. C. Thresh, D.Sc.	2	2	0
E. A. Thrower	0	10	6
Professor C. R. C. Tichborne, LL.D.	1	1	0
Professor Tilden, D.Sc., F.R.S.	1	1	0
J. G. Tingle	0	5	0
C. Tomlinson, F.R.S.	1	1	0
C. E. Turner	1	1	0
C. Virgo	2	2	0
C. Wakeham	0	5	0
W. Ward	1	1	0
Charles Walker	0	5	0
Henry Walker	1	1	0
D. Wallworth	0	10	6
W. P. Want	0	5	0
W. Warren	0	10	6
F. W. Warrick	1	1	0
G. E. Waterall	1	1	0
J. Watts, M.A., D.Sc.	5	0	0
J. N. Watts	1	1	0
W. Manning Watts	3	3	0
E. A. Webb	2	2	0
Sir Spencer Wells, Bart., F.R.C.S.	2	2	0
J. L. West	2	2	0
J. T. Westover	0	5	0
W. Whysall	1	1	0
H. J. Wigg	2	2	0
H. Wiggins	0	5	0
J. Wild	0	10	6
W. Wilkinson	0	10	6
E. Williams	0	5	0
John Williams	10	10	0
W. Willmott	1	1	0
Albert Wilson	0	5	0
R. E. Wilson	0	10	0
J. A. Wine	0	10	6
G. S. Woolley	5	0	0
H. Woolley	5	0	0
A. Wright	0	10	6
H. C. Wright	0	2	6
Wright, Layman and Umney	5	5	0
W. F. Wyley	3	3	0
Frederick Wynn	0	10	0
Francis Yates	2	2	0
J. Rymer Young	1	1	0
R. Fisher Young	1	1	0
W. C. Young	0	10	6

From Australasia.

A. Andrews (Beaufort)	0	10	6
C. A. Atkin (Hotham)	0	10	6
B. Baker (Richmond)	0	10	6
D. R. Blackett (Fitzroy)	0	10	6
W. Bowen (Melbourne)	0	10	6
H. Brind (Ballarat)	0	10	6
J. Brinsmead (St. Kilda)	0	10	6
F. P. Cheqwidden (South Melbourne)	0	10	6
W. Colledge (Geelong)	0	5	0
F. H. Cooper (Geelong)	0	5	0
S. M. Dalton (Prahran)	0	10	6
H. A. Dorinaldi (Prahran)	0	10	6
J. R. Duerdin (Melbourne)	0	10	6
J. D Evans (Collingwood)	0	10	6
A. R. Fowler (Launceston, Tasmania)	1	1	0
H. Francis (Melbourne)	0	10	6
R. P. Francis (Melbourne)	0	10	6
R. J. Fullwood (Melbourne)	0	10	6
R. Gabriel	0	2	6
H. Gamble (Prahran)	0	10	6
F. S Grimwade (Melbourne)	0	10	6
H. Gutheil (Melbourne)	0	10	6
C. Harrison (Prahran)	0	10	6
C. E. Hirst (West Melbourne)	0	10	6
E. G. Hooper (Melbourne)	0	10	6
T. Huntsman (Fitzroy)	0	10	6
W. Johnson (Windsor)	0	10	6
G. Kingsland (Melbourne)	0	10	6
J. Lacey (Melbourne)	0	10	6
T. Longstaff (Ballarat)	0	10	6
J. B. L. Mackay	0	10	6
C. Marston	1	1	0
A. H. Massina (Melbourne)	0	10	6
J. V. Morgan	0	10	6
G. Morrow (Geelong)	0	5	0
T. H. Naylor	0	10	6
W. Y. Nelson (Prahran)	0	10	6
J. H. Nieman	1	1	0
A. J. Owen (Geelong)	0	10	6
J. Owen (Geelong)	0	10	6
T. P. Palmer (Ballarat)	0	10	6
H. W. Potts (Melbourne)	0	10	6
C. Pleasance (Melbourne)	0	10	6
W. M. Rogers	0	5	0
W. M. Rowley (Melbourne)	0	10	6
J. W. Scott (Ballarat)	0	10	6
H. Shillinglaw (Melbourne)	0	10	6
J. G. Smith (Carlton)	0	10	6
S. S. Strutt (East Melbourne)	0	10	6
G. Swift (Melbourne)	0	10	6
J. T. Thomas (Melbourne)	0	10	6
J. D. Thompson (Melbourne)	0	10	6
H. T. Tompsitt (Melbourne)	0	10	6
Dr. Treaver	0	5	0
G. E. Treen (South Melbourne)	0	10	6
C. Wallis	0	10	6
T. H. Walton (Fitzroy)	0	10	6
A. Wallworth (South Melbourne)	0	10	6

The Pharmaceutical Journal.

SATURDAY, FEBRUARY 19, 1887.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

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CONSUMPTION OF DRUGS IN ST. BARTHOLOMEW'S HOSPITAL.

IN a very interesting paper published by Dr. W. S. CHURCH in a previous volume of Saint Bartholomew's Hospital reports, an account was given of the early history of the dispensing department of the hospital, or the apothecary's shop, as it was termed, and also of the earliest Hospital Pharmacopœia, discovered by Dr. MOORE among the manuscripts of Dr. EDWARD BROWNE, dated 1670. His review of the subject was then brought down to the year 1739, when another Hospital Pharmacopœia was published, and an abstract of the paper appeared in the *Pharmaceutical Journal* of April 4th, 1885. Dr. CHURCH has now resumed his historical account of the Hospital Pharmacopœia and Apothecaries' Shop at Bartholomew's by tracing their further progress from the year 1746, and at the outset he recalls to mind the reformation which took place in English pharmacy during the twenty-five years that elapsed between the publication of the fourth edition of the London Pharmacopœia in 1721 and of the fifth in 1746. While pharmacy up to that period had followed the old traditional lines adhered to since the days of HIPPOCRATES, GALEN and the Arabian physicians, and the learned colleges had remained subject to the superstitious element which played so great a part in the medicine of the Middle Ages, a very beneficial change was produced by the courageous action of the Committee of distinguished men appointed to prepare the fifth edition of the London Pharmacopœia, in sweeping away many of those "inartificial and irregular mixtures which the ignorance of the first ages introduced," as well as most of the disgusting substances, "for the most part superstitiously and doatingly derived from oracles, dreams and astrological fancies," which up to that time disfigured our Pharmacopœias. As an amusing instance of the belief in magic that then prevailed even among the learned, Dr. CHURCH gives the following quotation from PEPYS' Diary, January 30, $16\frac{6}{6}\frac{4}{5}$. "Homeward on my way, buying a hare and "taking it home, which arose upon my discourse "to day with Mr. BATTEN in Westminster Hall, who "showed me my mistake, that my hare's foot had "not the joynt to it; and assures me that he never "had his colique since he carried it about him; and "it is strange how fancy works, for I no sooner "handled his foot but I became very well, and so "continue." And the next day he ends his entry thus:—"Now mighty well, and truly I can but impute it to my fresh hare's foot."

These entries by a man so matter-of-fact and unimaginative as PEPYS serve to illustrate the manner in which the use of charms was regarded much in the same doubtful, but half credulous way that many now speak of homœopathy and spirit rapping. But great and radical as were the changes made by the London College in 1746, the belief in some of the old formulæ and mysterious drugs was still too strong to admit of such preparations as Mithridate or Damocrates confection and Theriaca Andromachi, or Venice treacle being expunged, any more than the bezoar of which PEMBERTON, in speaking of pulvis è chelis cancrorum compositus, remarked "that being a costly material it "is for the most part clandestinely left out of this me-"dicine upon supposition that physicians do not in "every instance where this powder is described de-"pend, in any particular manner, upon this express "ingredient." The accurate dispensing of physicians' prescriptions would not therefore appear to have been a *sine quâ non* with the pharmacists of that period, and the complexity of many of the common medicines must have afforded some inducement for omission or substitution, as was the case with Mr. LAVEMENT in 'Roderick Random,' who was described by SMOLLETT, probably from his own experience, as being so expert at a succedaneum as without the least hesitation to make up a physician's prescription though he had not in his shop one medicine mentioned in it. "Oyster shells he could con-"vert into crab's eyes; common oil into oil of sweet "almonds; syrup of sugar into balsamic syrup; "Thames water into aqua cinnamomi; turpentine "into capivi, and a hundred more costly prepara-"tions were prepared in an instant from the cheapest "and coarsest drugs of the materia medica."

Another very interesting part of Dr. CHURCH'S paper relates to a later period, and reviews the increase in the number of patients in Bartholomew's Hospital during the last fifty years, as well as in the corresponding rise in the consumption of some of the more important of the drugs used in their treatment. These statistics have been obtained by Mr. JEFFS, the dispenser, from the shop-ledgers, which have been kept with scrupulous exactness since the year 1836. They show not only the quantities of drugs received, but also the exact date at which any remedy was first used in the practice of the establishment, and how they bore the test of trial in the unfashionable and perhaps sceptical air of the hospital. As it is not a little remarkable to note the steady, and in many instances rapid increase in the use of preparations which have

eventually stood the test of time, and proved themselves of real value in the treatment of disease, while others soon fell into oblivion, we purpose making some extracts from Dr. CHURCH's records. Sulphate of magnesia is the drug that is used in the largest quantities in the practice of the hospital, and it is principally consumed in the two preparations Hst. Sennæ Co., and Hst. Menthæ Sulph. c. Mag. Sulph. The very great increase in the last thirty years over the preceding twenty, 120¾ cwts. against 43¼ cwts., may be taken as a measure of the increase in the out-patient and casualty departments, other circumstances being taken into account. Taking the ordinary dose at half an ounce, the quantity consumed gives the enormous number of 340,480 doses dispensed in the course of a year of this drug alone. The manufacture of this salt from dolomitic limestone was not known until the beginning of this century, and its extensive use since then has been partly due to its cheapness. During the last century, the purgative waters in the neighbourhood of London were largely used, and Dr. CHURCH suggests that it would be an interesting arithmetical calculation to find how many hogsheads of them would equal the quantity of magnesium sulphate now annually used in the practice of Bartholomew's Hospital alone. Linseed meal and lint are articles which forcibly illustrate the increase of the hospital work. At the commencement of the century, reference was frequently made in the minutes of the Shop Committee to the large and increasing quantities of linseed meal used, and to disputes as to price and quality. In 1836, the quantity was 8¾ tons; in ten years this had risen 11½ tons, and remained at that until about 1865, since which time it has gone on increasing, so that the average for the last ten years has been 15¾ tons. The increase in the consumption of lint is still more remarkable, for while 809 lbs. sufficed in 1836, no less than 4579 lbs. were required in 1885, notwithstanding the quantity of antiseptic dressings now used. The cost of the latter for the year ending Michaelmas, 1885, was £409 14*s.* 9*d.* The statistics of mercurial preparations could not be satisfactorily ascertained, since the hospital sometimes bought them ready made, and sometimes manufactured them. The maximum consumption of leeches was in 1837, when 96,300 were used; the consumption then declined until in 1868 it was 2200; since then the average has been 1770, and Dr. CHURCH considers that leeches are not nearly so much used now as they ought to be for the relief of pain.

Among the more important medicines, bark and its preparations first appear in the Hospital Pharmacopœia of 1739, but Dr. CHURCH is of opinion that Dr. E. BROWNE had used it fifty years before. In the pharmacopœia of 1764, there are only two formulæ for preparations of bark, tincture and decoction; in that of 1799 there are two formulæ for infusion; in that of 1803 there is a compound infusion, and a liquor as well as a liquor quininæ sulphatis. During the last fifty years the consumption of bark has been very fluctuating, and it is now very much less than it was twenty years ago, notwithstanding the great increase of out-patients. This decrease cannot be accounted for by the greater use of quinine, since the quantities of that drug used have varied in the same way. Dr. CHURCH suggests that the use of quassia may have something to do with it, since the increase in the consumption of quassia is very startling. From 1836 to 1846 it appears to have been used only to the extent of 60 lbs. After 1844 the average yearly consumption rose from 6 lbs. to 506 lbs. between 1866 and 1875, and the drug is still very largely used in the shape of Hst. quassiæ c. ferro. The quantity of quinine used between 1836 and 1845 was on the average 143 ounces yearly, and it has increased until in the last ten years it was 1123 ounces a year. Dr. CHURCH has been unable to ascertain when bromide and iodide of potassium were first used in the hospital, but they appear in the ledger for 1836 in small quantities, and for the last twenty years bromide has been used to the average extent of 146 lbs. between 1866 and 1875, since then to the extent of 347 lbs. yearly. The consumption of iodide has increased from an average of 105 lbs. between 1836 and 1845 up to 463 lbs. between 1876 and 1885. This is one of many instances in which a really valuable drug rapidly found favour in hospital practice. The increase in the consumption of bromide of late years is mainly due to the use of it in the casualty department introduced by Dr. BRUNTON.

Cod-liver oil was slow in finding favour even after 1841, when Dr. HUGHES BENNETT wrote upon it, the first entry upon the ledger being in 1846. In the following year 17 gallons were used, and in 1849 the consumption rose to 140 gallons, probably in consequence of the favourable account of its value in phthisis in the medical report of the Brompton Hospital. Since then the consumption has increased, until the average for the period from 1876 to 1885 was no less than 1368 gallons a year. Ergot, which has given rise to so much difference of opinion, did not come into use with English practitioners until after 1828, and its first appearance in the hospital ledger was in 1842, when a quarter of a pound was ordered. The average consumption from 1851 to 1861 was only about 1¼ lb. Since then its use has increased so enormously that from 1861 to 1870 the average quantity of the liquor used was 27½ lbs.; from 1870 to the present time it was 146 lbs. Since 1877, the consumption has fallen, possibly in consequence of the introduction of ergotine, and during the last sixteen years the use of the powdered drug has been discontinued. The first appearance of chloroform in the ledger of the hospital was on November 22, 1847, just a week after the appearance of Sir J. Y.

Simpson's pamphlet on its use in surgery and midwifery. In 1848 the consumption was 17 lbs., and it did not rise above 24 lbs. until 1855, when it was 59 lbs. During the last ten years the average consumption has been 286 lbs. The first appearance of chloral hydrate was in 1870, and it seems to have gained favour at once, having been used in the first two years nearly as largely as now; then it declined for a time, and the average consumption of the last twelve years has been 17 lbs. or 18 lbs. a year.

Croton chloral hydrate appeared first in 1872, but it has never been much used, the average consumption having been about 7½ ounces a year. Strychnine, which appeared first in 1836, and was introduced into the London Pharmacopœia in 1850, was not much used until 1870, and during the last fifteen years the average consumption has been 4 ounces yearly. Both the acetate and hydrochlorate of morphine are met with in the ledger of 1836. During the last fifty years the average consumption of the acetate has increased from 6·4 ounces to 19·8 ounces, that of hydrochlorate from 1·1 ounce to 15·1 ounces; but during the last ten years, although the number of patients has been greater than ever, there has been a very great decrease in the use of morphine, owing in all probability to the substitution of chloral as a hypnotic. The first entry of atropine is in 1861, and the sulphate does not appear to have been used until 1868; since then the use of both has increased, partly owing to the development of the ophthalmic department, until the average consumption has been 3·5 ozs. of atropine and 2·4 ozs. of sulphate. Glycerine, which first appeared in the hospital ledger in 1852 to the extent of 32 lbs., has gradually come into use to the extent of 2303 lbs. a year. The first entry of carbolic acid was for 5 lbs. in 1865, and in the following year 1¾ lbs. was bought; but since then the consumption has risen to 1267 lbs. a year, independent of that used for disinfecting purposes. Iodoform was first introduced into the practice of the hospital in December, 1875, and two ounces were then ordered, the next year 4 ounces, and the year after 4·75 lbs. In 1884 the consumption had risen to 115 lbs., and in 1885 it was 90 lbs. The first entry of salicylate of soda was for 25 lbs. in 1877, next year the consumption was 46 lbs., and since then it has averaged 75·3 lbs. The increase in the use of vaseline since its introduction in 1878 is, perhaps, the most remarkable, the consumption having risen from 20 lbs. to no less than 3257 lbs. in 1885, and that without any corresponding decrease in the consumption of lard, which is still used, for making zinc, sulphur and white precipitate ointments, to the extent of about one ton and a half annually, sufficient, as Dr. Church suggests, to keep the neighbourhood of St. Bartholomew's Hospital tolerably free from parasitic life.

THE REDWOOD TESTIMONIAL FUND.

At a meeting of the Executive Committee, held on Wednesday, February 9, the President of the Pharmaceutical Society in the chair, the Honorary Secretary (Professor Dunstan) announced that rather more than £800 had been subscribed, from which amount the working expenses had to be deducted. A discussion took place as to the best method of dealing with the balance in accordance with the resolutions which had been passed at a previous meeting. On the motion of Dr. Langdon Down, seconded by Mr Atkins, it was resolved "That about £600 "should be invested for the foundation of a Redwood "Scholarship to be held in connection with the "School of Pharmacy of the Pharmaceutical Society, "and that the surplus be expended in painting a "portrait of Professor Redwood to be placed in the "House of the Society." A Committee consisting of the President of the Pharmaceutical Society (Mr. Carteighe), Mr. John Williams, Mr. Walter Hills, Dr. Langdon Down and Professor Dunstan were appointed to carry this resolution into effect, and to report at a subsequent meeting of the Committee. A complete list of the subscribers to the Fund will be found in another part of this Journal.

We learn from Mr. Haydon that the amount of the donations to the fund for carrying on the work of the Chemists and Druggists' Association until the 30th of June next is now upwards of £400.

* * *

The *Sanitary Engineer* reports a series of occurrences, which illustrate forcibly a danger that may attend the use of an odourless gas for economic purposes. It appears that in Troy, N.Y., an odourless fuel gas has been supplied by a public company, and has been used to a considerable extent for heating and cooking in hotels, restaurants and similar establishments. Some weeks since, half a dozen workpeople in a laundry were suddenly prostrated, suffering from chills and headaches and becoming quite helpless. Medical aid was called in, and under the influence of restoratives and fresh air they revived; but in the meantime it was found that a stop-cock had been left partly open and that the fuel gas had been escaping into the room. A few days subsequently, three men employed in a restaurant suffered from a similar cause. Then the manifestation took a still more alarming character, about a dozen persons, employed in different stores, being attacked, the supposition being that in these cases the gas had made its way unnoticed into the stores through a leaky main. These occurrences are likely to originate a crop of law-suits against the company supplying the gas.

* * *

Having met with a specimen of "potash alum" which was considerably less soluble than the requirements of the German Pharmacopœia, Herr Salzer was led to suspect an admixture of rubidium or cæsium alum, due to the sample having been prepared from lepidolite. An examination by means of the spectroscope confirmed the suspicion. Herr Salzer points out that naturally cæsium alum can only be present in small proportion, but he adds that at least 25 per cent. of rubidium alum would be required to explain the difference from the normal solubility observed.

Provincial Transactions.

NORTH OF ENGLAND PHARMACEUTICAL ASSOCIATION.

A meeting of members and associates was held on Thursday, February 10, at 8 p.m., in the rooms of the Association, St. Nicholas Chambers, Newcastle-on-Tyne. In the absence of Mr. N. H. Martin, President, Mr. J. B. Payne was voted to the chair.

Mr. B. S. Proctor, Vice-President, then read a highly interesting and instructive paper on "Pharmacopœial Testing," and during the course of a lengthy reading touched upon many points of importance to pharmacists, concluding by a demonstration of spirit of nitrous ether. The paper will be found at p. 665.

On the motion of Mr. A. Wright, seconded by Mr. J. B. Payne, a hearty vote of thanks was accorded to Mr. B. S. Proctor.

A vote of thanks to the Chairman terminated the meeting.

DOVER CHEMISTS' ASSOCIATION.

The quarterly meeting of the above Association was held on Wednesday evening, February 9, the President in the chair.

After the usual routine business had been disposed of, the following paper was read:—

Bitter Aloes: A Confession of Bewilderment.

BY J. F. BROWN.

Almost the first step in an alphabetical progress through materia medica brings the student face to face with the numerous contradictions which cluster round the subject of this paper, making it appear almost an insoluble conundrum.

You will be relieved to hear that I shall pass by all questions of botanical origin or of chemical formulæ, and consider only those others which have been suggested by a collation of the statements *ad rem* published in the *Pharmaceutical Journal* at different times, and contained in a few standard authorities. All these agree that the drug is the inspissated juice which has exuded or been pressed from superficial vessels in the leaf, and that the different varieties fall naturally into two classes, of which Socotrine and Barbadoes are convenient types.

With the single but weighty exception of the late Peter Squire, all represent the first class as usually prepared by solar heat, the second by artificial evaporation. There is a consensus of opinion on the solitary point that the latter process is injurious to the quality of the drug, which is, however, unsupported by facts. On almost every other point there is an amusing see-saw of learned evidence, worthy of the famous trial at law of the simple question—what is coal?

Thomson ascribes the superiority of Socotrine aloes to the greater proportion of extractive contained therein. Squire gives the proportions of extract as 75 per cent. and 50 per cent. for Barbadoes and Socotrine respectively.

Squibb ascribes the more drastic nature of Barbadoes to its having been prepared by boiling; but it is questionable whether the two classes differ essentially in their operation, or merely in degree, needing only readjustment of doses to overcome it. A more important question, indeed the cardinal point in discussing the therapeutics of aloes, is, whether aloin is the true active principle or measure of value of the drug. In spite of the boiling, it is the Barbadoes variety which has generally been used as the source of this principle. Tilden, however, regards Barbaloin, Socaloin and Nataloin as unmistakably different substances. In the hands of Plenge, Tilden's process gave yields of 3 per cent. from Socotrine and 9 per cent. from Barbadoes respectively. An alternative process, in which Socotrine was treated by boiling in alcohol for two hours, gave 10 per cent. of aloin; but it is difficult to reconcile this method of separation with Squibb's statement that, with the exception of about 6 or 7 per cent of impurities, the whole of the drug is soluble in alcohol.

Tilden considers that all varieties owe their bitterness to the aloin they contain, and he obtained 20 per cent. from Barbadoes by treating it as for extract, evaporating the liquid resulting from 1 lb. of aloes to 32 fluid ounces, which must consequently have been a 10 per cent. solution of aloin.

Craig states that aloin constitutes 25 per cent. of aloes, yet Mitchell obtained only between 8 and 9 per cent. from Barbadoes, and oddly enough, states that the residual liquid from 1 lb. yielded 10 ozs. of "very good" extract.

It appears then that the boiling, which is so strongly deprecated both in obtaining the crude drug and in making its galenical preparations, is consistent with a larger yield of aloin and greater purgative power in the aloes so prepared.

Most curious is it also to note that while the sun-dried Socotrine is generally regarded as the standard quality, and described by Tilden and Rammell as consisting mainly of crystallized aloin with some resinoid, the authentic specimen procured by Professor Balfour, when examined by Dott, yielded only 2 per cent. of the former to 55 per cent. of the latter, and was regarded as more historically interesting than medicinally valuable.

If the reason for this be sought for in the fact that it had been kept for three years, we are confronted by the statement of Tilden that aloin is not easily decomposed by heat in neutral or slightly acid solution, which latter condition is stated by Branson to be natural both to the juice of the leaf, and an aqueous solution of the drug; also by the well-known practice of storing a certain variety of aloes, whereby it is believed greatly to improve. Prolonged exposure to moist heat is said by Tilden to convert aloin into a brown substance, called by Craig "changed" aloin, and stated by him to retain its therapeutic activity, since numerous experiments on human beings and rabbits showed that 1 or 2 grains acted as a mild aperient. So that Aitken's complaint of the injury done to the extract by the employment of steam heat in its preparation seems hardly well founded.

Royle and Headland state that aloin heated to 212° F. is rapidly oxidized and decomposed, but Tilden considers the presence of alkali essential to rapid oxidation, and notes that potassium carbonate is specially conducive to this change.

In Paris's 'Pharmacologia' it is held that the purgative property of an alkaline solution diminishes, *pari passu*, with the bitterness; Branson remarks that the decoction becomes less purgative by keeping, and Tilden states that the oxidized and tasteless alkaline solution has no effect, but W. Young found that the varying degrees of bitterness did not affect its aperient activity. My own very limited experience leads to a doubt whether a sample of concentrated decoction, which from keeping has ceased to be unbearably nasty, is therefore necessarily inefficient.

Cathartic remedies excel most others in the completeness with which their action is demonstrated; that such clouds of doubt, therefore, obscure the truth with regard to one of the best known of this class lessens our wonder at the virtues alternately affirmed and denied to belong to those whose working is less palpable.

The uncertainty as to the dose of aloin will illustrate my meaning. T. and H. Smith state the relative proportion as 1 to 5 of aloes; but Tilden took ½ to 1 grain without effect, although it does not appear that he controlled the test by taking 5 grains of aloes. Dr. Craig gives the dose as ½ to 1 grain, the B.P. ½ to 2 grains, Squire 1 to 2 grains, Mitchell 1 to 3 grains, and Martindale 1 to 4 grains. Stillé and Maisch regard aloin as probably two or three times as active as good aloes, and quote Dr. Harley to the effect that 1½ grains will produce two or three copious evacuations in a strong adult, and that 2½ grains are a powerfully cathartic dose.

This is rebutted by Dobson and Tilden's published

record of fifty cases, principally adult males, in which all three kinds were given in doses not exceeding 2 grains, with effect described as "slight and very uncertain."

Barbaloin, especially with soap, appeared slightly the strongest of the three, but Nataloin in 6-grain doses failed to act in some, in other cases acted freely in smaller dose. The authors conclude that aloin acts as well as an equal dose of aloes and gripes less. By A. P. Brown aloin is considered not more active than an equal dose of aloes, and the resin inert, while Proctor's personal experience is that aloes, aloin, uncrystallizable extract and insoluble portion all acted equally well.

That the solubility of aloin in water should be variously stated as 1 in 60, 1 in 90, and 1 in 500, and as insoluble—freely soluble—soluble 1 in 30 of alcohol—is only part of the puzzle.

It is agreed that the resin is very uncertain when used hypodermically, but Tilden and Craig take diametrically opposite views as to whether it is "changed" (possibly dehydrated) aloin, or something essentially different. The latter gave 8 grains with good effect, but 12 grains of a sample specially prepared free from aloin by Messrs. Smith failed to operate. Craig's own process consisted in dissolving well-washed resin in spirit, and precipitating by the addition of boiling water. Fifteen per cent. of the product was insoluble in spirit, and gave 23 per cent. of ash. It is known that the insoluble part of aloes is to some extent rendered soluble by prolonged contact with hot water, but this experiment points to such treatment rendering that insoluble in alcohol which had previously dissolved.

The successful hypodermic administration of aloin seems to render needless the elaborate building up of those composite pill structures, with casings of various degrees of solubility, which were recently recommended.

Would it be too much to ask some competent student of therapeutics, if the ever-rising flood of novelties will permit, to try and throw some light upon the action of this old and familiar drug. My own diffident guess is that when submitted to the process of digestion, and especially to the eminently solvent properties of the bile; the whole of the drug, save only the desert sand, and comminuted monkey skin casually and occasionally accompanying it, is capable of producing its well-known benign effect.

Owing to the lateness of the hour the subject was not discussed.

NOTTINGHAM AND NOTTS CHEMISTS' ASSOCIATION.

On Friday evening, the 11th inst., an examination of the students attending the pharmacy class of the above Association was held in the Sunday School Institute, Shakespeare Street. The examination was conducted by Messrs. W. Widdowson, H. Thacker and W. Gill, in a similar manner to the Minor, and was the second of a series to be held during the session, in order to test what progress has been made by the students and to familiarize them with the nature of the pharmaceutical Minor. Fifteen students attended, and eleven of these presented themselves for examination. As only three students could be examined at once, the remainder, while waiting their turn, inspected the contents of the Museum of the Association, and a number of materia medica specimens lent for the occasion.

These examinations are found to be an agreeable change from the routine of the pharmacy lectures, and are much appreciated by the students, especially the older ones. The class is held every Friday evening at 9.15, and has, so far, been very successful, there being eighteen names on the register, and an average attendance of fifteen.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

The monthly general meeting was held at the Society's Lecture Room, Norfolk Row, on Wednesday evening the 8th inst., when a paper was read by Mr. Thomas Dobb, pharmaceutical chemist, on "Organic Analysis with special reference to the Analysis of Oils."

A vote of thanks for the paper was unanimously passed.

The Secretary announced the donation to the library, of the Register 1887, and the Calendar of the Pharmaceutical Society, 1887, from the Pharmaceutical Society of Great Britain.

New members were elected.

TORQUAY CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting of this Association was held on Tuesday, the 8th inst., Mr. T. Horton, M.P.S., in the chair.

The minutes of the previous meeting having been read and confirmed, the debate on "Dispensing Difficulties," which because of its interest and helpfulness had been adjourned from the last meeting, was resumed and concluded.

One of the prescriptions presented involved the dispensing of 30 minims of oil of cubebs in twelve pills, and much merriment and assumed indignation was excited by the suggestion of a member that it would be best to make up a good firm mass with liquorice powder and magnesia, and then "weigh off" a sufficient quantity.

Mr. T. Colebank then read a paper on "Glycerine." He mentioned that glycerine was discovered in 1779 by Scheele, who obtained it from lead plaster, and named it sweet principle of oil, and that it was found in almost all fats and oils to the extent of 8 or 9 per cent. A description of the various methods for obtaining glycerine was then given, the principal being:—(1) by the saponification of oils by means of oxide of lead; (2) from soap leys; (3) By passing superheated steam at a temperature of 500° to 600° F. through melted fats. The various properties were then enumerated, antiseptic, hygroscopic, solvent etc.., and the peculiar products of decomposition if distilled without due precaution. The essayist went on to speak of the many uses of glycerine, as an application to the skin in the form of cosmetics, jellies and the like, as a lubricative for chronometers, as an essential ingredient of copying-inks, and as an adjuvant in the mounting of botanical and zoological specimens. The preparations of the B.P. containing glycerine were then given and criticized. It was suggested that the further addition of water up to 25 per cent. to glycerinum tragacanthæ would prevent further absorption and improve the preparation. The paper concluded with the mention of possible impurities, such as sugar, glucose, gum, dextrin, lime, lead and butyric and formic acids, and several tests for the detection of each were given.

In the discussion which followed, Messrs. Ness, Curtis, Bathe and March, and the Chairman took part.

Votes of thanks to the essayist and the Chairman closed the proceedings.

Proceedings of Societies in London.

CHEMICAL SOCIETY.

At a meeting of the Chemical Society, held on Thursday, February 3, Dr. Hugo Müller, F.R.S., President, in the chair, several certificates were read for the first time, and the following were elected Fellows of the Society:—Messrs. W. H. Coates, T. Cooksey, A. H. Downes, M.D., H. Emmons, G. A. Goyder, E Hori, H. McKeow, J. F. McArthur, D. H. Nagel, T. B. Reay, C. E. Sohn, Junr., L. W. Stansell, J. P. Strangman, D. A. Sutherland, Jokichi Takaminé.

The following papers were read:—

The Absorption of Gases by Carbon. By CHARLES J. BAKER.—A series of experiments are described in which carbon in the form of animal charcoal, previously heated *in vacuo*, was saturated with oxygen, both dry and moist, at a low temperature; the carbon thus treated, enclosed in a vacuous tube, was then heated for some time at 100°, and finally the absorbed gas was extracted and analysed. Using moist oxygen it was found that no gas was given off at 12° from the carbon which had been exposed for one hour at −15° in such an atmosphere; on heating the carbon thus treated at 100° during seven days, and then exhausting at this temperature, it gave about seven times its volume of gas consisting of carbon dioxide. No carbon dioxide was produced on digesting carbon and water vapour for a similar period and then exhausting. Using dry oxygen and proceeding similarly, no gas was given off from the charcoal at 100°; however, on raising the temperature to about 450° gas was expelled, consisting mainly of carbon monoxide mixed with carbon dioxide. Dried carbon was then charged with dried carbon dioxide, and the gas was extracted by heating at about 450° as before; it consisted of carbon monoxide and dioxide, the proportion of the former being less the more carefully the carbon was dried. The author therefore concludes that the more carefully moisture is excluded the less does the carbon burn in the carbon dioxide which it absorbs; and further, that carbon is burned directly to carbon monoxide by absorbed oxygen.

Mr. F. J. M. Page asked whether the author had ascertained if the same carbon could be used repeatedly; that is to say, was it possible to burn away the whole of the carbon, or was the action confined to the surface.

Professor Odling, who had communicated the paper, said this had not been ascertained; he thought, however, it was probable that the carbon would become less and less absorptive, but that the action would continue in proportion as absorption took place.

An Explanation of the Laws which govern Substitution in the case of Benzenoid Compounds. By HENRY E. ARMSTRONG.—Certain mono-derivatives of benzene, especially those containing a hydrocarbon radicle, one of the halogens, hydroxyl or amidogen yield a mixture of the para- and ortho di-derivatives in proportions which vary both according to the nature of the compound dealt with and of the reagent, and the conditions under which the change is effected; and if produced at all the meta-derivative is formed in but a small proportion. If, however, the radicle present in the mono-derivative be

$$NO_2,\ COH,\ CO_2H,\ SO_3H,$$

the meta-di-derivative appears invariably to be the chief product. Hitherto no explanation of this difference in the behaviour of the two series of mono-derivatives has even been suggested. In seeking to arrive at an explanation it is necessary to form a clear conception of the manner in which "substitution" is effected. The author is of opinion that in the first instance an additive compound is formed; and he points out that Kekulé has long since insisted in the plainest terms on this interpretation of changes of so-called double decomposition. He is inclined to believe that the tendency of negative to attract and combine with negative elements—to which he has of late frequently directed attention—is the effective cause; and that the additive compound is formed from those mono-derivatives which obey the "para-ortho law" by the fixation of the reacting molecule upon the carbon-atom which carries the radicle: separation of water or halogen hydride ensuing thereon, the radicle of the reacting molecule assumes the place either of an ortho- or of a para-hydrogen atom. It is easy to understand the formation of the ortho-di-derivative, as the hydrogen atom displaced is associated with a carbon atom contiguous to that to which the reacting molecule attaches itself. The formation of the para compound is attributed by the author to the tendency towards symmetry, so frequently evidenced in cases of isomeric change and in other ways by benzenoid compounds; and not to the existence of any direct connection between carbon-atoms relatively in the para-position. The formation of meta-derivatives is believed by the author to result from the addition of the reacting molecule not to the carbon-atom of the benzene-ring but *to the radicle*, which in the mono-derivative is attached to one of the carbon-atoms of the ring; he is, however, of opinion that in order to explain why the additive compound thus constituted yields a meta-di-derivative, it will be necessary to obtain further information regarding the "dynamics" of such changes.

Professor Odling observed that any attempt to solve the problem of the action of the commonly employed reagents, chlorine or bromine, nitric acid and sulphuric acid on one set of phenic mono-derivatives to produce under ordinary conditions mainly para-di-derivatives, and on another set of phenic mono-derivatives to produce mainly meta-di-derivatives, was entitled to a thoughtful and grateful consideration. But in his opinion a distinction should be drawn between the abstract cause of the result—as when Professor Armstrong attributed the habitual preferential formation of para derivatives to the existence of a tendency to the formation of symmetric compounds, and the mechanism leading to the result—as when he represented the formation of ortho-derivatives as being an almost necessary consequence of the particular process by which he conceived the substitution to be effected. The former suggestion did not appear to help the matter forward very much; but the latter suggestion was at any rate in the nature of a real explanation: though, for himself, he was not prepared to admit the general principle that the previous combination of reagents was an invariable and determining condition of their reaction. Under exposure to bright daylight, a mixture of equal volumes of chlorine and marsh-gas, for instance, reacted even with violence; and, in his opinion, while the evidence as to the fact of their previous combination was of the smallest, the evidence as to the previous combination being the determining condition of the reaction was none at all. Admitting, however, that in the case of phenic reactions a previous combination took place in the particular manner so ingeniously conceived by Professor Armstrong as favouring the production of ortho-compounds, the general question, exemplified in the special case of the nitro-bromo-derivatives, for instance, why, starting from the mono-bromo-derivatives we should get mainly a para-di-derivative instead of an ortho-di-derivative, and why, starting from the mono-nitro-derivative we should get mainly a meta-di-derivative rather than either a para- or an ortho-di-derivative, still remained a problem, and one of very great interest, towards the solution of which Professor Armstrong had, at any rate, made a serious advance. It was clear that the nature of the product depended a good deal on the conditions of, and modes of effecting, the reaction; but having regard to the usual modes of experimenting, he was accustomed to point out that where the pre-existing radicle was one of the typical radicles formulated as Cl, OH, NH_2, and CH_3, respectively, or some closely related radicle, the tendency was to the formation of 1—4 di-derivatives; and that where the pre-existing radicle was one of the acidic radicles formulated as NO_2, SO_3H, and CO_2H, or some allied radicle, the tendency was to the production of 1—3 di-derivatives. Having regard to the want of absolute concordance even in the writings of the present day, and to the extreme confusion in the writings of the last twenty years, as to the attribution of the prefixes para-, ortho- and meta-, he preferred to speak of the different sets of compounds as 1—4, and 1—2 and 1—3 derivatives respectively. At the same time the expression of the primary 1, in each case, was for the most part superfluous, and might be omitted with advantage; only, to avoid confusing the other numerals with multiples, it was preferable to denote them by means of the small Roman or italic figures used by doctors when writing their prescriptions, instead of by

the usual Arabic figures. Thus while speaking of the two liquid dibromobenzenes, or as he preferred to call then dibromo-phenoenes, as one-two, and one-three dibromophenoene respectively, he was accustomed to write and formulate them as ij-dibromo-phenoene or ij-$C_6H_4Br_2$, and iij-dibromo-phenoene or iij-$C_6H_4Br_2$, respectively, the so printed names and formulæ being much shorter and clearer than those usually employed. These expressions, moreover, stand in direct relation to the facts that ij-dibromo-phenoene gives origin to two tribromo-derivatives, and that iij-dibromo-phenoene gives origin to three tribromo-derivatives. As regards the expression of the 1—4 or crystalline dibromo-phenoene, he was accustomed to write and formulate it as jv-dibromo-phenoene, or jv-$C_6H_4Br_2$; but it might be very well expressed as j-dibromo-phenoene or j-$C_6H_4Br_2$, which would associate it with the fact of its giving origin to one tribromo-phenoene only.

Mr. Groves referred to the absorption of chlorine in large quantity by chloroform and carbon tetrachloride, and thought that facts such as these ought to be taken into account. He did not think that the tendency to form symmetrical di-derivatives was so universal as suggested by the author: the formation of resorcinol from benzene-*para*disulphonic acid was a case in point.

Dr. W. H. Perkin, Jun., thought that the production from hydrazobenzene, not only of benzidine but also of an isomer, was evidence against Dr. Armstrong's view as to the manner in which para-compounds were formed.

Dr. Armstrong, replying to Professor Odling's objection that the para-derivative was the chief product, and not the ortho-, as should be the case according to his (Dr. Armstrong's) explanation of the manner in which substitution was effected, said that this was by no means always the case: in a recent investigation of the chlorotuluenes, for example, it had been shown that about twice as much ortho- as para-dichlorotuluene was formed. The proportions in which para- and ortho-derivatives were formed, appeared, however, to vary greatly, and to depend very much on the conditions obtaining at the time of change. He was of opinion that the behaviour of the paraffins afforded the strongest evidence in support of his view that addition preceded substitution: the affinity of the carbon-atoms being all but satisfied, especially in the lowest terms, substitution was effected but slowly in consequence of the small extent to which the chlorine was able to combine with the paraffin; and it was most important to observe that when chlorine had once become introduced, the introduction of other atoms could be effected more and more readily—the chlorine already introduced rendering the molecule more ready to combine with chlorine. Mr. Groves's reference to the solubility of chlorine in chloroform and carbon tetrachloride was most apposite. The behaviour of hydrazobenzene appeared to him to be perfectly in harmony with his views, the isomer formed along with benzidine being the otho-compound. Cases such as were referred to by Mr. Groves were probably not simply isomeric changes, but involved the successive occurrence of several distinct changes.

Some Derivatives of Tetramethylene. By G. H. Calman and Dr. W. H. Perkin, Jun.

Derivatives of Pentamethylene. By Dr. W. H. Perkin, Jun.

The Action of Chlorine on Methyl Thiocyanate. By Dr. J. William James, University College, Cardiff.

The Decomposition of Potassium Chlorate and Perchlorate by Heat. By Percy F. Frankland, Ph.D., B.Sc., A.R.S.M., and John Dingwall. The authors have reinvestigated the points in the decomposition of these bodies which were raised by Teed (*Proceedings*, Nos. 12 and 16, 1885-6). In the first series of experiments, potassium chlorate was partially decomposed by heating in a tube over a naked flame. The results are summarized in the following table:—

Percentage of oxygen evolved on weight of $KClO_3$ taken.	On $KClO_3$ actually decomposed.			
	Percentage of oxygen evolved.	KCl formed (p.c.).	$KClO_4$ formed (p.c.).	Proportion of oxygen evolved to 74·57 parts of KCl formed.
No. 1. 2·66	6·30	22·48	71·22	20·87
No. 2. 5·19	6·27	22·43	71·30	20·84
No. 3. 6·47	7·09	23·68	69·23	22·32
Equation— $10KClO_3 = 6KClO_4 + 4KCl + 3O_2$ requires	7·83	24·34	67·83	24·00
$8KClO_3 = 5KClO_4 + 3KCl + 2O_2$ requires	6·53	22·81	70·66	21·33
$2KClO_3 = KClO_4 + KCl + O_2$ requires	13·05	30·42	56·53	32·00

In further experiments the potassium chlorate was decomposed at a temperature below that at which potassium perchlorate suffers change, by heating it in the vapour of boiling sulphur. It appears, therefore, that when potassium chlorate is partially decomposed by heat, the decomposition may be expressed by equations of the type $8KClO_3 = 2O_2 + 5ClO_4 + 3KCl$, and that the more complete the decomposition the more does it approximate to that indicated by the equation $2KClO_3 = KClO_4 + KCl + O_2$. The authors have fully established the formation of potassium chlorate in the first stages of the decomposition of potassium perchlorate. This reaction is of interest as forming an exception to Berthelot's law of maximum work, the well-known formation of potassium perchlorate from potassium chlorate being a reversible reaction. In a first series of experiments with perchlorate, the potassium chlorate was determined by means of the zinc-copper couple method. Finding, however, that the sample had a very slight action on perchlorates, a second series of experiments were made, in which the chlorate formed was determined by evaporation with chlorhydric acid; the results entirely substantiate those of the first series, and are as follows:—

Percentage of oxygen evolved on weight of $KClO_3$ taken.	On $KClO_3$ actually decomposed.			
	Percentage of oxygen evolved.	KCl formed (p.c.).	$KClO_4$ formed (p.c.).	Proportion of oxygen evolved to 74·57 parts of KCl formed.
No. 1. 6·89	8·14	25·44	66·42	23·88
No. 2. 6·78	8·76	26·03	65·21	25·10
No. 3. ($KClO_3$ mixed with powdered glass) 14·30	15·34	33·55	51·11	34·10

Percentage of oxygen evolved on weight of $KClO_4$ taken.	On $KClO_4$ decomposed.			
	Oxygen evolved (p.c.).	KCl formed (p.c.).	$KClO_3$ formed (p.c.).	Oxygen evolved to 74·57 parts of KCl formed.
No. 1. 6·34	36·54	38·70	24·76	70·41
No. 2. 7·80	36·63	38·79	24·58	70·42
No. 3. 24·05	43·60	49·21	7·19	66·06
The equation— $7KClO_4 = 2KClO_3 + 5KCl + 11O_2$ requires	36·29	38·44	25·27	70·40

Review.

MANUAL OF PRACTICAL PHARMACEUTICAL ASSAYING, including Details of the Simplest and Best Methods of Determining the Strength of Crude Drugs and of Galenical Preparations.* By A. B. LYONS, A.M., M.D.

Pharmacists will find this a very useful collection of the processes which give the best practical results in the assaying of the more important drugs, and which are best suited for the use of the ordinary pharmacist, being as simple as they can be made consistent with a moderate degree of accuracy, and requiring as little special apparatus as possible. Now that the assay of the strength of galenical preparations and drugs is becoming more general, a handbook of this description will be welcomed by many. The author is of opinion, and there are many who will agree with him, that the time is not far distant when physicians will insist on fixed standards of strength for the preparations of all active drugs. The last British Pharmacopœia has already made a step in this direction in the case of preparations of opium, nux vomica, and cinchona, but there are many other powerful drugs which are liable to vary in the proportion of their most active constituents, and although there is as yet no compulsory standard for them, it is obviously desirable that as much uniformity as possible in their preparations should be secured by a preliminary assay of the drug, and the use only of such as are of average strength.

The processes given have been collected from various sources, many being of comparatively recent origin, and as a rule two or three alternative methods are given for each drug. The number of drugs for which methods of assay are given is rather limited, but fairly representative, and several methods of general applicability are also described. Many of these processes have been originated or modified by the author to give results of sufficient accuracy for practical purposes with less expenditure of time and labour than would be required to obtain results of extreme accuracy, and these will often be found very useful.

The chapter on the volumetric estimation of alkaloids by Mayer's reagent deserves careful reading, and the discrepancies between the figures given by the author as the result of careful experiments, and those given by Mayer himself, or the tables quoted in Dragendorff, are very startling. In fact, having regard to the enormous differences produced by the degree of dilution of the alkaloidal solution and other circumstances, and the feeling of uncertainty left in the mind after its use, it is surprising that this method has found so much favour; we should never be inclined to use it where any reasonably good gravimetric method might be made available.

With the descriptions of these generally applicable methods is included a good scheme of proximate analysis by H. B. Parsons, which has appeared in this Journal; also an extract from Dragendorff's 'Plant Analysis' on the separation of alkaloids from each other by means of solvents. The drugs for which special modes of assay are given are aconite, belladonna and stramonium, cinchona, coca, colchicum, conium, digitalis, elaterium, gelsemium, guarana, hydrastis, hyoscyamus, ipecacuanha, nux vomica, opium, physostigma, pilocarpus, podophyllum, quebracho, rhubarb, tobacco and veratrum, and there are also directions for the estimation of alcohol, glycerine, amyl nitrite, and spirit of nitrous ether. We are rather surprised to find that the methods given for cinchona do not include the easy and rapid method which is now official in the British Pharmacopœia, and we are not inclined to put much trust in the physiological tests recommended, except for very rough purposes; more especially unreliable seems to us the proposal to estimate the proportions of strychnine and brucine in a mixture by comparing its bitterness with that of the pure alkaloids.

The assay of ipecacuanha seems to be a matter not yet satisfactorily settled. In the work before us the author states that he has seldom found this drug to contain less than two per cent. of emetine, and thinks Flückiger's results too low, either on account of his having operated on poor drugs, or from his process being untrustworthy; while on the contrary, Jones, in a paper read at the last meeting of the British Pharmaceutical Conference, maintains that Flückiger's process gives accurate results and that the drug seldom contains much more than one per cent of emetine.

The two methods given for the estimation of nicotine in tobacco are not very satisfactory, both being by distillation with alkali and titration of the distillate with standard acid; but those for coniine are better, and in regard to the latter, we agree with the author that Dragendorff's statement as to hydrochlorate of coniine being volatile at ordinary temperatures is for all practical purposes incorrect.

There are one or two verbal inaccuracies such as the substitution of "two" for "ten" (p. 48) "157° C." for "15·7° C." (p. 68) and "colchicum root," for "colchicum corm:" these, however, are very few.

The author very properly recommends the use and adaptation of the simplest apparatus wherever possible. For instance, in the estimation of spirit of nitrous ether by Allen's method, instead of having a special apparatus for the purpose, it is recommended to use an ordinary burette inverted in a vessel of salt solution, and with a small funnel attached to the point. This in our own experience for some time past has been found to be just as efficient as the instruments made expressly for the purpose. The whole work is written in a very plain, terse manner, very much resembling an ordinary laboratory note book, and concludes with tables of analysis of several typical drugs made by the author.

* Detroit: D. O. Haynes and Co. 1886.

BOOKS RECEIVED.

PROCEEDINGS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION at the Thirty-Fourth Annual Meeting, Philadelphia, held at Providence, R.I., in September, 1886. From the Association.

A TEXT-BOOK OF INORGANIC CHEMISTRY. By Professor VICTOR VON RICHTER. Translated from the Fourth German Edition by EDGAR F. SMITH. London: Trübner and Co. From the Publishers.

CHEMISTRY OF THE CARBON COMPOUNDS; OR ORGANIC CHEMISTRY. By Professor VON RICHTER. Translated from the Fourth German Edition by EDGAR F. SMITH. London: Trübner and Co. From the Publishers.

PROCEEDINGS OF THE FIFTH ANNUAL MEETING OF THE MASSACHUSETTS STATE PHARMACEUTICAL ASSOCIATION. 1886. Lynn. From the Secretary.

PROCEEDINGS OF THE EIGHTH ANNUAL MEETING OF THE NEW YORK STATE PHARMACEUTICAL ASSOCIATION, held in Rochester, June, 1886. Elmira. From the Secretary.

Obituary.

Notice has been received of the death of the following:—

On the 30th of November, 1886, Mr. Edwin Baker, Chemist and Druggist, Button Road, Stratford, E. Aged 66 years.

On the 2nd of February, 1887, Mr William Charleson, Chemist and Druggist, Bedford Leigh, Lancs. Aged 55 years.

On the 3rd of February, Mr. John Eaton Dewar, Chemist and Druggist, Great James Street, Lisson Grove, N.W. Aged 70 years.

On the 3rd of February, Mr. George Kershaw, Pharmaceutical Chemist, Kentish Town Road, N.W. Aged 57 years.

On the 3rd of February, Mr. John Ashlin Thomas, Pharmaceutical Chemist, Market Place, Boston. Aged 42 years. Mr. Thomas had been a member of the Pharmaceutical Society since 1868.

On the 10th of February, Mr. Levi Stanniforth, Chemist and Druggist, Rye Bank, Sheffield. Aged 54 years.

On the 13th of February, Mr. Charles William Knowles, Chemist and Druggist, Market Place, Thorne. Aged 54 years.

On the 14th of February, Mr. Edward Beckington Smith, Chemist and Druggist, Askew Place, Gateshead. Aged 52 years.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

The Registrar's Report, and a New Scheme.

Sir,—On perusing the Registrar's Annual Report for 1886, I was struck with one or two facts contained therein. Of course it is something, as you state in last week's Journal, "that with regard to the percentage relation with the entire body of chemists, the Society has maintained its position during the past year," but I do not think there is much cause for congratulation here. I gather from the report, that of the 5675 persons who possess the Minor qualification, only 2180 of them are connected with the Society; also that the total number of pharmaceutical chemists and chemists and druggists connected with the Society only average a little more than 34 per cent. of those on the register. This is not as it should be, and some remedy ought to be devised to counteract it. The only one I can see, is to make the Society more popular with the trade generally, and endeavour to arouse some interest in those lethargic people who still remain outside.

The Society should be a powerful bond of union and the means of drawing closer together those who follow the calling of pharmacy. It will be granted there are great difficulties to confront in bringing about this end, owing to the many different phases and classes that compose the business in one way and another. For instance, the chemist in the town, who nowadays has to compete with stores, etc., wants matters looked at from his special point of view, and wishes his wrongs redressing, which the country chemist probably knows nothing about, and does not comprehend. Another matter which ought to command early consideration is that the important class of Associates in Business, who compose the bulk of the Society, should be eligible for election, and should be represented in the Council. It would infuse new blood into it, which in itself would be an advantage, besides making the Council more representative of the body generally.

The unlimited sale of poisons by unqualified persons and stores, and why the the offenders are not prosecuted, is a continual source of lament, and a frequent grievance against the Society. I should suggest that defence or vigilance committees should be formed throughout the country, each committee having its centre in one of the large towns, and having a certain district of the country to look after, which should be mapped out. These committees should be composed of a representative from each town or village in the district, with the Local Secretary of the Society as Chairman, who should meet at certain times and report any cases requiring prosecution to the Registrar, who would doubtless undertake to institute the necessary proceedings against the offenders.

Thus the Society would not only gain in popularity, but many who have kept aloof would come forward to its support. The Chemists and Druggists' Trade Association is dying a natural death, and no such organization would be needed if some scheme of this kind was carried out and properly worked.

I believe that when those who are still unconnected with the Society see that it is thus aiming in a practical manner for their benefit, and defending them from unqualified and unscrupulous traders, they will see it is to their interest to enlist under its banner. C. J. S. Thompson.

[*** Our correspondent is in error in his statement that "of the 5675 persons who possess the Minor qualification only 2180 of them are connected with the Society." The fact is, that out of the 1758 Pharmaceutical Chemist Members, 1181 possess the Minor qualification; besides which the qualification is also possessed by 21 Chemists and Druggist Members, 932 Associates in Business, and 900 Associates not in Business. The total number of persons possessing the Minor qualification who are connected with the Society is therefore 3034 instead of 2180.—Ed. Pharm. Journ.]

The Future of Pharmacy.

Sir,—I have read with attention "A Sheffield Student's" remarks upon my letter of January 29, and, whilst congratulating him upon his fluency of expression, must dissent from his arguments.

He says, "It ought to be patent to everyone who can reason from facts that no one can care for the public safety so well as the public itself." I fail, in reading his letter, to find where he gives the facts upon which he grounds that assertion. On the contrary I would point out, first, that the public elect certain persons from amongst themselves to form a Parliament to enact rules and laws for their protection and safety. Second, that the Parliament thus elected have seen fit to pass an Act in which it states "that it is expedient for the safety of the public" that the Pharmaceutical Society should possess certain powers. Evidently the representatives of the people do not think with the "Sheffield Student" that "no one can care for the public safety so well as the public themselves," and did think with myself that the Society should have for its special object "the care of the public safety," and I would ask, if he is right, where is the necessity of the Pharmaceutical Society, the education of pharmacists, or all the means taken under the Act to ensure the public safety, if, as he asserts, the public can take better care of themselves?

The whole of the criticism in the part of his letter devoted to myself is based upon the quotation already given and on this one, that "every individual pharmacist must be a law to himself," *i.e.*, do that which is right in his own eyes. If that were correct and based on facts, the "Sheffield Student" must be classed as one who would willingly abolish the Pharmacy Act, and necessarily with it the Society.

As to the statement that "the public takes good care of itself," the fact of there being preventive legislation of any kind is a denial. What is the use of the "Adulteration of Food and Drugs Act," if the public can take care of itself? Is not the Act itself an acknowledgment of the contrary? In the latter part of his letter our "Student" admits it when he says, "the poorer classes suffer most by the fraud." The poorer classes being a part and the greater part of the public, he thus admits, cannot "take good care of themselves."

I quite agree with him that "corrupt members when joined together make a perfect body," but when joined to healthy members, they only taint them, and that I take to be the object of the recent prosecution to prevent.

It would be a great step in advance if the Pharmacopœia was established as the legal standard for all preparations sold retail by chemists. Look at the question raised respecting tincture of opium. Suppose a person has been taking tincture prepared within the line drawn by our stipendiary, that is, with as little opium and as little spirit as will enable it to be sworn that there is some of both in the tincture. Then let him take an equal fluid measure of tincture prepared by a chemist who holds to his pharmacopœial standard, the person would run considerable danger of having taken his last dose, and, as we are told, the public takes "good care to look after itself," and

must, therefore, be right, the man who follows the Pharmacopœia must be in the wrong, by endangering the public's life.

I would ask our "Sheffield Student," that with those "ethical considerations" he wishes not to be ignored he would join with them an earnest desire that the law be made a terror to evildoers

4, *High Street, Sheffield.* GEORGE A. CUBLEY.

Sir,—Permit me to say I object to enter into correspondence with an individual who has not the moral courage to append his own name to the letter which appeared in last week's Journal.

Sheffield. WILLIAM WARD.

Sir,—Allow me the privilege of replying to your correspondent, who, under the *nom de plume* of "A Sheffield Student," makes what might be termed a personal attack on two gentlemen of this town.

I emphatically repudiate his authority to speak on "behalf of true students generally," and further, Mr. Cubley was quite justified in referring to the "younger members" in his letter. For at the meeting of the local Association, held a short time ago, I believe almost every one of the "younger members" voted with the majority, in favour of "trade standards being recognized for medicinal preparations."

"It ought to be patent to every one who can reason from facts" that one of the authorized functions of the Pharmaceutical Society is "the care of the public safety," that responsibility being cast upon it by Act of Parliament in the "Pharmacy Acts" and "Amendments." And what is Parliament but the crystallized opinion of the public or State? Therefore who can deny "the care of the public safety" was not entrusted to the Pharmaceutical Society, by the public and for the public?

If (as your correspondent seems to imply it ought to be) the sale of "poisons" was left to the working of "natural causes," there would soon be as many deaths from poisoning as from "natural causes."

Your correspondent evidently writes in sublime ignorance of there being such things in existence as the "Pharmacy Acts" and "Amendments." I would refer him to p. 26 of the Calendar, a careful study of a few pages from there, would give him much necessary enlightenment.

In reference to his query about the vendors of diluted tinctures, if I gather his correct meaning (which I must confess is a difficult matter in his jumbled epistle) it is this: that dishonesty is a necessary qualification to a poor pharmacist. Comment on such a monstrous assumption as this is superfluous.

What is most amazing in your correspondent's production is his vague reasoning (?) against legislation. He says:—"I feel, sir, that your standpoint is the right one, and that every individual pharmacist must be a law to himself. Until this is the rule, and everyone performs the miscellaneous details of his business in certain ways," etc., etc., and further talks about "proper tests" being applied. How are these "proper tests" and this "certain way" to become universal, unless there is some legal standard authority and some authorized body to enforce it? What so likely as the Pharmacopœia being taken as the standard and its use being enforced, or a prosecution made under the "Food and Drugs Act?"

It is most ludicrous to insinuate that Local Secretaries should be less sensitive than other members of the trade, to what is really the adulteration and false marking of dishonest men.

I understand by the term "wholesome competition" that honest, manly competition is meant; say, a customer asks for sweet nitre, the genuine article to be supplied, not equal parts of sweet nitre and water. For I fail to see, sir, how an ordinary member of the "discerning public" is to distinguish between the genuine and the diluted preparation.

As to paregoric *minus* opium, I venture to say your correspondent would have some difficulty in proving that his beloved "discerning public" really desire the opium to be *minus*. For on the authority of our worthy stipendiary paregoric is undisputably a soothing preparation. And what so likely to soothe as the opium?

Your correspondent asks the question, "Are people, visiting the establishments of qualified pharmacists, supplied with the quality demanded, etc.?" I can (as far as my limited experience goes) decidedly answer him in the affirmative. And further, that the "scientific and intelligent" members of our "profession" do not "dilute" for the sake of extra profit.

The fact is, in my opinion, it is what might be termed the uneducated members of the trade and outsiders, such as drug mart, drug store, herbal medicine depôt proprietors and "sham druggists," who dilute sweet nitre, etc.

Therefore it is manifestly unfair that the law allows these people to palm on the innocent "discerning public" their half-and-half preparations with impunity.

I am convinced, sir, that the sooner there is an alteration in the law the better it will be for the "discerning public" and the honest pharmacist.

T. LOWE HOLLELY,
Student at the Sheffield School of Pharmacy.

THE VOLATILITY OF CAFFEINE.

Sir,—I should feel indebted if you will correct the erroneous statements attributed to me in last week's issue concerning the presence of caffeine in the sublimate obtained in coffee roasting.

The statement I made was that I had never failed to detect the presence of caffeine in these sublimates, thus showing that a loss took place. This you will find is diametrically opposed to the printed matter in the Journal.

Ossory Villa, Ossory Road. WATSON WILL.

THE POISON CABINET.

Sir,—I have read report of the Evening Meeting of the Society, in the Journal of Saturday, and particularly note the remark concerning a new "poison cabinet" of American origin.

Mr. Passmore is right; beyond the application of electricity, the utility of which is doubtful, the mechanical arrangement and general idea is practically identical with that patented by my father fifteen years since. I may be pardoned for thinking that Young's poison cabinet has not yet been improved on.

Sankey Street, Warrington. J. RYMER YOUNG.

LINIMENTUM TEREBINTHINÆ.

Sir,—In view of the different results obtained by the various makers of this preparation, I beg, with your permission, to make a suggestion, which will, if acted on, produce a liniment of an elegant and uniform character, with very little expenditure of time and trouble.

My suggestion is to use rectified spirit in place of the water ordered in the British Pharmacopœia. By doing so and dissolving the soap in the spirit of wine, the camphor in the turpentine, mixing the solutions and filtering the mixture a bright and elegant liniment may be made, which would, I think, be satisfactory to all.

48, *Porchester Road. W.* W. SMITH.

Erratum.—On p. 660, col. ii., lines 8, 11 and 14, for "Shade Hill," read "Shude Hill."

Marking Inks.—Verax asks for information as to reliable forms for preparing from aniline dyes black and crimson marking inks which will not require the application of heat.

C. B. G.—A note on "Our Salad Herbs" was published in the *Pharmaceutical Journal* for August 27, 1870; but we are not acquainted with any book specially devoted to the subject.

H. S.—See articles on the estimation of tannins by Mr. H. R. Procter, in the *Pharmaceutical Journal*, [3], vii., 1020, and xvi., 843.

C. W. Bobby.—We are unable to inform you as to the address of the person mentioned.

COMMUNICATIONS, LETTERS, etc., have been received from Miss Mitten, Messrs. Haydon, Martin, Turrup, Baildon, E. O.

"THE MONTH."

In a paper upon antifebrin, or acetanilid, a compound which appears to have now taken a place among the antipyretics (*Journ. Pharm.*, Jan., p. 22), M. Yvon states that in examining samples from different sources he has met with some that were unsatisfactory. He points out that it is essential to be assured of the purity of this compound, since acetanilid imperfectly purified may retain traces of aniline that would impart to it a toxic action. A delicate test for this contamination is to triturate an excess of acetanilid in water and add a little solution of sodium hypobromite. If the compound has been well purified the mixture will remain limpid and yellow; but if it contain only traces of aniline a plentiful orange-red precipitate will be produced, the liquid taking the same colour. For medical use M. Yvon recommends the rejection of any antifebrin that is not free from odour, white or scarcely rose-tinted, converted into a colourless liquid when heated on platinum foil, completely volatilizable and capable of standing the above test with sodium hypobromite. Heated in a capsule with mercurous nitrate acetanilid assumes an intense green colour; the green substance is soluble in alcohol and this reaction may be used for recognizing the presence of acetanilid in urine. The urine should be shaken with chloroform, and after the evaporation of the solvent the residue, upon being heated with mercurous nitrate, will give the green coloration if the urine contained traces of the compound.

Antifebrin.

Another mercurial compound has been introduced into medicine under the name of "phenol mercury" (*Zeit. österr. Apot.-Ver.*, Feb. 1, p. 53). It is described as having the composition represented by the formula $C_6H_5.OHg.OH$, and as being prepared by mixing an aqueous solution of 132 parts of "phenol potassium" with one of 271 parts of mercuric chloride, and washing the resulting reddish-orange-coloured precipitate upon a filter until the filtrate no longer shows a reddish colour upon the addition of a little potassium iodide. The precipitate is somewhat lighter in colour after drying, and has only a faint odour of phenol. The "phenol potassium" is prepared by mixing alcoholic solutions of 94 parts of crystalline carbolic acid with 56 parts of caustic potash and evaporating to dryness. This compound is, however, very hygroscopic and difficult to keep long. The phenol mercury is administered in pills containing 0·02 gram, of which the dose is at first two, increasing to six daily. Stomatitis is said to be only exceptionally produced by it.

Phenol Mercury.

Notwithstanding statements that have been made from time to time that chromic acid when free from sulphuric acid is non-deliquescent under ordinary conditions (see *Pharm. Journ.*, [3], xiv., 24), the acid is rarely met with in this condition, and the article recently made officinal in the B.P., as well as those of other pharmacopœias, is described as being "very deliquescent." The presence of sulphuric acid in chromic acid is no doubt due to the method of preparation, which generally consists in decomposing potassium bichromate with strong sulphuric acid in excess, the sulphuric acid remaining adherent with great persistence, possibly in combination, as the two acids are known to form several crystalline compounds. It is stated that the article usually supplied for pharmaceutical purposes contains 7 per cent. of sulphuric acid. An "acidum chromicum cryst. puriss.," alleged to be "absolutely free from sulphuric acid," is referred to in the new descriptive list of Merck of Darmstadt, where it is stated to form "small red dry crystals which are readily soluble in water and in alcohol, and are only very slowly deliquescent in dry air." It is claimed that the acid free from sulphuric acid does not, when used as a caustic, spread over the surrounding tissue, and that therefore it is better suited for application to parts that cannot readily be protected.

Chromic Acid.

After being used for a time with a freedom that might almost be called indiscriminate, iodoform appears to be just now the subject of somewhat adverse criticism; the imputation that it in some cases produces toxic effects when used as a dressing for wounds having been followed by a denial that it possesses antiseptic properties. Messrs. Heyn and Rovsing, of Copenhagen, report (*Lancet*, Feb. 12, p. 328) that in order to test its germicidal reputation they prepared solutions of iodoform in olive oil and serum, and having sterilized them, studied the effects of the solutions and of iodoform powder upon cultures of various bacterial organisms; they also experimented on rabbits by mixing inoculation fluids with iodoform. Their experience was that in no case did the presence of the iodoform interfere with the development of micro-organisms, so that they conclude that as an antiseptic its employment in surgery is useless. Further, they point out that if this conclusion be correct, iodoform might itself act as a carrier of pathogenic germs, and its unguarded use might lead to mischief. They therefore recommend that before using iodoform, which is valuable as a dressing on other grounds than as an antiseptic, it should be disinfected in sublimate solution.

Iodoform.

Among the preparations of *Cannabis indica* that have been introduced is one that passes under the name "haschisch purum." It is said (*Pharm. Rundsch*, Feb., p. 42) to be prepared by treating alcoholic extract of Indian hemp with caustic alkali, which combines with all the ingredients of acid character, and brings them into solution. The residue is the "pure haschisch," and consists essentially of a mixture of the soft resin cannabinon and the alkaloid tetanine. It forms a brown soft resinoid substance, insoluble in water, but forming golden-yellow solutions in alcohol, ether and chloroform. A small dose, one-third of a grain, of "haschisch purum" is said to act as a stimulant, and a larger dose to produce the hemp effects completely, with subsequent sleep; but in determining the dose the characteristics of the patient should be borne in mind. The full effect is only produced when the drug is in a fine state of division. It is, therefore, recommended to be administered in the pastille form, with powdered cacao or powdered roasted coffee as a vehicle.

Haschisch.

If from the foregoing preparation the poisonous tetanine be removed by means of tannic acid, the remaining cannabinon has no stimulant action, but only the narcotic property. It forms a soft brown resin, with physical properties resembling those of "haschisch," and for greater convenience in dispensing it is usually supplied as a ten per cent. trituration with milk sugar. Made up in the pastille form with cocoa or coffee, it is administered in doses of from one-half to one and a half grains as a hypnotic, especially for hys-

Cannabinon.

terical or insane patients, but it is contra-indicated where heart disease exists.

Lobelia inflata.

In a paper on *Lobelia inflata* (*Pharm. Rundsch.*, Feb., p. 32), Messrs. J. W. and C. G. Lloyd confirm the statement of Herr v. Rosen as to the presence of two alkaloids in lobelia seed (*Pharm. Journ.*, [3], xvi., 858), but they describe them somewhat differently. One of these alkaloids, for which they appropriate the name "lobeline," was obtained as a colourless and odourless amorphous substance, non-hygroscopic and apparently not affected by air, slightly soluble in water, and readily soluble in alcohol, chloroform, ether, benzol and carbon bisulphide. Lobeline salts, which, like the base, have hitherto resisted crystallization, are readily soluble in water, alcohol and ether. They are described as being most powerful emetics, one drop of a tolerably strong solution being sufficient to produce immediate emesis without disagreeable after-symptoms. Upon trituration, the dust is powerfully irritant to the nose and air-passages, more so probably than veratrine. The other alkaloid, which the authors name "inflatine," has been obtained in large colourless, odourless, and tasteless crystals, insoluble in water or glycerine, but soluble in carbon bisulphide, benzol, chloroform, ether and alcohol. Therapeutically inflatine has no apparent importance. In spite of the statements of previous workers, no volatile or liquid base was met with by Messrs. Lloyd in lobelia seeds, and it would seem probable that the supposed liquid alkaloid previously observed was a mixture of lobeline, inflatine and oil. All parts of the fresh plant contain an essential oil having a strong smell and little taste, and the seeds contain nearly 30 per cent. of their weight of a fat oil.

Purity of Quinine Sulphate.

A long paper on the testing of commercial quinine sulphate has been published by Drs. Kerner and Weller in the *Archiv der Pharmacie*, in which they insist upon the necessity of regulating the definition of the term purity as applied to that salt by common-sense considerations and not merely from the strictly chemical point of view. Naturally the ammonia test is considered by the authors as being best adapted in this sense for the purposes of pharmacy and medicine. The main defect of this test, to which reference was recently made in this Journal (see *ante*, p. 646), is now admitted by Dr. Kerner, as well as the accuracy of Hesse's observation that the presence of lævorotatory alkaloids may be overlooked when the ammonia test is applied in the way originally directed by Dr. Kerner, and thus a satisfactory justification of the step lately taken by the Paris Pharmaceutical Society has been furnished. As regards the use of the polariscope, however, the authors express most distinctly their opinion that from every point of view it is to be regarded as altogether unsuited for the purpose of testing commercial quinine sulphate, and that the results obtained by the application of this method of testing as recommended by Drs. de Vrij and Koppeschaar must necessarily be quite illusory. Practical consideration of the facts of the case, therefore, leads Drs. Kerner and Weller to the conclusion that Dr. de Vrij's statements as to the amount of cinchonidine in commercial quinine sulphate cannot have any claim to accuracy.

Test for Cocaine.

Objection has been raised against the test for cocaine suggested by Dr. Giesel,—which depends upon the formation of a violet-red precipitate on the addition of solution of potassium permanganate, without any reduction of the permanganate,—that it is too delicate, since the presence of even a minute quantity of amorphous alkaloid brings about a reduction. Mr. H. Maclagan recommends as a practically satisfactory test (*Amer. Drug.*, Feb., p. 22) to dissolve one grain of cocaine hydrochlorate in about two fluid ounces of water and add two drops of solution of ammonia. He states that, if the salt be pure, upon rubbing the sides or bottom of the containing vessels with a glass rod well-marked striæ will appear where the rod has touched, followed by the formation of a flocculent precipitate, leaving the liquid clear and bright; but that if amorphous alkaloid be present, even in moderately small proportion, no striæ or precipitate will form, the liquid remaining milky for a long time and presenting an oily appearance on the surface. Mr. Maclagan adds that the amorphous alkaloid may be partially separated from a contaminated sample of cocaine hydrochlorate by dissolving it in water and adding ammonia solution drop by drop until a flocculent precipitate begins to appear, when it will be found deposited in sticky masses on the glass and rod. This amorphous alkaloid, freed from colouring matter, is a clear yellowish transparent substance, resembling Canada balsam, but of firmer consistence, and its hydrochlorate forms a varnish-like mass that cannot be reduced to powder.

Cali Nuts.

Under the name of "cali nuts," seeds have been recently met with in commerce which according to Mr. Merck present a great similarity to the calabar bean. The external appearance and the anatomical structure leave no doubt that they are derived from a Papilionaceous plant belonging to the tribe Phaseoleæ, but nothing more definite is known as to their origin, except that like calabar beans they come from the West African coast. The only superficial distinction between the cali nut and the calabar bean is said to be that whilst the length of the latter is always greater than the breadth, the former is rounder. It has been ascertained that the cali nut contains an alkaloid which chemically and physiologically behaves like physostigmine and corresponds with it in composition.

Irisin.

From the rhizome of *Iris Pseud-acorus* Herr Wallach has separated a carbohydrate which he has been unable to identify with any hitherto known and has therefore named "irisin." It is obtained by macerating with water for two or three days the rhizomes chopped small, treating the liquid from the pressed residue with basic lead acetate, filtering and decomposing the precipitate, again filtering and treating the filtrate with alcohol which throws down the irisin (*Deut.-Am. Apot.-Zeit.*, Feb., p. 683). The pure air-dried carbohydrate is described as forming white friable pieces which superficially are scarcely distinguishable from starch. Analysis showed the composition to correspond with the formula $C_6H_{10}O_5 + H_2O$. With cold water irisin forms a paste, but when slightly warmed it forms a perfectly clear solution, which is strongly lævogyre. It does not reduce Fehling's solution when boiled, but reduction takes place immediately if the carbohydrate has been gently warmed with dilute sulphuric acid. Irisin is indeed readily converted by dilute acids into sugar, principally lævulose. The yield of irisin from the rhizome is considerable.

In a communication upon the diagnosis and therapeutics of disorders of the stomach, Dr. Riegel states (*Munich. med. Wochensch.*, Feb. 8, p. 111) that in his hands no agent has proved a better stomachic than condurango bark, which can be administered most suitably in the form of condurango wine. The "cortex condurango" of the Pharmacopœa Germanica is the bark of *Gonolobus Condurango*, which acquired a temporary notoriety some years since through being recommended as a specific against cancer.

Condurango.

As the result of some experiments as to the solvent best suited for making a solution of menthol for outward application, Professor Remington gives the preference to oleic acid (*Therap. Gaz.*, Jan., p. 36). The method of preparation recommended is to heat two hundred grains of menthol with half a fluid ounce of oleic acid in a test tube; but he says there is no difficulty in obtaining a 70 per cent. solution.

Mentholeate.

Dr. B. W. Richardson speaks very highly of peroxide of hydrogen as a remedy in hooping cough (*Asclepiad*, Feb., p. 53). In his opinion it acts in a manner very similar to dilute nitric acid, but with more effect, subduing the spasmodic paroxysm, checking the secretion in the throat, and shortening the duration of the malady. His formula for prescribing it is:—Hydrogen peroxide (10 vols.), ℥vj.; glycerine, ℥iv.; water to ℥iij. Dose, half a fluid ounce in a wine-glassful of water five or six times a day.

Hydrogen Peroxide in Hooping Cough.

M. Schmidt, in *Répertoire de Pharmacie*, continues his description of the root barks of Euphorbiaceous plants, and in the February number (p. 73) describes the microscopic structure of those of *Euphorbia corollata* and *E. Ipecacuanha*. He remarks, concerning the species indigenous to France, that the dose of the root bark of *E. Lathyris* as a purge is 1½ gram; that *E. Esula* is a hydragogue cathartic and *E. Cyparissias* acts as an emeto-cathartic in doses of 0·60 to 1 gram.

Root Bark of Euphorbiaceæ.

The root of the melon is said by Dr. Heberger to possess emetic and purgative properties, and Dr. Torosicviez has obtained from the roots a crude emetic principle by treating the aqueous extract with alcohol. It has a slightly acrid and bitter taste and is precipitated by acetate of lead and infusion of nut galls. It is easily soluble in caustic potash and is precipitated again by acids as a greyish-brown precipitate difficultly soluble in water. From experiments made with this substance in the military hospital of Lemberg (*Répertoire*, Feb., p. 76) it would seem that a solution of 9 centigrams of it is sufficient to cause vomiting. The powdered root of the wild plant acts, according to Dr. Langewicz, as an emetic in doses of 50 to 75 centigrams.

Melon Root.

The true action of colchicine has been examined by Messrs. Mairet and Combemale (*Comptes Rendus*, civ., p. 439), who find that it acts as an irritant poison, affecting more especially the digestive canal and the kidneys, though capable of irritating any of the organs. The toxic dose of colchicine in the dog and in the cat varies according to the mode of introduction into the system. The fatal hypodermic dose is ·000571 gram, and taken internally ·00125 gram per kilogram of the weight of the animal. The poisonous action is produced most rapidly when administered hypodermically.

Colchicine.

Mr. R. van Romund's report on the Dutch official cinchona cultivation (*Indische Mercuur*, Feb. 12, p. 88) affords some valuable details. The young plants derived from Schuhkraft's seed, which was sown in 1880, have now flowered and show considerable variation, some approaching the shrubby type of *C. Josephiana*, while others are nearer to *C. Ledgeriana*. Those cultivated under the name of the fine and finest calisaya of Mapivi also show many forms, the best of which might be classified as belonging to *C. Ledgeriana*, vars. *chinidinifera* and *cinchonidinifera*. The plants grown from seed obtained through the Colonial Office under the name of *C. verde* (*C. Calisaya*, var. *oblongifolia*) show a much nearer approach to the Ledgeriana type. The plantations of *C. Triana* (*C. Pitayensis*), made at an elevation of 4000 to 6000 feet, continue to flourish, and the plants have already begun to show flower-buds. The analysis of the hybrids obtained from the seed of Ledger plants hybridized with *C. succirubra* have afforded interesting results, inasmuch as the hybrids, agreeing in habit, form of leaf and flower with the *C. Ledgeriana*, show a very high average percentage of the characteristic alkaloids. In some of the hybrids, not only was as large a percentage of quinine found as in the typical Ledgeriana, but also an amount of cinchonidine exceeding that found in *C. succirubra*.

Java Cinchonas.

M. P. Guyot (*Rép. de Pharm.*, Feb., p. 87) gives the following tests for oil of peach kernels:—With caustic alkalies it gives a dark yellowish-brown soap, easily soluble in distilled water; with phosphoric acid at first a yellowish-brown emulsion, which becomes grey and then loses its colour. Chloride of zinc forms dirty grey flocks in the liquid; and sulphuric acid an orange-yellow coloration passing through various shades of brown and red to a dark brown, the oil giving off a distinct odour of oil of bitter almonds as soon as it becomes warm. Sulphocarbonate of sodium affords an orange-yellow coloration, and acid nitrate of mercury produces no effect except when sulphuric acid is added, when the oil becomes of a clear citron-yellow colour. Bisulphide of calcium forms with the oil a granular canary-yellow soap, which subsequently loses its colour.

Peach Kernel Oil.

The same author, M. P. Guyot, gives the following tests for oil of ben (*Moringa aptera*):—Sulphuric acid colours it a golden-yellow, which quickly turns to a brown; ammonia gives a slightly yellowish-white soap, and potash a white soap; bichromate of potash turns it a reddish colour and then brown, some green flocks appearing in the liquid, which after a time and by the aid of agitation becomes yellowish-green turning to greyish-green; phosphoric acid colours it yellowish-white when shaken up with the oil; chloride of zinc gives a greyish-white emulsion; chromic acid colours it a clear brown; aqua regia a slightly greenish-white colour; nitrate of mercury gives no reaction, but by the addition of sulphuric acid the oil is coloured yellowish-white; bisulphide of calcium gives a bright canary-yellow soap, becoming yellowish-white; sulphocarbonate of sodium a greenish-yellow emulsion. When submitted to a low temperature it throws down a solid fat in a granular state and can be thus clarified. It is said to be used in perfumery because it does not soon turn rancid. This statement, however, is open to doubt. The oil possesses emetic and purgative properties. It could

Oil of Ben.

evidently be obtained as a colonial product in considerable quantities if any use could be found for it. Oil of ben should not be confounded with oil of benne, which is the name given in some American price lists to the oil obtained from the seeds of *Sesamum orientale*.

New Adulteration of Saffron.

The value of delineations of the microscopical structure of drugs is not always immediately evident. By this aid, however, Dr. Niederstadt, of Hamburg, has been able to recognize an adulteration which he recently met with in saffron and which he found to consist of tiny splinters of sandal wood. If the sophisticated saffron be repeatedly washed with water, and the washings allowed to stand, the minute splinters of sandal wood that separate out may be identified under the microscope. His examination of Barcelona and Orleans saffron, recorded in the *Archiv der Pharmacie* (p. 73), shows that the latter is considerably superior to the former. From the best Orleans saffron he obtained only 5·84 per cent. of mineral matter and 14 per cent. of water. In three samples of Barcelona saffron he found more than 14 per cent. of mineral matter and from 15 to 17 per cent. of water. He also found the saffron adulterated with chloride of sodium and glycerine, probably added to prevent the saffron losing weight by drying. The glycerine may be recognized by pressing the saffron on bibulous paper or by the greasy feel of the saffron when rubbed between the fingers. Honey, which is also used as an adulterant, is less easily recognized, since the best saffron has been found to contain as much as 13 per cent. of a sugar resembling or identical with glucose.

Pepperette.

The adulteration of pepper by what is known as poivrette or pepperette has lately attracted considerable attention in this country (*Analyst*, Feb., p. 23), and the *Daily Telegraph* (Feb. 21) devotes a leading article to the subject. This adulterant is stated in De Baudrimont's 'Dictionnaire des Adulterations et Falsifications des Substances Alimentaires' to consist of ground olive stones, and he gives figures of the microscopical appearance of the cells, which are not unlike the sclerogenous cells found in true pepper. It may be interesting to point out that another plant, the *Schinus molle*, a South American species belonging to the *Anacardiaceæ*, has a small stone fruit rather less in size than a peppercorn and possessing a somewhat similar flavour but less pungency. The fruit when ripe is a red berry, similar in shape and slightly so in colour to the pepper fruit before it turns yellow. It is not astonishing, therefore, that this plant should be confounded in Italy with pepper, and that it should not unfrequently be sent to botanists with the inquiry whether it is the true pepper plant. The name of poivrette is given in France also to the seeds of *Nigella sativa*.

Tanekaha Bark.

The tanekaha bark (*Phyllocladus trichomanoides*) of New Zealand, which was noticed at the drug sales a few weeks ago, appears to be used by dressers of glove leather to give a favourite tint to Cape and other gloves. For some years after the 1851 Exhibition, in which it was exhibited, its use was kept a secret by one firm, which enjoyed in this way a monopoly of the article, but for the last twenty years its use is said to have become more generally known (*Leather*, p. 39).

Chinese Cantharides.

The curious vermilion-coloured "cantharides" (*Huechys sanguineus*), recently offered in the London market (see *ante*, p. 608), have been examined by Mr. John Moss, who finds that although they possess a rubefacient property this is not sufficiently strong to produce a blister.

Absorption through the Skin.

A further contribution (*see* also before, pp. 346 and 427) towards clearing up the uncertainty which exists as to the extent to which absorption of medicaments takes place through the skin has been made by Messrs. Ritter and Pfeiffer (*Med. Chron.*, Feb., p. 424). The method followed in their experiments was to rub well into the extensor surface of a healthy limb half an ounce of an ointment containing the substance under investigation, then to cover the spot with a protective bandage to prevent any possible absorption by the lungs, and after twenty-four hours to collect some urine and examine it for the presence of the drug. It was found that potassium iodide from a 10 per cent. ointment passed into the urine in only one out of five cases, and this was after the ointment had been used for four days, when the skin had become irritated and its continuity practically destroyed by the prolonged action of the fatty acids derived from the decomposition of the lard. Sodium salicylate applied in the same way was never found, even in traces, in the urine; but salicylic acid invariably gave its characteristic colour test with ferric chloride within a few hours after its application. This behaviour of salicylic acid is attributed to the property possessed by it of softening the epidermis and rendering it permeable, and the extent to which this takes place is shown by the fact that if the application of salicylic acid ointment be followed by one of potassium iodide ointment the potassium iodide quickly passes into the organism and becomes detectable in the urine. When lard was replaced by lanolin it was not found that the ointment manifested any superior penetrative power. Some other experiments made to test the capability of the skin to absorb substances sprayed on to it in watery solution gave, when precautions were taken to exclude the spray from the respiratory passages, only negative results.

Oxygen in Vital Phenomena.

In apposition with the account recently given to the Chemical Society by Mr. C. J. Baker as to the behaviour of oxygen absorbed by carbon (see before, p. 680) may be placed some interesting information given by Dr. B. W. Richardson respecting the influence, under varying conditions, of oxygen in vital phenomena (*Asclepiad*, Feb., p. 71). It was obtained by enclosing mice in glass chambers containing atmospheres in which the proportion of oxygen varied with the experiment, and observing the time that lapsed before the animals became narcotized at different temperatures. It was found that, at a temperature of 55° F., when oxygen and nitrogen were present in the proportion of 1 and 4 (*i.e.*, common air) the animal became narcotized and died asleep in one hour and fifty minutes. In two parts of oxygen and three of nitrogen, as well as in three of oxygen and two of nitrogen, the animal remained free from narcotism thirty minutes longer, but eventually became rapidly narcotized and died within two minutes of the same time. But with four volumes of oxygen and one of nitrogen narcotism did not occur for two hours, and then lasted six hours before death took place, whilst with pure

oxygen narcotism was also deferred for two hours, but only lasted four hours. When an animal was placed in a vessel five times as large as those previously used, containing common air, so that the quantity of oxygen present was equal to the smaller atmosphere of pure oxygen, narcotism did not occur until after nine hours, and death after eleven and a half hours, which indicates the vital value of nitrogen as a diluting agent. In the case of the pure oxygen the larger proportion of the gas remained unchanged, and five similar experiments were made before sufficient carbonic dioxide was formed to cause asphyxia. When the temperature was lowered to 20° F. the effect was to reduce the vital combining power to such an extent that oxygen became practically an anæsthetic gas ; in pure oxygen the animal was narcotized in a few minutes and died in half an hour, whilst in common air the animal remained longer awake, but died in forty-five minutes. When the temperature was raised to 70° and 90° F., pure oxygen sustained life longer than common air in equal volume, but at 125° F. coma and death took place in fifteen minutes.

Adaptability of Micro-organisms.

In a recent Presidential Address to the Royal Microscopical Society, the Rev. Dr. Dallinger contributed some very suggestive information as to the capability of micro-organisms to adapt themselves to surrounding conditions. This was obtained whilst experimenting with "monads" contained in a medium so arranged that the temperature could be gradually altered or maintained constant at the will of the operator. In one experiment, commencing with the normal temperature of 60° F., this was raised gradually so that at the end of two months 70° F. was reached without the organisms suffering any apparent inconvenience. On the temperature reaching 73° F., however, their vitality and reproductiveness appeared to be adversely affected; this temperature was therefore maintained constant for the next two months, during which time they regained their full vigour. Then the temperature was again gradually increased until in five months more it had reached 78° F., when another long pause became necessary to allow of adaptation. The same method of slowly increasing the temperature, with intervals of pause, was followed, until at last the temperature of 158° F. was reached, when the experiment was terminated accidentally. But by that time the vital conditions had in this way been, almost imperceptibly, so altered that organisms which originally lived and flourished at a temperature of about 65° F., and would have been killed at 140° F., had become inured to withstand a temperature higher than the starting point by nearly one hundred degrees, whilst sudden reversion to the original temperature was actually fatal to them.

Large Crystals.

A novel method of obtaining fine crystals of chemical compounds which has been introduced by Dr. L. Wulff, of Gadebusch, is said to be creating considerable interest in pharmaceutical circles on the continent (*Pharm. Zeit.*, Feb. 2, p. 70). It is based upon the conclusion, arrived at on theoretical considerations, that the crystallizing powers of crystallizable bodies are exercised most favourably and uniformly in a solution that is kept constantly in motion. The method has hitherto been applied principally to such solutions as can be crystallized from metal vessels, the plan followed being to cool the solution to the point of crystallization in a suitably constructed cylinder, add some small crystals of the same compound previously warmed, and then rotate the cylinder, at first slowly, but afterwards more rapidly, continuing, if necessary, the cooling of the mixture uniformly. In this way remarkably fine and perfect crystals of sugar, red prussiate of potash and many other salts have been obtained, suitable for teaching purposes. Should there be more than one compound present and the concentration be carried to a point at which the second compound commences to crystallize out from the mother-liquor, the second crystallization, not being started upon added nuclei, separates as a crystalline powder that can be readily separated from the larger crystals.

Icelandic Jottings.

In an interesting note on the plant products of Iceland in the *Gardeners' Chronicle* (Feb. 19, p. 246) Mr. J. Wight, who has frequently visited the country, remarks that Iceland moss, although at one time used as an article of food, was recently more valuable as an article of export to Europe, and the annual gathering of the Fjallgrass was made a holiday of by families dwelling in tents *pro tem.* This statement seems strangely at variance with the remark made in 'Pharmacographia' (1879) to the effect that "none is imported from Iceland." Mr. Wight also remarks that in 1814 to 1816 whale and seal beef were eaten by the poorer classes, but with the departure of these animals from Icelandic shores the horrible disease called leprosy, but really elephantiasis, has departed also. He states that an infusion of *Achillea Millefolium* is still used as a medicinal simple, but that the bulk of the medicines in use are bought from the Apothek once a year.

Botanical Illustrations.

The collections of different kinds of woods in book form, which were shown at the Colonial Exhibition, do not appear to have been as representative as it is possible to make such specimens. According to *Leather* (p. 29) there exists at Warsenstein, in Germany, a collection of volumes consisting of blocks of different woods, in each of which the bark at the back of the volume has been removed so as to admit the scientific and common name of the tree. One side of the volume shows the natural grain and surface and the other its appearance when smoothed and varnished. On opening the book it is found to contain fruit, leaves, seeds, and other products of the tree, the moss that usually grows on the tree and the insects which feed upon various parts of it. To this is added a well printed description of the habits, usual locality, and manner of growth of the tree.

Apophysis of Mosses.

Mr. J. R. Vaizey, in a paper on the morphology of the sporophore in mosses, expresses his opinion that the curious swelling called an apophysis found below the capsule in some mosses is an assimilating and absorbing organ, and performs all the functions of a leaf, and should therefore be classed as a phyllome.

Seedling Leaves.

At the last meeting of the Linnean Society Sir John Lubbock, in the course of a most instructive paper, entitled Phytological Observations on Seedlings and Leaves, pointed out that in certain species of *Œnothera* and *Clarkia* either the base or the stalk of the cotyledonary leaves undergoes a development in which it gradually assumes a similarity of appearance to

the form of leaf peculiar to each species. Thus in species where the stem leaves are linear the cotyledons, which are at first round, exhibit an elongation of their stalks, which increase in width until they foreshadow as it were the linear shape of the future stem leaves; in other species where the stem leaves are ovate the cotyledons themselves enlarge at the base until at that part they bear a resemblance to the ovate stem leaves, although the apex of the cotyledons may still retain their rounded appearance. After describing the apparent cause of the various positions of the cotyledonary leaves in different species of *Plantago*, *Tilia*, and *Cardamine*, Sir John Lubbock called attention to the peculiar truncate shape of the leaves of the tulip tree, and demonstrated that it is caused by the way in which the leaves are folded in the leaf-buds, the apparently arrested growth of the natural form of the leaf being caused by the simultaneous development of the large stipules and the pressure arising therefrom, the stipules and the conduplicate leaves exactly fitting the one into the other in the leaf bud.

Leaf of Tulip Tree.

THE EVIDENCE FOR THE EXISTENCE OF ACID MORPHINE MECONATE.*

BY D. B. DOTT, F.R.S.E.

At a former meeting of this Society I contributed a paper† on the Meconates of Morphine, in which I described the normal meconate, and mentioned that an acid salt also probably existed. At that time there was some doubt as to the basicity of meconic acid. It was generally supposed to be tri-basic; that is, the acid was believed to contain in the molecule three atoms of hydrogen each replaceable by an atom of a univalent radical, each of these hydrogens likewise having the same function. In the case of an organic oxyacid such as meconic, this infers the presence of three carboxyl radicals in the molecule. By the researches of Dittmar and Dewar,‡ Mennel,§ Hilsebein,‖ and others, it is now established that meconic acid is only dibasic though triatomic. In other words, while it contains three hydroxyl radicals it only contains two carboxyls. Whence it appears that the existence of two morphine meconates is theoretically possible. The normal or neutral meconate has been described as above referred to, and it now remains to consider whether there is sufficient evidence to prove the existence of an acid meconate of morphine.

In the identification of a substance, there is no property of so much importance as crystalline form. If a salt having the composition of acid morphine meconate, and possessing a particular crystalline formation, could be prepared, the evidence for the existence of the acid meconate would be complete. No such salt, however, has been prepared, and we have therefore to rely entirely on less satisfactory and perhaps merely negative evidence.

As it is an almost invariable, if not quite invariable, rule, that the neutral and acid salts of a base differ widely in their solubility in a given menstruum; it seemed likely that light would be thrown on the subject under discussion by the following experiments:—A saturated solution in water of neutral morphine meconate was prepared at the ordinary temperature, and then divided into two portions of 50 c.c. introduced into separate flasks. To one (*a*) 0·2 gram of morphine meconate was added, which after diligent shaking did not perceptibly diminish in bulk, showing the solution to be saturated. 0·3 gram of meconic acid was then added, and the solution well shaken. The salt did not disappear, and even after the lapse of twelve hours, and with frequent agitation, there was no appreciable diminution in the bulk of the salt. To the other flask (*b*), 0·2 gram of meconic acid was added. On standing several hours with occasional shaking, the acid was slowly dissolved. Now, if acid morphine meconate were more soluble than the normal salt the meconate added to (*a*) ought to have dissolved; while if less soluble than the normal salt the acid added to (*b*) should have caused a precipitation. These experiments, therefore, tend decidedly to prove the non-existence of the acid salt. They are not, however, absolutely conclusive, as the acid salt may exist, and yet be decomposable by water. If from a mixture possibly containing acid meconate with excess of meconic acid, a particular solvent should remove morphine and meconic acid in the proportion to form acid meconate, we would have good ground for believing that salt to exist, though it might be in a very feeble state of combination. Unfortunately, we know of no solvent which dissolves meconate and which does not at the same time dissolve meconic acid. That test, therefore, cannot be applied. What reasons, then, have we for assuming that acid morphine meconate has ever been formed? Almost the only basis for this belief is the fact referred to in my former paper, that a mixture of morphine and meconic acid in molecular proportions under certain circumstances forms an amorphous hygroscopic mass. We have, therefore, to determine whether this mass possesses any properties which cannot be explained on the hypothesis that it is a mixture of the normal meconate with excess of acid. To elucidate that question, the following experiments were tried:—

(1). Morphine and meconic acid in molecular proportions were dissolved in anhydrous alcohol with the aid of heat. On cooling, an amorphous mass was deposited.

(2). Morphine and meconic acid in the same proportions, but with 10 per cent. excess of acid, were similarly dissolved, with the same apparent result, no crystals of meconic acid being visible in the amorphous deposit.

(3). Morphine and meconic acid in proportions to form the neutral salt were dissolved in the same manner. An amorphous mass was likewise deposited.

According to the general law in such cases, this amorphous meconate is extremely soluble, but it quickly combines with its water of hydration and then crystallizes out as neutral 5-hydrate until the solution attains its normal condition of saturation. The above results, considered with those stated in former papers, render it extremely doubtful whether the acid morphine meconate really exists. There is certainly no sufficient evidence that it has ever been prepared. All references therefore, in the British Pharmacopœia or elsewhere, to "morphine bimeconate" ($C_{17}H_{19}NO_3C_7H_4O_7$) must be taken as referring to a purely hypothetical compound, which is not surely known to have a being.

* Read before the Pharmaceutical Society of Great Britain at an evening meeting in Edinburgh, Wednesday, Feb. 16.

† *Pharm. Journ.*, [3], ix., 883.

‡ 'Proc. R. S. E.,' 1869, 129.

§ *Journ. pr. Chem.*, [2], xxvi., 449.

‖ *Ibid.*, [2], xxxii., 129.

The Pharmaceutical Journal.

SATURDAY, FEBRUARY 26, 1887.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE BENEVOLENT FUND.

IN accordance with the customary practice of drawing special attention to the Benevolent Fund of the Pharmaceutical Society once in every year, at a stated period, a list of subscribers and donors to the Fund will be found in the present number of the *Pharmaceutical Journal*, together with a statement of the relief granted during the past year, and in order to make these particulars as widely known as possible a copy of this number of the Journal will be sent to every person whose name appears upon the official Register of Chemists and Druggists. It is hoped that by this means an interest in the Fund may be excited, not only among members of this Society, but also throughout the general body of chemists. Such an expectation is justified by the circumstance that while the benefits of the Fund are exclusively confined to registered chemists and druggists they are available for all who possess that qualification, whether connected with the Pharmaceutical Society or not. As this is the period at which subscriptions are collected by the Local Secretaries throughout the country, a circular has been sent to these officers by the Secretary, requesting that when they call upon the chemists in their several districts for that purpose they will urge the special claims of the Fund to general support by all members of the trade. This personal canvass concurrently with the extended issue of the Journal with all the details of the Fund has been found advantageous in former years, and it is to be hoped that on the present occasion also the efforts of the Local Secretaries may be attended with no less satisfactory results in advancing the prosperity of the Benevolent Fund.

With the object of rendering some assistance in the same direction, it may be useful to state that during the year 1886 there were 47 annuitants who received from the Fund £1597 10*s.*, and in the same year a further sum of £631 14*s.* 5*d.* was expended in grants for the relief of cases of necessity, so that the entire amount disbursed was £2229 4*s.* 5*d.* It is a circumstance that cannot be too frequently pointed out that the very considerable assistance thus rendered is unattended by any of those heavy charges for management and official expenditure which have to be borne in the case of most other charitable organizations, and deduct largely from the amount actually available for the purposes contemplated. In this respect the Benevolent Fund of the Pharmaceutical Society is unique; for with the exception of the expenses of printing and postage, every shilling subscribed to it is applied directly for the relief of necessitous members of the trade or their widows and children, without any kind of deduction. On this ground alone the question that is sometimes asked as to the utility of the Pharmaceutical Society might be answered so as to convince the most sceptical, and at the same time so as to prove that there are ample reasons for according a more general and generous support than has yet been realized from the trade at large.

In December last six additional annuitants were elected, making the total number at the present time forty-nine, and involving an increased charge on the Fund of £205 a year. In authorizing this further expenditure the Council has trusted to the efforts which will be made by the Society's Local Secretaries to enlarge the number of subscribers and donors. The claims upon the Fund in the shape of annuities will therefore amount to £1680, and as the amount usually granted for the relief of cases of emergency usually exceeds £600 a year, the total expenditure to be met in the present year will probably amount to upwards of £2300. The income that will be received as interest upon the invested capital of the Fund, now amounting to £21,414 10*s.* 10*d.*, will be far from sufficient even to pay the present annuities, so that considerable reliance has been placed upon the subscriptions not only for the purpose of obtaining funds to pay these annuities, but also for increasing the invested capital sufficiently to admit of the annual election of annuitants being continued. It is important that these facts should be considered by every member of the trade, and it is with that object that the present extended issue of the Journal, with a full statement of the position of the Benevolent Fund, has been decided upon as a means of placing this information before every one of them.

THE PHARMACY ACT AMENDMENT BILL.

THE Pharmacy Act Amendment Bill, to which attention was directed in our issue of the 5th inst., was, on the 22nd inst., introduced in the House of Lords by the Earl of MILLTOWN, read a first time and ordered to be printed. In the notices of Bills in progress it also appears as waiting for second reading. The effort made by the Council to carry out the object of the Society by improving the system of education may therefore be regarded as being now fairly in progress so as to lead to the acquisition of the powers that are requisite for the purpose. It will not, therefore, be inappropriate to call to mind the fact that the Act of 1868 did not fully effect all that was desired by the Society for

the advancement of British pharmacy, in consequence of internal dissension. Much of the dissatisfaction that has been felt in regard to the Act of 1868 may be attributed to this influence and to the unfortunate necessity that then existed for accepting a compromise between the Bill introduced by the Society and that brought in by a rival party in the trade. It may, we think, be regarded as certain that if legislation beneficial to the interests of pharmacy in this country is to be obtained, it can only be through the instrumentality of the Pharmaceutical Society as the representative of the entire body, and, as Mr. BAILDON pointed out in his address at Edinburgh, the moral to be learnt from past experience should be laid to heart with the view of arranging any existing differences before going to Parliament. The Society has, in General Meeting, formally and thoroughly endorsed the principle embodied in the amendments of the Bye-laws that were proposed by the Council last July, and the Bill that is now before Parliament has for its object simply the acquisition of powers by which that principle may be carried into effect. The precise means by which that is to be done will be a matter for future consideration in regard to details. The obstacle to progress at the present time is merely the want of power to act and it is only to remove that obstacle that the Bill now before Parliament has been introduced.

Assuming, then, that by the passing of this Bill the Society is empowered to make such alterations in the educational system as may be found desirable, the object of those alterations will be to render the education of those who are trained for the work of pharmacy more systematic and thorough. This is surely an object which no one connected with the business can reasonably object to from the point of view of internal organization, since experience has demonstrated the insufficiency of mere examination for the purpose. Again, as regards the public functions of the Society, it is for the same reasons equally certain that there is necessity for educational improvement in order to justify the existence of the Society by ensuring the thorough and effective qualification of those whom it stamps with approval as legally qualified chemists and druggists. These are considerations of vast importance at the present time, and it is to be hoped that the arguments which Mr. BAILDON, as a member of Council, has urged in his address at Edinburgh will very generally meet with that acceptance which we think they deserve.

SCHOOL OF PHARMACY.

THE re-commencement of the courses of lectures in the School of Pharmacy of the Pharmaceutical Society will take place on Tuesday next (March 1), when Professor DUNSTAN will deliver the first lecture of a course on "Chemistry and Chemical Physics," which will continue until July. On Thursday, March 3, Professor BENTLEY will deliver the first lecture of a course on "Botany and Materia Medica," which will include Practical and Systematic Botany. In addition to these lectures Practical Instruction in Chemistry is given daily in the laboratories under the direction of Professor ATTFIELD.

Students will find the present opportunity a favourable one for commencing scientific study, for during the summer there will be a course of lectures at the Botanic Society's Gardens in the Regent's Park on "Practical and Systematic Botany," which will enable students to become practically acquainted with medicinal plants and with the representatives of the Natural Orders.

Instruction will also be given in "Practical Pharmacy and Dispensing" under the direction of Professor REDWOOD. This class, which meets for the first time on Tuesday, March 1, at 5 o'clock, when an introductory lecture will be given on "The Art of Dispensing," is conducted by Mr. JOSEPH INCE, who will lecture on Thursday and give demonstrations on Tuesday and Friday of each week at 5 o'clock, until the close of the session in July.

Further information respecting these arrangements will be found in an advertisement on another page.

The universal use of ice as an adjunct to the table in the United States has given great importance to the question how far organic impurities are eliminated from water when it undergoes freezing. Some local epidemics of typhoid fever and diarrhœa have been attributed to the use of natural ice from an infected source, and on a recent occasion the City Board of the city of Syracuse forbade ice cut from Onondaga Lake to be sold for any purpose which would bring it into contact with articles of food or drink. Resistance to this order led to an investigation by an expert, who reported that the lake was contaminated with sewage from the sewers of Syracuse, and that ice taken from it contained living bacteria of various kinds and sewage matter equal to about ten per cent. of that present in the water from which it had been formed.

* * *

At the next meeting of the Chemical Society on March 3 there will be a ballot for the election of Fellows, and the following papers will be read:—"The Colouring Matter of Drosera Whittakeri," by Professor E. H. Rennie; "Anhydraacetinebenzil and Condensation of Benzil with Ketones," by F. R. Japp and T. Brunton; "Constitution of Glycosine," by F. R. Japp and E. Cleminshaw; "Diphenylglyoxaline and its Homologues," by F. R. Japp; "Dehydracetic Acid," by Dr. W. H. Perkin, Jun.

* * *

The next meeting of the School of Pharmacy Students' Association will take place on Thursday, March 3, when Mr. A. Edwards will read a paper on "Volumetric Analysis," and Mr. F. J. Yeatman will give a Report on Physics.

* * *

The next meeting of the Chemists' Assistants' Association will be held on Wednesday, March 2, when a paper on "Sanitation and Sanitary Legislation," by Mr. W. G. Blackham, will be read.

Transactions of the Pharmaceutical Society.

EVENING MEETING IN EDINBURGH.

The first evening meeting in Edinburgh of the present session was held in the Society's House, 36, York Place, on Wednesday evening, February 16, at 8.30 p.m., when Mr. H. Bellyse Baildon, B.A., F.R.S.E., Chairman of the Executive of the North British Branch, opened the proceedings with the following

Opening Address.

Gent'emen,—In the first place it is my very pleasant duty to congratulate you on the resumption of these evening meetings. As we are all painfully aware, we have had no meetings of this character for upwards of a year. Into the causes which brought about the suspension of these gatherings, or into the merits of the dispute—now, I devoutly trust, happily and finally adjusted—I shall not enter. I would only like to say that we are mainly indebted to two factors in the settlement of this matter. First to the zeal, ability and discretion with which the members of the deputation, headed by Mr. Watt, conducted their case; and, secondly, to the time and patience devoted by the Council of the Society to the subject. As to my own endeavours in the matter, although I do not wish to be guilty of the Devil's favourite sin, "the pride that apes humility," it does not become me to speak. The point, however, on which I chiefly congratulate myself is, that I was successful in getting the question re-opened in such a way as has actually led to arrangements being made which are, perhaps, as satisfactory to both parties as either could reasonably expect, considering all the facts of the case.

What I am much more anxious about than anything that has occurred in the past is that we should as clearly as possible understand our present position, and some of the advantages it presents over the *status quo ante*. The main, and I do not hesitate to say, the enormous advantage is that now, for the first time, we have clear and authoritative recognition by the Council of the Society of a North British Branch, with a defined constitution. Whether that constitution is logically unassailable I, for one, care very little indeed, if only it prove a practical success. That will doubtless depend upon the moderation and wisdom with which the Executive and the Council of the Society respectively exercise their powers. There is one other point in which we are now in a position of vantage as compared with our former condition. I refer to the payment of the railway fares of members of the North British Executive who come from other parts of Scotland, thus giving that body every chance of becoming thoroughly representative of Scottish feelings and interests. This, with other causes, has led to a certain quickening of interest, as evinced by the very large number of candidates who accepted nomination. Unfortunately, this was not followed up by an increase in the proportion of voting papers filled up. But that may be partly due to the prolonged mental effort required to decide which twelve men were least worthy to become members of the Board. There are still important towns and districts unrepresented, and I hope the voters in these parts will not be disheartened, but will renew their efforts when the next election comes round to secure good representatives. I think a little foresight and organization should enable them to do this. I think, indeed, that every voter might well consider this aspect of the question, and allocate his votes not merely with the view of securing the return of the candidates who specially represent his or her own interests, but also endeavour to obtain a good all-round representation.

I am sure we all now cordially approve the liberal policy of the Council in purchasing this house and equipping it so thoroughly for all the purposes for which it is required, but I feel equally sure that we are very far from wishing to monopolize or restrict its benefits. I mention this because the notion has been entertained by some of our friends across the border that we did wish to do so. Now I wish once for all to repudiate this idea, which is a most mischievous one, and to declare most emphatically that these premises and all that is in them are held by the Council for the benefit of the whole Society. I would especially emphasize the fact that we shall most cordially welcome any of our friends from England who may wish to be present at these scientific meetings, or to contribute papers to our proceedings. While on this subject I am glad of this opportunity of congratulating the Assistants' Association here on its active and flourishing condition. At the same time I trust they will not forget what I may call the parent Society, and will give it every support in their power both by their attendance here and by contributions. They are they who will one day, perhaps sooner than they think, be called upon to fill our shoes, and they cannot take too early or too keen an interest in the welfare of the Pharmaceutical Society. I know there are many persons, and they are not least numerous or most reticent at the present moment, who ask, "What is the use of the Society?" Now the answer to this question depends on the view we take of its objects and functions. The best definition I can give is this general one: "The elevation of pharmacy and the pharmacist." I cannot but believe that anyone who accepts this definition and looks with open mind into the history of the subject for the past forty years but must admit that the Society has not wholly failed. I cannot, owing to the limited time at my disposal, both in the preparing and delivery of this address, enter into a lengthened *apologia* in behalf of the Society. So far as my present audience goes I feel such an *apologia* is unnecessary. But I have some hopes my words may penetrate to those dwelling as it were *in partibus infidelium*. Yet all I shall say refers only to one or two points of immediate interest. The main and prevailing policy of the Society has been the promotion of education. From the year 1852 to the year 1868 this was done by means of voluntary examinations and by the educational establishment at Bloomsbury Square, London. We must not, however, forget the scientific meetings held in London, Edinburgh, and other important centres, nor the *Pharmaceutical Journal* itself. It is due to this much criticized periodical to say that, whatever we may think of it as a weekly source of instruction and "amusement," it is undoubtedly of great value as a work of reference. It is also undoubtedly to the impulse coming from the Society that we owe the annual meetings of the Pharmaceutical Conference, and the instructive reports issuing therefrom. Now regarding all these as the results of the founding of the Society, will anyone dare to say it has failed in its aim of elevating pharmacy?

With the Act of 1868 no doubt the Society entered on a new and greatly enlarged sphere of action, and it is open to dispute whether the mutilated Bill then obtained has proved of great advantage to the pharmacist. It must always, in justice to the Society, be borne in mind that the Bill as passed by Parliament was not the Bill introduced by the Society, but, as the event seems to have proved, a somewhat unfortunate compromise between that and a measure brought in by a rival party in the trade. I do devoutly trust that the moral of this will be laid to heart, and that in future we shall arrange our differences before we go into Parliament, and not after we get there.

This brings one to what may be called a burning question,—that of the present Pharmacy Bill, which we may for convenience call the Curriculum Bill. Now it has been whispered to me by that proverbial little bird by whose inconvenient revelations we have all been at one time or other annoyed, that even in Scotland, the home of educational progress, there have been murmurs against the action of the Council in deciding to proceed

with this measure. You know the position I took at the last meeting of the Council, which is briefly this; that I thoroughly approve of the object of the Bill, while still entertaining doubts as to the policy of piecemeal legislation. My doubts were not, however, sufficiently strong to justify my opposing a measure whose object was so desirable. This object, then, is to render the education of those who in the future are trained for the work of a qualified chemist and druggist more systematic and thorough. Is this a consummation to which any one connected with the trade or profession can reasonably object? The Pharmaceutical Society, in common with every other body which has to do with examinations, has become convinced of the imperfection of mere examination as a complete and final test of knowledge and training. Does anyone dispute this conclusion? Does anyone decline to admit that one of the chief functions of the Society, indeed, the one function which from the point of view of the public welfare justifies its existence, is to see to it that those it stamps with its approval as qualified chemists and druggists shall be thoroughly and effectively qualified?

It is, I think, admitted on all hands, on none more willingly than where attacks on the action of the Society are most common, that in this respect reform is needed. There are only two ways in which the problem can be attacked, viz., by altering the examinations themselves, and by imposing a curriculum. The Society—for it must not be forgotten that a general meeting has endorsed the principle—has determined to do both. In its endeavour towards this end it has met with this obstacle, that the existing Acts of Parliament do not empower the Society to enforce a curriculum. Having arrived so far, the Council had either to abandon altogether the scheme which it was quite entitled to assume the Society had at heart, or it was compelled to apply to Parliament for an extension of powers. If the Council had decided to succumb, those who ridicule its present action would not have been backward in jeering at its impotence. The question remained of the tactics to be adopted. Were the whole of the objects which the Society desiderated to be sought in one sweeping and comprehensive measure or were the various problems to be solved in detail? The former method had already been tried without the least success. I really do not see that the Council could have persisted in that course. The Government had announced its intention of taking up the subject of the sale of poisons in a Bill of its own, and to bring in an opposing Bill would be an act of extreme folly. Really the more I think of it the less am I able to see that the Council could have taken any other course. Now supposing this Curriculum Bill becomes law, what does it amount to? It simply removes one obstacle. The details of the Council's schemes still require to be regularly passed at the annual meeting of the Society, and to be approved by the Privy Council. So there is still ample opportunity of criticizing and amending the scheme.

Let us assume for a moment that this Act is passed, and a curriculum is enforced. Who will be the worse for it? The candidates? I very much doubt it. For the chances are that a greater proportion of those who go up will succeed in passing, thus saving in time and examination fees more than they will expend in attendance and fees for classes. There is only one class of persons who may really have some adequate cause of complaint. I mean chemists in country districts where there is no opportunity for assistants taking out the necessary classes. I do not wish to shirk this difficulty, but it is hardly of sufficient magnitude to justify an abandonment of the curriculum scheme. Necessity is mother of invention, and even this may be in great measure surmounted. It is at any rate remarkable that no member of Council was found to oppose the principle of a curriculum; although on other points there is wide diversity of opinion. As to the details of the scheme, as approved by last year's Council, I may frankly say I think them decidedly open to criticism, and if I have opportunity I hope to do my endeavour towards improving them.

I think I have already indicated one very cogent reason why the Society cannot at present bring in a Bill on the subject of the sale of poisons, viz., that the Government had announced its intention of dealing with the subject in a Bill of its own. Those persons who so noisily maintain that the Council ought at once to deal with the matter are surely unconscious of the extravagant compliment they are paying it, when they infer that it is stronger than the Government itself; these persons also seem to assume that the Council Board at Bloomsbury Square is a sort of epicurean Olympus composed of beings having no sublunary cares. I can assure the Titans who are anxious to scale this Olympus, or at any rate to discredit the present occupants, that in this respect they are mistaken; we are men even as they are, and as fully alive as they to the highly unsatisfactory nature of the existing state of the law as regards our individual interests. For the sake of argument, let us suppose that we had a free field, or were even invited by Government to frame a measure to obviate the defects of the present Acts. We all know what we consider the main defect of these viewed in the light of the notorious decision in the case of the Society *versus* the London and Provincial Supply Association, and the judgments in other less noted instances; and we are all quite prepared to suggest remedies which would be satisfactory to ourselves. This, unfortunately, is not all that is required. We must be prepared with a Bill whose principles the Government can thoroughly endorse, and whose provisions they can carry through both Houses of Parliament. We may at the outset as well assure ourselves that no Government can afford to appear in the light of a champion of the privileges of any class, especially when that class is so insignificant politically as we undoubtedly are. There is only one point of view from which the Government can or will regard the question, viz., that of the public interest and safety. I fear it is no use our pleading our hardships, nor the danger to the science of pharmacy resulting therefrom. Any measure we bring in, any proposal we make, must commend itself on the grounds of giving additional security to the lives of Her Majesty's lieges. I very much fear for instance that any proposal which went the length of altogether preventing corporations from dealing in poisons would not be entertained. But it would be very reasonable and distinctly conducive to the public safety to prescribe rigid conditions under which they should carry on such a perilous traffic, so as to secure qualified service and surveillance and to prevent *bogus* companies or individuals, in the guise of corporations, taking part in this delicate and dangerous work. Apart from any other consideration, I strongly suspect the Co-operative Store interest will prove too strong for us on this point. It is even possible that in order to secure this moderate reform we may have to submit ourselves to increased stringency of the law affecting ourselves. It is no use disguising the fact that some of the oldest, if not the wisest, heads of our order deny the wisdom of entering the parliamentary arena at all at this juncture; and one cannot help being reminded by the valiant utterances from some quarters that a certain class of persons are apt to rush in where a higher order of beings fear to tread. One thing is absolutely certain, that it is only by showing a united front that we can accomplish anything. The question remains, Under what banner can we unite? There are only two corporations which afford a rallying point, the Pharmaceutical Society and the Trade Association. If an *entente cordiale* between these two bodies could be established, so much the better; and circumstances could not well be more favourable when we have the President of one body cordially supporting the policy promoted by the executive of the other. But if we have to choose, if the chemists and druggists of the country have to choose, between the two, I think there should be no hesitation in preferring the leadership of

he Society. You are well aware I do not look upon the conduct of the Society as immaculate, but it never to my mind made so fatal an error as did the Association in defending counter-prescribing by chemists. I quite admit that, standing as we do in open shops, surrounded by an innumerable asortment of drugs, we cannot avoid expressing an opinion on their properties and merits, such as might be construed into the recommending or prescribing of medicines; something of this kind is inevitable; but I am certain the medical faculty have no wish to reduce the pharmacist to a drug-distributing machine, in which the money goes in at one slit and the medicine comes out by another. But for an Association representing, nominally at any rate, the chemists and druggists of Great Britain, formally to defend the practice of counter-prescribing is in my opinion worse than a crime, it is a mistake. A good understanding between physician and pharmacist is the only sound basis of comfort and dignity on the one hand, and prosperity and self-respect on the other. I cannot but think that charitable judgments on one side and careful and conscientious conduct on the other are capable of producing and securing an admirable relation.

We in Edinburgh have been accustomed, not without reason, to boast that this relation existed in our own case. It would be idle to ignore that things have happened not far from our doors which cannot fail to threaten these relations.

In this reference you must permit me to quote a very high authority, Sir Henry Acland, who, in his address to the pharmaceutical students in London at the opening of this session, said:—"Fear has sometimes been expressed that the highly educated pharmacist will interfere with the functions of the medical practitioners, many of whom must, in rural districts, dispense their own medicines. Experience and observation show that this is a fallacy arising from a mistaken reading of the past. The uneducated and ignorant step in where better men will not interfere. The whole tendency is in this manner to subdivision of duties. Moreover, it is not true to say the pharmacist has no concern with the action of the agents which he dispenses. Theoretically and professionally he has not. Practically he has. He dare not dispense that which he believes to be dangerous in the quantity written. Therefore, he has to know the dangerous point of all dangerous substances that are in use. He may form his opinion of the usefulness of certain agents, but he cannot, as the telegraphist does, forward mechanically whatever is ordered. A dispenser of intelligence is an observant and thoughtful person, and brings a watchful and often a critical sense to bear on all that passes through his hands."

But I am wandering from my argument, which is that if we are to rally round one banner, it must be that of the Pharmaceutical Society. Even were we united and unanimous, we are a small and, politically, insignificant class; without union we are powerless. We have the opportunity, which other classes would be too glad to get, of uniting in support of one already wealthy and privileged Society; which, if recruited by even a moiety of those eligible to join it, would become enormously more powerful; of which, if the constituency desired it, the Executive could be changed in two years sufficiently to enforce any change of policy; yet persons eligible to join the Society seem to prefer the simpler, if less effective, *rôle* of remaining outside and abusing the Executive. I would entreat those persons to come over and help us. They are welcome, I can assure them, to the sweets of power and office. I think it is Schiller who is the author of the statement that "against stupidity the gods themselves are powerless." But there is a power that is more difficult to overcome than stupidity; it is inertia. We measure a force in physics by its power of overcoming inertia. It is the inertia, the indifference of the trade at large, that is the greatest force to be overcome.

I do not mean to say that there is no room for the Society itself to move in the direction of becoming more popular over the country than it at present is. It ought, I think, to strain every nerve to distribute its benefits over as wide an area as possible; to diffuse them from as many centres. If the arrangements now made for the conduct of this North British Branch prove satisfactory, it may encourage the Society to promote the formation of other branches or sections which may stimulate interest and lead to the elevation of pharmacy in the provinces.

One mode of popularizing the Society would be by admitting "Associates not in Business" to the franchise, by giving them a voice in the conduct of the Society. It would afford an additional inducement for young men to join as soon as they passed their Minor.

In this reference I am heartily glad to note the revival of the local Society in Glasgow, under the able presidency of my esteemed friend Mr. Kinninmont, who, to judge by the voting for the Executive, is the most popular pharmacist in Scotland. The importance of such societies and meetings can hardly be exaggerated, both as promoting the higher pharmacy and in emphasizing the professional and scientific aspect of our calling. The corporation and the limited company will not dog our footsteps here; for as they have apparently no brains with which to pass examinations, neither will they enlighten us with scientific papers.

Another pleasant symptom to note is the activity of our *confrères* in Aberdeen in educational matters which has elicted a well-earned grant from the Society. This reminds me that I have hardly begun to say, and shall not be able to say, all which might be said with advantage concerning education. Some people are fond of inveighing against over-education. I have studied a good part of my life, but that is a complaint I never suffered from. I do not remember the sensation of knowing too much of any subject worth study at all. My habitual feeling is rather one of ignorance of what I ought to have at my finger-ends. Nor have I yet made the acquaintance of any person who appeared to me to know too much, even on those subjects he or she was best acquainted with. On the other hand, one has not far to go to find *imperfect* or *misdirected* education. I take it that the chief defect of education all over the country, and in all departments, has been on the technical or practical side. That is a point we must especially look to. Our calling is an art or craft quite as much as it is a trade or scientific profession. A man is valued and remunerated not according to his theoretical knowledge but his practical power of using it. Technical skill is what everyone, from the Poet Laureate to the shoe-black, must have in order to produce any result. If we only keep education sufficiently practical; if we produce a technique in proportion to our head knowledge, we need not fear over-education. I believe myself that tbe most important part of a pharmacist's training is his apprenticeship. The methods and habits acquired then determine a man's style of work for the rest of his life. I therefore hold that the term of apprenticeship should not be less than four or five years, and that no apprentice should be bound till he has passed his Preliminary examination, because until he has done so he cannot devote his attention to the technical and scientific aspects of his work. I confess I find a difficulty in understanding the large percentage of failures in this simple and restricted examination. I am inclined to think more would pass if it were less restricted. If, for instance, a few extra alternative subjects were added, such as an elementary knowledge of French, German, mathematics or mechanics, all of which are extremely useful departments of knowledge to the modern pharmacist, those who had special gifts in these directions would be able to produce a more favourable impression on the examiners than they now do.

I fear my address is like that extraordinary weapon the boomerang which always returns to the point it started from and that I am continually harking back to the subject of education. But I do so because I think

at the present moment we are all of us apt to be a little distracted from the subject by what appear to be more practical questions. Nor do I think I can too greatly emphasize my statement that over-education is all but, if not altogether, an impossibility. Some of you may say that the actual bread-and-butter question is the more essential. Now I say this, that the better a pharmacist is educated the surer he is in the end of being supplied with bread and butter, if not with something nicer. Even taking the worst case of all, where a pharmacist fails to make a living in his own business; the more thorough his education, the more likely is he to find some other means of livelihood in connection with those sciences with which he is already familiar. But I go further, and I venture to say that it is not, as a rule, the best educated pharmacist that succumbs in the struggle for existence, but rather those who were registered without examination. It is notorious that these persons and their widows and children hold a very prominent place among the applicants for relief from the Benevolent Fund of the Pharmaceutical Society. There will always be exceptions to every rule, and there may be cases in which an accomplished pharmacist remains unappreciated by his townsfolk. But it certainly will not be on account of his superior education that he is neglected, but through some other cause. One element I will admit may operate against him. He will probably take a higher view of his position and responsibility than a less educated man, and will therefore be less capable of stooping to anything approaching puffery or quackery; arts which, alas, in this world and age are so apt to be crowned with success. He may be in a sense just a little over-conscientious; just a little too eager to disillusionize the public on points on which it seems greatly to prefer being continually duped. He consequently suffers, as every man who does not take Solomon's advice against being over-righteous will suffer this side of the Millenium. With all this, if I may be pardoned the use of a sporting phrase, Education is the horse I would put my money on; nor would I hesitate to back, taking a sufficient number of cases, the examined man against the unexamined man, the Major man against the Minor man, for success in life. There is nothing to my mind more regretable than the small number of our men who go up for the Major examination. The question, What is the use of it? I think I have already indicated the answer to in my remarks on education. There is another point which is too much left out of account, viz., that the title of pharmaceutical chemist is thoroughly protected even by the present Acts; whereas it is much more difficult to secure the title of chemist and druggist or close approximations to it for the use of qualified persons only. With regard to individuals of course this can to a large extent be done, but as we all know to our cost, corporations and companies are not so easily dealt with. If the neglect or defect in the Act had been noticed sooner, before the system of Co-operative Stores had grown to its present dimensions, the matter might very simply and easily have been put right to our satisfaction. Doubtless the Pharmaceutical Society of Victoria has lately scored a great success in getting its Act amended. But I strongly suspect the opposing interests were there much weaker than with us. While I by no means despair of an inprovement in our present Acts in the direction of greater security both to the public and the pharmacist, I feel certain that by far the greatest security we have lies in the direction of educating ourselves and in educating public opinion. This latter is certainly a slow process, but from all I can learn we in Edinburgh are receiving assistance from an unexpected and not very welcome quarter. For if even a part of what one hears be true, the companies of unqualified persons professing to practise pharmacy in our neighbourhood are rapidly and surely demonstrating to the public the superiority of the registered and qualified pharmacist over a congeries of persons ignorant of that business or profession.

Perhaps the chemist and druggist is next to the landlord the best-abused person at the present time. We are held up to execration as extortioners and monopolists. To this first charge this is no place to reply at length. I would only ask that before these accusations are made or believed the subject should be not partially, but thoroughly examined. Not merely the gross profit, which is high, but the net profit, and the actual income cleared, must be taken into account. Then the really terrible responsibility of working with materials which in their way are as dangerous as gun-cotton and dynamite must be allowed for, as the risk of ruin by the least misadventure. Nor must it be forgotten that this class has sunk considerable capital in time and money in education, Persons who have not done this, looking on from the outside, think the whole affair very easy and profitable. They form a company in order to evade the action of the Pharmacy Acts, and then proceed by a sort of Chinese cheap labour to supplant the qualified pharmacist. They invest their capital not in education but in advertisements, and expect a better percentage on their outlay. Great is the power of puffery, but I doubt if it will persuade the intelligent public of Scotland that ignorance is better than learning, and interested assertion more trustworthy than long experience. In point of fact no sane persons will go on day after day putting their lives at the mercy of persons who have no visible or tangible credentials. There is a certain official register of the qualified chemists and druggists and pharmaceutical chemists of Great Britain, which if the public were alive to their own interests they would occasionally consult. There will be found the names of all individuals legally qualified to practise pharmacy in all its branches. That volume is newly published, and I feel sure the Assistant-Secretary will be happy to show it to any inquiring spirits. One general remark I would like to make, that I think it is manifestly unfair to apply to us the term "monopolists." If we are monopolists so are the members of every one of the professions; so are certificated teachers; so are all persons who are asked by the Government to show their fitness to discharge the offices they undertake. The only bar in any man or woman's way are examinations, such as any person of moderate ability and diligent application can certainly pass. These examinations are carefully watched by the Privy Council's visitors both in England and in Scotland. The candidate may go to either of the boards. He may return to the charge as often as he likes. So little practically does this constitute a monopoly that the trade is already overstocked. I know several very able young pharmacists who have gone to India and the colonies because their prospects at home were so gloomy. Does this look like a monopoly? But then any stick will do to beat a dog with, especially when you covet his bone. We have of late been so subject to attack that I thought a few words of defence might be permitted on this occasion, if it were only that we might start this session with some little remnant of self-respect.

If I were asked what one alteration I would make on the Pharmacy Acts, I should really have some hesitation in saying. While I am certainly of opinion in the interest of public safety the carrying out of the principle of individual responsibility is of high importance, there is an evil which to my mind is almost as great. I mean the exclusion of patent medicines so called from the regulations for the sale of other poisons. I find it difficult to get the public to believe that any drug, however deleterious or dangerous, may be sold by any person (paying a patent medicine licence), under cover of the Government stamp. Yet it is undoubtedly the fact. Take the distressing case in London the other day where a man applied to the magistrate for advice. His wife had become a chlorodyne drinker, and was ruining him and herself by the habit. He went round the chemists and asked them not to supply her. They agreed, but she continued to purchase it at the stores. Now if that medicine had been in the poison schedule, where it ought to be, those who sup-

plied her without knowing her would have been breaking the Act, and the poor man would have had some protection. As it is, any child may be the actual seller. I cannot help thinking that by withdrawing the exception in favour of proprietary medicines, and leaving it to the seller to secure himself by getting written guarantees from the makers, and also, when he has any cause to suspect, by making analysis himself, the public safety would be increased, and the dealing in these articles taken out of the hands of ignorant and unqualified persons. I say it will be a scandal if the Government do not deal firmly and boldly with this question in its Poisons Bill.

There are many tempting subjects, and even some burning questions, which I cannot possibly touch to-night. Among such questions, that of the decision of the Sheffield stipendiary is prominent. I do not agree with the Editor of the Journal in all he says on those decisions. At the same time, it appears to me rather the part of the Medical Council to move in the direction of getting their publication accepted more generally as a standard, and not the function of the Pharmaceutical Society.

One point I must not omit to touch on. There is an impression abroad that the Council of the Society is not sufficiently active in the prosecution of offenders against the Pharmacy Acts. I held that opinion myself. My increased knowledge of the subject has caused me to modify it. The truth is, the Act puts the responsibility of prosecution on the Society, but provides no adequate machinery for enforcing it, and is, in itself, about as unworkable a piece of legislation as Parliament in its wisdom ever passed. Not even the Food and Drugs Act, the inutility of which I pointed out years ago, can be more futile. The cases brought before the Council are chiefly of two classes, miserable hucksters or half-broken tradesmen or their widows, who are not worth powder and shot, or, on the other hand, smart and unscrupulous persons, probably acting under clever legal advice, who are apt to get the better of the Society and thus secure a splendid advertisement for themselves. Now, the Council neither cares to drive needy wretches to extremity and appear in a brutal light, nor does it desire to promote high dividends in unqualified companies. The very fact of the Society being the pursuer often seems to me to prejudice the Judge against it. He is so apt to look on it as an attempt to protect not the public, but a monopoly.

I am not afraid to mention even the unfortunate Judd case. Attention was drawn to the case by persons in the same town as Mrs. Judd's business was carried on in. The Solicitor advised the Council that Mrs. Judd was not entitled under the Act to continue in business. The "qualified assistant" was by this time Mrs. Judd's son-in-law; it was thought a little pressure would cause that lady to hand over the business to this person. A correspondence lingered on for months. All sorts of apparently frivolous delays and excuses were made. The Council began to think the issue rather a fine one, and instructed the Solicitor not to proceed if he got promise of expenses, and delayed consideration for a month. In the meanwhile the lady plucked up courage—declined to pay anything. The Solicitor went on with the case, which was lost. Then went up a great shout of execration against the Council. They had been "persecuting a widow." It is very easy to make these *ex post facto* condemnations. It is much less easy to administer an Act, the main principle of which is traversed by that most unfortunate, yet popular clause, known as "the widow's." So long as we allow a Trust to carry on business through a qualified assistant, how can we legally object to a company doing the same?

I must really apologize for this rambling discourse. I had no intention of saying more than a few words at the opening of this session. It had never entered my head that I should be called upon to make a formal address till it was strongly, almost imperatively urged upon me by some of my colleagues of the Executive here. I had to attend the Council meeting the first week of this month. It was the second week of the month before I could make a beginning. Had I had a month or two in place of a little over a week I might, I flatter myself, have written a fairly interesting address.

All I can say to you to-night is to exhort you "not to be weary of well-doing;" not to abandon a high ideal of pharmacy; not to desert the cause of a wise and balanced education; not, in a word, to haul down the colours which have flown for upwards of forty years from the mast-head of our Society.

Mr. Gilmour said in the able address to which they had just listened Mr. Baildon had touched upon a variety of topics very judiciously, and with admirable discretion. He was very pleased to think that they had reached a settlement of the points which had been in dispute for some time, and had been able to resume the evening scientific meetings under the chairmanship of one so well qualified as Mr. Baildon. It was very important that they should keep themselves well to the front, so as to maintain that confidence and sympathy on the part of the medical profession which had happily always existed in Edinburgh. He thought it was desirable to emphasize the statements made by Mr. Baildon as to the great importance of thorough education on the part of pharmacists, and agreed with his suggestion that in the Preliminary examination a greater choice of subjects might be permitted with advantage. He had much pleasure in proposing a cordial vote of thanks to Mr. Baildon for his very appropriate and thoughtful address.

Mr. J. L. Ewing heartily seconded the motion, and agreed with Mr. Gilmour as to the graceful and eloquent way in which Mr. Baildon had addressed them. He had always looked upon Mr. Baildon as one who set a good example to them as pharmacists. From the absorbing nature of their calling, they were apt to become the victims of a certain narrowness of view. Mr. Baildon had shown how they might cultivate greater breadth and depth of view by travelling into other regions such as poetry, philosophy and natural science. While he agreed with the greater part of what had been said by Mr. Baildon, there was one point which he specially desired to have prominently brought forward. It was a point of very great practical importance. He entirely endorsed Mr. Baildon's views as to the necessity for maintaining a high standard of education on the part of pharmacists, but there was another question which more immediately affected them from a practical business point of view. He referred to the dispensing and sale of poisons by bogus companies and other unqualified traders. He believed such a system of trading would ultimately find its level and terminate, but, nevertheless, it was a question of great urgency in the interest of the public safety, quite as much as in the interest of the duly qualified chemist and druggist. He thought the present penalty for an infringement of the Pharmacy Act was not sufficient to deter unscrupulous parties from running the risk of a conviction. He believed that the fine for illegally acting as an attorney was something like £50, and he would suggest that the penalty for illegally acting as a chemist and druggist should be very considerably increased. He would like, in this connection, to address a few words to those who, like himself, belonged to the younger members of the pharmaceutical craft. They must all be gratified at the great improvement which had taken place during the last twenty years. Their hours were shorter, and they had more holidays, thus affording opportunity for self-improvement and healthful recreation. He felt convinced that those corporations to which he had referred would have little consideration for the dispenser, and short hours and holidays would be conspicuous by their absence. He would therefore advise all the younger pharmacists to seek the higher tracts of their profession, and refuse to pander to a system which must inevitably lead to the destruction of all true pharmacy. It would be the wisdom of all

pharmacists to hold their heads high, and not be too much down-hearted, and he trusted that this institution would long continue to be a lighthouse to the pharmacists of Scotland.

The vote of thanks was awarded with acclamation.

Mr. Baildon, in reply, said the subject referred to by Mr. Ewing was undoubtedly a very crying one. The principle involved in this system, which practically defeated the main purpose of the Pharmacy Act, was one which must reduce the practice of pharmacy to the very lowest level. Ht thought this would be discovered by the public, and there was some hope, therefore, that the evil would not increase. That the principle was false was clear from the fact that it did not take into account the high skill and great responsibility, together with the special education and training of the pharmacist, which were insisted upon by the Legislature as necessary to secure the public safety.

Mr. D. B. Dott, F.R.S.E., then read a paper on "The Evidence for the Existence of Acid Morphine Meconate," which will be found on page 690.

The Chairman, in moving a vote of thanks to Mr. Dott, said that the paper dealt with a purely scientific and technical subject, which was, perhaps, beyond the reach of immediate criticism. He had seldom listened to a clearer or more complete piece of scientific reasoning, and thought it a valuable contribution towards the settlement of a doubtful point.

Mr. J. B. Stephenson, in seconding the motion, said they were all at one as to the spontaniety and heartiness with which they thanked Mr. Dott, and any criticisms might be reserved till such time as they had an opportunity of considering the paper when it appeared in the *Pharmaceutical Journal*. He regarded the Chairman's address and the valuable communication by Mr. Dott as a highly favourable omen.

A number of donations to the museum were exhibited, and were briefly referred to by the Assistant-Secretary. They included a Kombé poisoned arrow kindly lent by Messrs. Burroughs, Wellcome and Co., who also sent a specimen of strophanthus follicles. There were also shown samples of greenish-brown and white strophanthus seeds and the seeds of a new species, *Strophanthus hispidus acera*, sent by Mr. E. M. Holmes; and also a specimen of immature strophanthus follicles presented by Professor T. R. Fraser. In connection with this subject it was pointed out that there was a want of uniformity at present in the strength of tincture of strophanthus. Some chemists were still dispensing the 1 in 8 tincture, others dispensed the new 1 in 20 tincture, and others again who had a stock of 1 in 8 tincture had diluted it to 1 in 20. It was pointed out that, according to the statements made by Mr. Martindale, in the latter case the 1 in 8 tincture should be diluted to 1 in 16 only to correspond in strength to a 1 in 20 tincture made from the seeds, and it was also suggested that a uniform practice in the dispensing of so powerful a remedy was very desirable. Two specimens of adulterated drugs were presented by Mr. C. A. Macpherson. These consisted of a sample of serpentary rhizome and squill bulb. The former was of good quality, but contained a very large proportion of the stems, leaves and fruits of the plant. Apparently the whole herb had been pulled up and it also contained a small proportion of the rhizomes of *Hydrastis Canadensis*. The squill was of fair average quality, containing some of the red variety. The adulteration consisted of pieces of gypsum about the size and appearance of the slices of squill and not readily detected. Messrs. T. and H. Smith sent a mass of lead weighing 6¼ ounces which had been found in a ball of opium.

The Chairman having intimated that it was proposed to have the next evening meeting on March 16, when they expected to have various communications, including some notes by Mr. Gilmour, the meeting was closed.

Proceedings of Societies in London.

ROYAL INSTITUTION.

Genesis of the Elements.

Only a few weeks ago, in a lecture delivered at the Royal Institution, Sir W. Thomson, looking back an imaginary period of twenty million years, pictured the moment immediately before the birth of our sun, but on Friday last, Mr. W. Crookes, in lecturing upon "The Genesis of the Elements," asked his audience to accompany him back to a period more remote. The lecture, which is partly a recapitulation of the lecture before the British Association at Birmingham last year, is not suitable for abstraction, as it consists of an enumeration in minute detail of various phenomena tending to throw a doubt upon the simple nature of the commonly received elements. It will therefore be sufficient to notice here some of the more prominent features of the phenomena observed and the conclusions drawn from them by Mr. Crookes, pending the publication of the lecture *in extenso*. In the distribution of the chemical elements two very distinct cases are apparent. In one instance bodies are observed grouped in definite proportions with other bodies of a diverse nature, to which they are attached by more or less affinity. In the second case bodies associate themselves with other bodies more or less closely allied to themselves, and often almost identical in atomic weight. The latter are not combined in any definite proportions, nor held together by any decided affinity, and the difficulty of obtaining one or more of the component bodies in a separate state lies not in the strength of the affinities to be overcome, but in the circumstance that any reagent employed acts upon each of the substances in an almost similar manner. The most striking instance of such association is found in the metals of the so-called "rare earths," which, grouped together in a few minerals such as samarskite and gadolinite, are occasionally found in a few localities. Their separation can only be effected by a process of chemical fractionation, in which a slight difference in the behaviour of the constituents to some reagents is taken advantage of to effect a partial separation, until by continued retreatment they are obtained in a state of relative purity. Thus in dealing with two earths almost identical in their properties, but differing slightly in their basicity, Mr. Crookes suggests that to a very dilute solution of the earths weak ammonia be added to an amount sufficient only to precipitate one-half of the bases present. Upon filtration, two parts are obtained no longer identical in composition, and the minute difference can be made to accumulate systematically until it becomes perceptible either by chemical or physical tests. One of the most delicate tests yet introduced for the determination of the presence of any of these rare earths is that designated by Mr. Crookes as the radiant test. Although a vessel containing no solid or liquid body is generally spoken of as "empty," yet the incorrectness of the statement was made very apparent by Mr. Crookes when he showed to his audience a glass tube of a capacity of 5 cubic centimetres exhausted to one fifty-millionth part of an atmosphere and yet computed to still contain about one hundred million million molecules. But still with a vacuum of one millionth of an atmosphere certain substances under the action of the induction spark phosphoresce, and the examination of the spectra of these phosphorescing earths constitutes the test introduced by Mr. Crookes. With the application of the test several earths were shown to differ in their phosphorogenic properties and also in their power of retaining residual phosphorescence. By means of the fractionation before referred to Mr. Crookes has been able to split yttria up into several bodies, each of which gives a slight variation in the phosphorescent spectrum, but the electric spark spectrum of any of which differs not in the slightest from what is found in the original yttrium. For the explanation of these phenomena two theories are

put forward, one suggesting that there is a structure of the molecule of yttrium similar to that of the benzol ring, and that its components slightly differ from each other according to their position, but that in the intense heat of the electric spark, the little differences of molecular arrangement vanish. The alternative theory introduces a number of new elements which have not yet been obtained in a sufficiently pure state of separation to distinguish their spectra. Amongst other arguments Mr. Crookes brought forward to favour the theory that bodies now regarded as absolutely simple and elementary may be split up, he referred to recent decomposition of didymium into two simpler bodies, neither of which can claim to be ultimately simple bodies. These results the lecturer considered to show not that a number of new elements had been discovered, but rather that the very idea of an element, as something absolutely primary and ultimate, seems to grow less and less distinct. He provisionally concludes that our so-called elements or simple bodies are, in reality, compound bodies, and the matter which existed anterior to our elements he proposes to name *protyle*. This protyle he considers has been converted into the atomic condition by the same tendency that all amorphous matter has to aggregate, and under a process analogous to cooling the protyle was converted not into only one kind of matter, but many. The first-born element would be most nearly allied to protyl, and this is hydrogen, of all known bodies the simplest in structure and of the lowest atomic weight, and the interval between the formation of two elements would determine the atomic weight, affinity and chemical position of the new element. In this genesis of the elements the longer the time taken up by the cooling down process the more sharply defined would be the resulting element, whilst with a more rapid or irregular cooling the resulting bodies would fade into each other by almost imperceptible degrees. Mr. Crookes explained his theory fully with the aid of a modification of the diagram designed by Professor Reynolds to illustrate the periodic law.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting was held on Thursday, February 17, Mr. E. G. Baker, Vice-President, in the chair. The proceedings commenced by the reading of the following paper :—

Atoms.

Based on Stallo's Concepts and Theories of Modern Physics.

BY WALTER H. INCE.

In these days of high pressure and rapid learning too much is taken for granted and too little thought is given to analyse theories on which depend great issues. "Theories," as Tyndall* remarks, "are indispensable, but they sometimes act like drugs upon the mind. Men grow fond of them as they do of dram drinking, and feel discontented and irrascible when the stimulant to the imagination is taken away."

In this question of atoms we must remember the value theories have been, and are, to chemical science ; by the concepts we may predict bodies, explain isomers and metamers by different groupings of atoms ; they are indispensable both to the synthetical and analytical chemist ; in fact the atomic theory taken as a whole is a valuable working hypothesis.

Bearing this in mind I will adopt the sceptical method of examination, which is postulated by Kant† in his 'Critique of Pure Reason,' as follows :—

"This method of watching, or rather originating, a conflict of assertions, not for the purpose of finally deciding in favour of either side, but to discover whether the object of the struggle is not a mere illusion, which each strives in vain to reach, but which would be no gain even when reached—this procedure, I say, may be termed the sceptical method. It is thoroughly distinct from scepticism—the principle of a technical and scientific ignorance which undermines the foundations of all knowledge, in order, if possible, to destroy our belief and confidence therein. For the sceptical method aims at certainty by endeavouring to discover in a conflict of this kind, conducted honestly and intelligently on both sides, the point of misunderstanding."

In the ancient conception of the atom we have much to smile at, but those who live in glass houses must not throw stones. When we read that the properties of honey are due to the smooth, and of vinegar to the rough atoms, we feel inclined to throw ridicule on the ancient philosophers ; but what have we substituted in its stead? We have the atom likened to a whalebone balloon, or to a bell with a clapper hung on a spiral spring.* Picture to yourselves an atom, that is an indivisible particle, in the shape of a bell. Then lastly we have an elastic atom, which would make the ancients smile in their turn.

In the writings of Lucretius we have fundamentally the same concepts of the properties of the atom as at the present time. We read as follows†:—"Primordial atoms are therefore of pure solidity, which, composed of the smallest points, closely cohere, not combined of a union of any other things, but rather endowed with an eternal, simple, and indissoluble existence, from which nature allows nothing to be broken off, or even diminished, reserving these primordial atoms as seeds of her productions." Again (lib. i., line 623), "You must be prevailed upon to acknowledge that there are bodies which exist having no parts, and consist of the least possible substance ; and since they are so, since they are indivisible and undiminishable, you must also concede that they are solid and eternal."

In the second book the germs of the kinetic theory may be seen, the passages are too long to give *in extenso*, but I will quote a few of the most striking :—"The atoms driven by perpetual and constant motion part when struck by other atoms, rebound to a great distance ; and whatsoever particles being brought together in a more close congeries rebound only small distances, these form the strong substance of rock, and the rigid consistence of iron, and a few other things of their kind, and of similar hardness. Other particles again, which wander through the vast void of space, fly, when, struck, far off, and rebound away to great distances, these supply us the thin air and radiant light of the sun."‡

But unfortunately when Lucretius wanders into speculation concerning the shape of these atoms he contradicts himself ; his particle may be jagged, rough, hooked, or globose ; he says,§ "There are some atoms also which are neither justly thought to be rough or smooth, nor altogether hooked with bent points, but rather furnished with small angles slightly jutting out, which have power rather to titillate the sense than wound it ; of which kind of atoms consist pickle and the taste of elecampane." Here we have a view of an indivisible atom, a body consisting of no parts having bent or hooked points, rough, or with angles ; a direct contradiction of his definition in the first book, for an angle must consist of more than one part.

If we allow that these ultimate particles are indivisible, being the smallest portions of matter that can be divided by physical means, it follows that they are absolutely hard and inelastic ; hard, because they are unable to be penetrated or divided ; inelastic, because "elasticity is the property in virtue of which bodies resume their original form or volume, when a force which altered that form or volume ceases to act,"‖ and a body which could be altered

* Tyndall, 'Heat as a Mode of Motion.'

† Kant, 'Critique of Pure Reason, Transcendental and Dialectic.'

* Professor Clifford, 'Atoms.'

† Lucretius, 'De Re. Nat.,' lib. i., l. 610, *et seq.*

‡ *Ibid.*, lib. ii., l. 96.

§ *Ibid.*, lib. ii., 420.

‖ Ganot's 'Physics.'

or modified in shape would not be of a simple, but a complex structure, having at least two parts to be acted upon. Such was the view entertained in earlier times, but recent theories, more especially that of the kinetic theory of gases, entirely denounces the theory of rigid, hard and inelastic atoms, and advocates the claim of perfectly elastic atoms, gases being filled with rapidly moving atoms which are for ever colliding with each other.

Unless these atoms composing the gas were perfectly elastic, the motions would gradually become slower, and eventually cease, owing to loss of energy, for when two partially elastic bodies meet, such as two billiard balls, loss of motion is accounted for by the change of external to internal motion.

Here we have two theories, diametrically opposed to each other. To which are we to pin our faith? And what is the outcome of them?

In the first proposition (that of the indivisible, unchangeable and indestructible atom) we account for the indestructibility and impenetrability of matter, expansion being the increase and contraction the decrease of the space between such particles.

Each atom is supposed to have a definite relative weight, and also a definite power of combination.

The indestructibility of matter is proved chemically, for neither analysis nor synthesis can take away the weight of any body acted upon. Take any quantity of zinc, oxidize it, dissolve it in acids, act on it in any way you please, still the same quantity of metal exists in the various combinations, and may be extracted therefrom.

And yet this quantity is simply relative, take it to the top of a mountain and the weight will be relatively the same, but change the form of balance and the weight will be lessened.

This constancy in weight (on which the indestructibility of matter is founded) is only a constancy, if the relations are the same.

Next we come to impenetrability, *i.e.*, that two bodies cannot occupy the same space. This formulates that there is a certain limit to compression of all substances; in the case of solids and liquids there is a point which, with our limited means, we cannot further compress; yet the simple admixture of water and alcohol occupies less space than if separately subjected to the greatest pressure known.

Thus it would seem that neither indestructibility nor impenetrability of matter can be experimentally proved by the theory of "atomic" structure of matter.

The only fact we know is, that all things being equal, certain fixed quantities of elements unite with each other; thus as Sir William Thomson has said, "The assumption of atoms can explain no property which has not previously been attributed to the atoms themselves."

We next come to the second concept of an atom, the elastic atom of perpetual motion, which accounts for the fact that the volume of a gas is inversely as the pressure and proportional to its temperature.

It rests on the hypotheses—

1. That a gas is composed of solid particles which are indestructible, and of constant weight and volume.
2. That these particles are absolutely elastic.
3. That they are in perpetual rectilinear motion.

The contending arguments may be briefly summed up thus:—That in experience no perfectly elastic body is known, nor bodies ceaselessly moving without attraction or repulsion till on the verge of collision.

Here in a condensed form are both concepts of the atom shown, each equally overthrown by the other side, the "atom" to the chemist being what the enigma "life" is to the biologist.

But the knowledge of the nature of "life" does not in any way hinder probable and plausible theories for the propagation and evolution of the various species which inhabit the earth.

Let "life" be taken for granted, be it from "bathybios," "amœbæ," or "monera;" and the rest is comparatively easy.

So with the "atom;" let us accept the atom as a something, beyond which matter cannot be divided; an indivisible particle, the nature of which at present is unknown; and starting with this something, let us use it to its greatest advantage possible, keeping in mind, not so much its theoretical but its practical value.

On this subject we may well recall to our minds Carlyle's* saying that "Science has done much for us, but it is a poor science that would hide from us that great deep sacred infinitude of Nescience whither we can never penetrate, on which all science swims as a mere superficial film. This world, after all our science and sciences, is still a miracle; wonderful, inscrutable, magical, and more, to whosoever will think of it."

After a discussion on the above paper, a Report on Practical Pharmacy was made by Mr. F. C. J. Bird, the subject being Alcohol. The reporter first touched on the manufacture of alcohol, and gave one or two simple tests for its freedom or otherwise from fusel oil and other impurities, but devoted the main portion of his report to the comparative strength of alcohols, and the meaning of degrees over or under proof. Alluding first to the difficulty of obtaining really absolute alcohol, and giving examples of the different specific gravities arrived at by successive observers, down to Squibb's of ·7935, the lowest yet obtained, he proceeded to show by a table and diagrammatic curve the contraction that takes place on mixing it with water in varying proportions. The method of expressing the strength of alcohol in terms of proof spirit was then explained, and it was shown that much misconception prevailed on this point, the definition given in the United States Dispensatory being instanced as quite erroneous. The matter was put in a very simple and intelligible light by means of coloured diagrams, and the practical convenience of this system in fortifying or diluting alcohols to any required strength was shown. The report was illustrated by the hydrometers, etc., used for ascertaining the strength of alcohol, and by examples of the calculations necessary in adjusting the strength of spirit recovered by distillation in pharmaceutical operations. A sliding rule was also shown which is very useful for saving the labour of calculation, as it enables any number of volumes at one strength to be converted at a glance into an equivalent number of volumes at any other strength. It consists of three narrow rules placed side by side, the two outer being firmly bound together at the ends by brass bands, whilst the inner one is capable of sliding freely between them. The outer rules are graduated on their inner edges in unequal divisions representing volumes, the numbers in an ordinary size ranging from 10 to 180. The sliding portion is also graduated on both edges in a scale of unequal divisions representing degrees over or under proof (from 68 under proof to 70 over proof). To use the instrument the central rule is moved along until the graduation mark representing the given strength is coincident with the graduation on one of the outer scales representing the given number of volumes, when the number of volumes at the strength sought will be found on the outer scale exactly corresponding to the degree denoting that strength on the inner scale.

The report gave rise to a discussion, in which the Chairman, Secretaries, Messrs. E. White and E. J. Woolley took part, after which the meeting adjourned.

CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting of the Chemists' Assistants' Association was held at 103, Great Russell Street, on February 16. Mr. J. F. Burnett, F.C.S., Vice-President, occupied the chair. After the preliminary business had been disposed

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* Carlyle, 'Heroes and Hero Worship.'

of, the Chairman called upon Mr. Thompson to read a paper on "Pharmaceutical Soaps."

In opening his paper, Mr. Thompson said that he found most of the work on pharmaceutical soaps had already been dealt with by former workers, specially referring to a paper by Mr. Dechan, and a later one by Messrs. Dechan and Maben; the results obtained by these gentlemen, more especially the analytical figures, were referred to and commented on at some length.

After describing the methods by which the various soaps of the Pharmacopœia were made, and pointing out that one of the most important matters the chemist had to ascertain was the absence or otherwise of any appreciable quantity of free or uncombined alkali, Mr. Thompson proceeded to discuss the various methods in use for the determination of free alkali in soaps.

Two processes were dilated upon, viz., the "salting-out process" and the "alcohol test." The first of these consists in taking a known weight of soap, dissolving in water, and adding to the solution, either a definite volume of saturated brine, or a known weight of NaCl, which has the effect of precipitating all the soap (so long as no large percentage of cocoanut oil soap be present). The solution is then filtered, the curd washed with brine, and the filtrate titrated in the usual manner. The second process is worked by dissolving a known weight of soap in alcohol, filtering through a hot funnel, washing the residue with hot alcohol, and finally titrating with cochineal both the filtrate and the solution obtained by dissolving the residue on the filter in water; the algebraic sum of these two results gives the total free alkali.

This latter process was recommended as the most reliable, the former being rendered inexact owing to the "hydrolysis" of a certain amount of the soap.

The analyses of various soaps examined were then discussed, Mr. Thompson stating that he had only found one specimen out of several free from uncombined alkali.

In conclusion, it was pointed out that the B.P. tests should be made more stringent, especially in the case of *sapo animalis*, and that an absolutely neutral soap should be insisted upon for use in all pharmaceutical preparations.

After the reading of the paper a long discussion took place, of which the following is an abstract:—

Mr. T. S. Dymond asked whether Mr. Thompson did not consider that the practice of precipitating soap by the addition of strong lye tended to contaminate the product with excess of alkali. In the hydrolytic decomposition the author had described, he would have anticipated that either the free alkali would have prevented such a phenomenon, or that the fatty acid would have been separated from the solution as such. He should be glad to hear what colour changes cochineal underwent when used as an indicator.

Mr. E. J. Millard thought the presence of alkaline carbonate in soaps was rather an advantage than otherwise, its chief effect being to soften the water used in washing. There were certain proprietary powders largely sold for effecting this object, and they all owed their properties to alkalies. He considered it rather premature to insist on a standard alkalinity for all soaps.

The Chairman, referring to the *sapo durus* of the late Pharmacopœia, stated that lin. pot. iodidi c. sapone used to show up well the differences in commercial samples of hard soap. He had never succeeded in preparing a satisfactory liniment, except when he used a pure soap made from olive oil and soda. He thought the solubility of the soap in spirit, mentioned in the Pharmacopœia, a good test, as it readily indicated contamination with carbonates and sulphates. There had recently been much discussion on the new lin. terebinthinæ. Perhaps Mr. Thompson could tell them how it was that one man makes a thin liniment and another a jelly. With reference to the last speaker's criticism he agreed with Mr. Thompson that soaps for pharmaceutical use should be free from alkali, but thought it unnecessary for washing purposes.

Mr. P. MacEwan said he had often prepared lin. pot. iod. c. sapone when he was a junior. He remembered a patient bringing a prescription that had been dispensed at Buxton, and also a covered pot. He was thus able to trace the source of the modification at present official. Curd soap makes a jelly, but hard soap an inelegant mixture. He would like Mr. Thompson to tell him why some soaps were so much better for shaving than others. Those prepared with lanolin, he had noticed, lather much better than any other varieties.

The Chairman said that for a long time past he had made a lin. pot. iod. c. sapone exactly like that of the new Pharmacopœia. He had always mixed the glycerine and soap instead of the potassium iodide and glycerine, as directed by the late Pharmacopœia.

Mr. Hollis wished to know why ordinary green soap turned yellow.

Mr. Thompson, in reply, stated that boiling the soap with caustic lye had no effect in increasing its alkalinity, as the soap floated in a cake on the surface, and was afterwards thoroughly drained in specially constructed frames. Cochineal gives a purple tint in alkaline solutions, acids turn it bright yellow. The advantage is that the standard solution can be arranged to work to a definite yellow tint, and the estimation may be conducted by gaslight. The great disadvantage of cochineal lies in the fact that it is impossible to titrate back to the original colour. Hence two analyses are frequently necessary. Free acids are not liberated when soaps are decomposed by water, but an alkaline hydrate and acid oleate or stearate. Dr. Wright and he had based this conclusion on the behaviour of an ammoniacal soap. If an ammonia soap be exposed, the volatile alkali gradually disappears and an acid salt remains. The phenomenon of hydrolysis can be prettily shown by making an alcoholic solution of a neutral soap, and adding a little phenolphthalein. Pour into a long glass jar, and when set into a jelly, add some water. As the latter sinks in the soap solution, it leaves a crimson track due to the liberation of free alkali. He did not agree with Mr. Millard as to the desirability of having carbonated alkali in soaps. Neutral soap possesses the same cleansing properties as very alkaline samples, and leaves a much more pleasant sensation after use. It is certain some fatty acids are more detergent than others, and that is the reason neutral soaps differ in cleansing powers. Dr. Wright had patented a neutral soap which exercised really an extraordinary detergent effect. It would remove almost anything from the hands, and no unpleasant feeling remained. With regard to Mr. Burnett's query, it was not in his power to give any information respecting lin. terebinthinæ. In the preparation of lin. pot. iod. c. sapone, the way in which the glycerine was added undoubtedly made a considerable difference. Green soaps that became yellow were badly prepared. If properly made they should not change.

CHEMICAL SOCIETY.

A meeting of the Chemical Society was held on Thursday, February 17, Dr. Hugo Müller, F.R.S., President, in the chair, when Messrs. E. Hori and Charles E. Sohn, Jun., were formally admitted Fellows of the Society, and several certificates were read for the first time.

It was announced that the following changes in the Council List were proposed by the Council:—

As President: Mr. W. Crookes, F.R.S., *vice* Dr. Hugo Müller, F.R.S.

As Vice-Presidents: Professor McLeod, F.R.S., Professor Schlorlemmer, F.R.S., and Mr. Ludwig Mond, *vice* Mr. Crookes, F.R.S., Professor Liveing, F.R.S., and Professor T. E. Thorpe, F.R.S.

As Ordinary Members of the Council: Professor A. H. Church, Dr. P. F. Frankland, Professor Kinch and Dr. H. F. Morley, *vice* Messrs. H. T. Brown, A. E. Fletcher, and Professors Mendola and Pickering.

The following papers were read:—

The Influence of Temperature on the Heat of Dissolution of Salts. By S. U. PICKERING.—This is an extension of the author's previous work on the sulphates—entitled "The Influence of Temperature on the Heat of Chemical Combination" (Trans., 1886, 260)—which tended to show that the heat of dissolution of a salt does not increase regularly with a rise of temperature, but that irregularities occur at various points, so that the heat of dissolution must be represented by a series of curves. The experiments with potassium sulphate, hydrated and anhydrous magnesium sulphate, and hydrated and anhydrous copper sulphate, have been repeated, and the investigation extended to potassium, sodium, hydrated and anhydrous strontium chloride, potassium and the two strontium nitrates, the two sodium carbonates, sodium acetate and potassium sodium tartrate. The investigation comprises over 700 determinations, the mean results with each salt being deduced from two to five distinct series of experiments, each performed with different thermometers. The observations extended from 3° to 25°. In all cases it was found that the irregularities previously noticed were the result of error, and that the heat of dissolution of a salt is represented by a series of straight lines. In rising from low temperature the heat of dissolution is expressed by a straight line up to a certain point, when the rate becomes suddenly lowered and remains constant till a further sudden reduction occurs at some still higher temperature. The average divergence of all the mean results from lines of perfect straightness amounted to less than one thousandth of a degree. With the normally anhydrous salts one lowering of the rate (amounting to about 30 per cent.) only was observed between 3° and 25°, occurring at temperatures between 14° and 9·5° in the various cases; while with the salts which combined with water ef crystallization the first alteration occurred at temperatures between 9° and 7°, and a second change took place at 21° to 18°; the frequency as well as the temperature of occurrence appearing to depend mainly on the tendency of the salt to combine with water. This lowering of the rate of increase in the heat of dissolution as the temperature rises must be accompanied by an increase in the specific heat of the solution which would indicate decomposition of some description. Marignac's determinations of the specific heat of solutions give a rate of increase agreeing very closely with the author's results, and they also show that a further lowering takes place at temperatures above 25° up to 50°. Tilden's direct determinations of this rate at the higher temperatures show a very much larger decrease in the rate, but they cannot be freely accepted, as they are entirely at variance, not only with all specific heat determinations, but also with a fundamental principle of thermochemistry. The heat of combination of a salt with its water of crystallization is deduced from the author's results. He concludes that it is not a constant quantity at all temperatures; the general effect of rise of temperature being to diminish it, although at very low temperatures this effect seems to be more than counterbalanced by some other cause, probably the tendency of the water molecules to unite with each other, the heat of combination diminishing then with fall of temperature. The more water a salt contains the more marked are both these results.

Periodates. By C. W. KIMMINS, D.Sc., B.A.—The author, at the suggestion of Mr. Pattison Muir, has re-examined certain periodates of potassium, silver and sodium, with the object of explaining the discordant results of various observers. Besides the salt $Na_2H_3IO_6$, described by Langlois, he has obtained a sodium periodate of the formula $Na_3H_2IO_6$; he also describes a potassium periodate $K_3HI_2O_9$. He has prepared and analysed the following silver salts:—

Ag_2HIO_5, dark brown.	$AgIO_4$, bright yellow.
$Ag_2H_3IO_6$, dark red.	$Ag_4I_2O_9 \cdot 3OH_2$, light yellow.
$Ag_3H_2IO_6$, slate-coloured	$Ag_4I_2O_9 \cdot OH_2$, claret-coloured.
$AgIO_4 \cdot OH_2$, orange.	$Ag_4I_2O_9$, chocolate-coloured.

Sulphonic Acids derived from the β-monohaloid-derivatives of Naphthalene. By H. E. ARMSTRONG and W. P. WYNNE.

The Decomposition of Potassium Chlorate and Perchlorate by Heat. By FRANK L. TEED, D.Sc.

The Formation of Ethylic Cyanacetoacctate. By Dr. J. JAMES.

The Relation of Diazobenzene Anilide to Amidoazobenzene. By R. J. FRISWELL and A. G. GREEN.

Note on Wallach's Explanation of the Isomeric Transformation of Diazoamidobenzene into Amidoazobenzene. By R. MELDOLA, F.R.S.

Provincial Transactions.

LEICESTER AND LEICESTERSHIRE CHEMISTS' ASSOCIATION.

The annual meeting of this Association was held at St. George's Chambers Leicester, on Thursday evening February 17.

The President, Mr. J. G. F. Richardson, F.C.S., J.P., occupied the chair, and there was a good attendance of members and associates.

The Treasurer read the financial report, which showed a balance in hand of £14 16*s.* 8*d.*, which, considering the heavy expenses incurred in fitting up the rooms, was highly satisfactory. The Secretary then read the annual report, which was as follows:—

ANNUAL REPORT.

Your Committee has pleasure in submitting the first annual report of this Association, and in doing so begs to call attention to the measure of success which has attended its efforts during the year.

Soon after the foundation of this Association, your Committee applied for and obtained a grant of £25 from the Pharmaceutical Society, which enabled it to fit up the room as a class room and chemical laboratory, and to purchase apparatus for carrying on the educational work of the Association. Your Committee begs to thank the Council of the Pharmaceutical Society for so promptly and generously responding to its application. The thanks of the Association are also due to Messrs. J. Richardson and Co. for a donation of £5 5*s.* A class for the study of systematic botany was conducted during the summer months of last year by Mr. S. F. Burford, at which the average attendance was fifteen. Specimens of flowers, etc., for this class were provided by Mr. J. Burns, of the Abbey Park, to whom the Committee begs to tender its thanks. The winter session was inaugurated by a dinner at the Bell Hotel. Forty-five attended, and a most enjoyable evening was spent. Classes for the study of chemistry, materia medica, and pharmacy have been held during the winter months; these have been a great success, the attendance on several occasions exceeding the accommodation. The lecturers report most favourably on the way the students have worked.

The thanks of the Association are due to Messrs. Brice, Burford, Garratt, Goodess and Rowe, for the time and attention they have given in conducting the various classs.

Your Committee is pleased to notice that several past and present students of the Association have been successful in passing the examinations of the Pharmaceucal Society.

Arrangements were made with Mr. Knowles, classical tutor, to conduct a class for the Preliminary examination at a nominal fee to associates. Thirteen pupils joined, but on account of the variable amount of knowledge possessed by the students it is proposed to divide the class into preparatory and advanced classes, and hold it on two nights weekly instead of one as heretofore.

Your Committee begs to tender its grateful thanks to Professors Attfield and Bentley, Messrs. Christy, Holmes, Ince, Lescher, Luff, Martindale, Squire and Wills, for gifts of new books for the library, and to Mr. Esam for the gift of a set of apparatus for volumetric

analysis. Messrs. Southall Bros. and Barclay were good enough to send a specimen of the gum benzoin which has been buried in the sand at Table Bay for nearly two centuries; this is a valuable addition to our museum, as is also the specimen of strophanthus pods sent by Messrs. Christy and Son, and thanks are accorded to the donors.

Several cases of infringement of the Pharmacy Act have been brought to the notice of the Secretary. In two cases the Council of the Pharmaceutical Society was communicated with, and steps were promptly and successfully taken; in other cases the offenders were warned of the consequences if they failed to respect the Act of Parliament.

The report, after an expression of thanks to the Council of the Pharmaceutical Society for the gift of mounted botanical specimens, and for the regular supply of the *Pharmaceutical Journal*, to the Editor of the *British and Colonial Druggist* for the supply of copies, and to the British Pharmaceutical Conference for the gift of the 'Year-Book of Pharmacy,' concluded by congratulating the Association on the state of its finances, and pointing out how much the success of the Association depends on the individual efforts of every member.

The President, in moving the adoption, urged the members not to rest satisfied with the result of their work, however good, but to use every honest endeavour to improve the educational status of the profession. The Council of the Pharmaceutical Society was always ready to help provincial associations where good work was being done, and the result justified it in doing so. He should, as long as he had a seat on the Council, do what he could to plead their cause and assist them in every way. The annual report was in marked contrast with the gloomy and pessimist reports which one reads in the *Pharmaceutical Journal*, but he himself thought that failure arose from apathy on the part of the rank and file. He denied the right of a few West-end chemists to speak for the trade at large, as they did not understand the wants and requirements of provincial pharmacists. He hoped the Pharmacy Act which the Council had in view would become law, so that they would be in a position to amend and modify their bye-laws, and provide for a suitable curriculum. He believed that if any young man learnt his profession well and carried it on in an honest business-like manner, he must succeed. He had no sympathy with members of the trade who sold garbled preparations for what the public confidently asked for as genuine preparations; it was neither safe for the public, nor creditable to the trade that such preparations as laudanum and sweet nitre should be a different preparation in different towns or in different shops in the same town. He urged the students to work hard and obtain all the knowledge they could at the classes, and to submit to the periodical examinations. It was very gratifying to know that out of the sixteen prizes given at St. Mary's and Westminster Hospitals, eleven were carried off by former students of this Association.

Mr. E. H. Butler seconded the motion, which was carried.

Mr. T. H. Lloyd proposed a vote of thanks to the teachers, this was seconded by Mr. Davis, and carried by acclamation.

Votes of thanks to the Committee and to the Hon. Secretary brought the meeting to a close.

At the ballot for the Council for the present year, the following were elected:—President, Mr. J. G. F. Richardson; Vice-Presidents, Messrs. J. H. Lloyd, and J. Young; Treasurer, Mr. W. Thirlby; Hon. Secretary, Mr. J. J. Edwards: Members of Council, Messrs. Burford, Butler, Dudley, Goodess and Rowe.

LIVERPOOL CHEMISTS' ASSOCIATION.

The eighth general meeting of the thirty-eighth session was held at the Royal Institution on Thursday evening, 17th inst. The President, Mr. A. C. Abraham, F.C.S., in the chair.

The minutes of the previous meeting were read and confirmed, and the following donations announced:—'The Calendar of the Pharmaceutical Society, 1887,' from the Society; *Pharmaceutical Journal*, from the Society; *Canadian Pharmaceutical Journal*, from the publisher; *British and Colonial Druggist*, from the publishers; 'Index to the Literature of Explosives.' Part I. By Professor Munroe, U.S. Naval Academy.

A vote of thanks was accorded to the respective donors, and the President showed a new form of specific gravity bottle with thermometer.

The President now said that the business of the evening was a "discusssion of the proposed Pharmacy Act Amendment Bill," and called upon Dr. Symes to open the discussion. This Dr. Symes did, and explained very lucidly the present position and the objects of the proposed Bill.

Messrs. A. C. Abraham, T. F. Abraham, E. Davies and J. S. Ward took part in the discussion.

The opinion of the meeting was very divided on the subject, and no resolution was proposed.

It was intended, also, to discuss "Sir John Lubbock's Shop Hours Bill;" but time would not allow, and it was postponed until the next meeting.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Albumen Test for Nitric Acid.

Sir,—In Mr. Proctor's valuable paper on "Pharmacopœial Testing," the following passage occurs, "Why not tell us what impurity would be detected by a solution of albumen? . . . . Though nitric acid is well known as a test for albumen, the converse application of this reaction is not so common as to make an explanation undesirable." I have always understood the albumen test was given for detecting the presence of metaphosphoric acid, which, if present, would coagulate the albumen; a result which would only occur with moderately strong nitric acid. Another test is given for detecting nitric acid, viz., strong sulphuric acid and ferrous sulphate. Mr. Proctor would have conferred a boon on many readers of the "Journal," if his paper had been accompanied by a sketch of his extemporized nitrometer.

14, *Market Place, Chesterfield.* J. R. D. Barfoot.

An Associate.—We fail to see what Mr. Proctor's paper has to do with the criticisms that called forth Dr. Attfield's reply.

V. S.—The exemption is specified in the first section of the Pharmacy Act Amendment Act of 1869, which provides that nothing contained in the first fifteen sections of the Pharmacy Act, 1868, shall prevent any person who is a member of the Royal College of Veterinary Surgeons of Great Britain, or holds a certificate from the Highlands and Agricultural Society of Scotland, from dispensing medicines for animals under his care.

E. Rees.—*Petasites fragrans.*

C. M.—The article is probably a quack medicine.

H. P. T. L.—The address of the Royal College of Veterinary Surgeons is Great College Street, Camden Town, N.W.

E. Brooke.—Your assertion is incorrect, the person mentioned having been a registered chemist and druggist, as may be seen by referring to the Register.

E. O.—(1) *Bryum capillare.* (2) *Racomitrium heterostichum.* (3) *Tortula unguiculata.* (4) *Hypnum cupressiforme.* (5) *Racomitrium fasciculare.* (6) *Schistidium maritimum.*

Communications, Letters, etc., have been received from Messrs. Mitchell, Blake, Hunter, Humphrey, Dispenser, Paranitrosophenol.

BENEVOLENT FUND.

STATEMENT OF RELIEF GRANTED DURING 1886.

ANNUITANTS.

			£	s.	d.	£	s.	d.
37	Annuitants	@ £35 per annum	1295	0	0			
7	do.	@ £30 „	210	0	0			
1	do.	one quarter @ £30 „	7	10	0			
		three quarters @ £35 „	26	5	0			
1	do.	two quarters @ £30 „	15	0	0			
		two quarters @ £35 „	17	10	0			
1	do. (deceased)	three quarters @ £35 „	26	5	0			
						1597	10	0

Total number of Annuitants during 1886 ... **47**

TEMPORARY GRANTS.

Amount granted in **65** cases after investigation by the Committee... ... **631 14 5**

Total amount of Relief granted during 1886 ... **£2229 4 5**

SPECIAL NOTE.—The benefits of the Benevolent Fund were, by the provisions of the Pharmacy Act, 1868, extended to all persons—whether connected with the Pharmaceutical Society or not—whose names appear on the Register of Chemists and Druggists, and the widows and orphans of such persons.

BENEVOLENT FUND.

LOCAL LIST OF SUBSCRIPTIONS & DONATIONS

RECEIVED DURING 1886.

	£	s.	d.
Aberayron.			
Jones, John Price	0	2	6
Aberdare.			
Jones, D. W.	0	5	0
Smith, Morgan	0	2	6
Aberdeen.			
Broomhead, George E.	0	5	0
Coutts, Charles	0	5	0
Cruickshank, Geo. P.	0	5	0
Davidson, Charles	1	1	0
Giles, William	0	5	0
Glover, W. K.	0	5	0
Gordon, William	0	5	0
Johnston, John	0	5	0
Kay, James P.	0	10	6
Kemp, James	0	5	0
Mackay, Wm.	0	5	0
Paterson and Sons	0	10	6
Sim, James	0	5	0
Sinclair, William	0	10	6
Strachan, Alexander	0	5	0
Aberfeldy.			
Macnaughton, H. B.	1	1	0
Abergavenny.			
Shackleton, G. W.	0	5	0
Abergele.			
Hannah, John	0	2	6
Aberystwith.			
Davies, David J.	0	2	6
Ellis, Robert	0	2	6
Thomas, John	0	2	6
Wynne, Edward P.	0	10	6
Abingdon.			
Allen, Herbert	0	2	6
Osborne, Geo. C.	0	5	0
Smith, William	0	5	0
Smith, William F.	0	5	0
Aboyne.			
Petrie, James J.	0	5	0
Accrington.			
Stanley, Thomas	0	2	6
Addiscombe.			
Townsend, Charles	0	10	6
Alcester.			
Adcock, H. D.	0	5	0
Adcock, Isaac Dickson	0	10	6
Heath, Josiah W.	1	1	0
Overbury, Henry	0	5	0
Alcival North (Cape Colony).			
Broadhead, Richard	0	5	0
Aldershot.			
Williams, James	0	10	6
Alexandria (N.B.)			
McFarlane, Peter	0	5	0
Alford.			
Allis, Wm.	0	10	0
Alfreton.			
Robinson, Joseph S.	0	10	6
Alnwick.			
Newbigin, James L.	0	10	6
Newbigin, Lesslie	0	5	0
Alresford.			
Richardson, J. H.	0	2	6
Willis, William	0	2	6
Altrincham.			
Clarke, J. T.	0	5	0
Ambleside.			
Herd, Henry W.	0	2	6
Ampthill.			
Allen, George	1	1	0
Brown, James	0	10	6
Andover.			
Bienvenu, John	1	1	0
Angmering.			
Freeland, H. W.	0	2	6
Appleby.			
McConal, A.	0	5	0
Arbroath.			
Burn, David H.	0	5	0
Mill, William A.	0	5	0
Robertson, John	0	5	0
Whyte, James S.	0	5	0
Ashbourne.			
Bradley, Edwin Sylvester	0	10	6
Greaves, Frederick W.	0	5	0
Osborne, James	0	5	0
Reckless, A. H.	0	10	6
Ashby-de-la-Zouch.			
Bullen, George W.	1	1	0
Ashford (Kent).			
Brothers, John	1	1	0
Ingall, Joseph	1	1	0
Stedman, William	0	5	0
White, Charles Thomas	0	5	0
Ashford (Middlesex).			
Hazledine, Thomas	0	5	0
Ashton-under-Lyne.			
Arnfield, John C.	0	5	0
Belfield, William	0	5	0
Bostock, William	0	5	0
Fisher, Edwin	0	5	0
Waterhouse, Jabez	0	10	6
Ashwell.			
Skelton, J. H.	0	5	0
Atherstone.			
Orme, William	0	10	6
Atherton.			
Fletcher, Ellis	0	5	0
Heywood, John H.	0	5	0
Aylesbury.			
Dickins, Rowland	0	5	0
Palmer, Edwin T.	0	5	0
Turner, John	0	5	0
Bakewell.			
Carrington, Edward G.	0	5	0
Thompson, John	0	5	0
Baldock.			
Bally, Edward F.	0	5	0
Kent, T. W. (Arlesey)	0	5	0
Banbury.			
Ball, George V.	1	1	0
Bartlett, H.	0	5	0
Gilkes, Frederick G.	0	5	0
Watts, W.	0	5	0
Banchory.			
Lunan, Alexander	0	5	0
Banff.			
Ellis, George	0	10	6
Bangor.			
Jones, Owen	0	5	0
Roberts, Meshach	1	1	0
Webster, Thomas	0	5	0
Barnstaple.			
Britten, Wm. B.	0	5	0
Goss, Samuel	0	5	0
Partridge, James	0	5	0
Pratt, Edward	0	5	0
Symons, William	0	5	0
Barrow-in-Furness.			
Sansom, E.	0	2	6
Barton-on-Humber.			
Ingoldby, William	0	2	6
Smith, Richard F.	0	5	0
Bath.			
Alcock, Henry	0	5	0
Appleby, E. J.	0	10	6
Bright, William	0	5	0
Capper, Edmund	0	5	0
Chadwick, G. W.	0	5	0
Clarke, B. G.	0	2	6
Collis, Samuel	0	5	0
Commans, Robert D.	1	1	0
Dunn, Richard	0	10	6
Goodman, D. H.	0	5	0
Griffin, Alfred W.	0	5	0
Hillier, Henry	0	10	6
Marsh, John H.	0	10	6
Masters, Henry James	0	5	0
Merrikin, John B.	0	10	6
Oldham, R. T.	0	5	0
Partington, J. J.	0	5	0
Pinch, James E.	0	5	6
Sloan, William G.	0	7	6
Thomas, Henry J.	0	10	6
Thring, E. J. H. (Monkton Combe)	0	10	6
Tilsley, George	0	10	6
Toone, Joseph V.	0	10	6
Whiston, E.	0	5	0
Williams, Mrs. Sophia	0	10	6
Wilson, Joseph	0	5	0
Beaufort West (Cape Colony).			
Rivett, Arthur J.	0	10	6
Beaumaris.			
Slater, John	0	10	6
Bedale.			
Pratt, William (West Burton)	0	5	0
Swinbank, J.	0	5	0
Bedford.			
Anthony and Biss	0	10	0
Cameron, William Alexander	0	5	0
Clifford, R. N.	0	5	0
Corrie, A. A.	0	2	6
Corrie, Isabella A.	0	5	0
Ekins, John	0	10	6
Hester, Charles	0	5	0

Bedford—continued.	£	s.	d.
Mountford, Maurice	0	2	6
Norman, Joseph S.	0	5	0
Taylor, J. B.	0	5	0
Thompson, H.	0	5	0
Bedlington.			
Foggan, George	0	2	6
Belfast.			
Green, Thomas	0	5	0
Kennedy, William	0	5	0
Yoxall, Henry	0	5	0
Belper.			
Burkinshaw, W. T.	0	5	0
Calvert, James	0	5	0
Berkeley.			
Bell, Edward Collinson	0	10	6
Gowen, Albert	0	10	6
Berkhamsted.			
Bosher, Alexander	0	2	6
Berwick.			
Carr, Walter P.	0	2	6
Lyle, William	0	2	6
MacIntyre, John	0	5	0
Beverley.			
Marshall, Joseph J.	0	5	0
Marshall, Thomas	0	5	0
Bexhill.			
Brisley, George	0	5	0
Bexley Heath.			
Mason, Alfred J.	0	5	0
Pavey, H. J	0	5	0
Bicester.			
Bates, John	0	5	0
Sandiland, R. B.	0	10	6
Bideford.			
Betty, Samuel C.	0	10	6
Griffits, John A.	0	5	0
Hogg, Thomas	0	5	0
Biggar.			
Eunson, John	0	2	6
Biggleswade.			
Spong, D. M.	0	5	0
Bilston.			
Gray, Charles	0	5	0
Kearnes, Robert H.	0	5	0
Bingham.			
Doubleday, Frederick	0	5	0
Bingley.			
Skirrow, William E.	0	10	6
Slicer, Walter	0	7	6
Birkenhead.			
Barber, George	0	10	6
Dutton, H. O.	1	1	0
Field, H. E.	0	5	0
Foulkes, William James	1	1	0
James, Thomas C.	0	5	0
Mullock, Richard	0	10	6
Stewart, Alexander	0	10	6
Stewart, John	0	10	6
Wolliscroft, Henry	0	5	0
Birmingham.			
Barker, Thomas	0	10	6
Bird, Alfred	1	1	0
Brevitt, W. Y.	0	10	6
Brown, James	0	2	6
Campbell, Henry	0	2	6
Chase, Thomas, jun.	1	1	0
Churchill, Walter J.	0	10	6
Clayton, Francis Corder	1	1	0
Cornforth, Edwin	0	2	6
Foster, Alfred H.	0	5	0
Foster, James Alfred	0	2	6
Frobisher, Frederick	0	5	0
Greatrex, Henry	0	10	6
Holdsworth, Thomas W.	0	10	6
Hutton, Harry	0	2	6
Jacombs, W. H.	0	5	0
Jones, G. M.	0	5	0
Lucas, Joseph	0	10	6
Mantell, Charles	0	10	6
Mantell, Charles, jun.	0	10	6
Mott, John C.	0	5	0
Naish, C. E.	0	10	6

Birmingham—continued.	£	s.	d.
Pegg, Herbert	1	1	0
Perry, George E.	0	5	0
Perry, William Henry	0	5	0
Prosser, Frank H.	0	10	6
Snape and Son	0	10	6
Southall Bros. and Barclay	1	1	0
Thompson, William	0	5	0
Wakefield, John	1	1	0
Weaver, T.	0	5	0
Wilcox, George	0	10	6
Bishop Auckland.			
Dobinson, Thomas	0	5	0
Harburn, Alfred	0	5	0
Townend, Thomas F.	0	5	0
Bishop Stortford.			
Hardy, John	0	5	0
Speechly, George	0	10	6
Bishop's Castle.			
Bills, Martha Cam	0	10	6
Blackburn.			
Booth, James	0	10	6
Butterfield, William	0	5	0
Critchley, T.	0	5	0
Farnworth, William	1	1	0
Garland, A. P.	0	5	0
Hindle, James	0	2	6
Paffard, Frank	0	10	6
Blackpool.			
Jackson, Joseph	0	5	0
Parkinson, Charles	0	10	6
Richardson, W. C.	0	5	0
Blagdon.			
Dudden, R. M.	0	5	0
Blandford.			
Groves, Richard H.	1	1	0
Groves, Mrs. W. E.	1	1	0
Bodmin.			
Williams, Joel D.	1	1	0
Bognor.			
Long, Alfred T.	0	10	6
Bolton.			
Blain, Alfred Lucas	0	5	0
Blain, William	0	10	6
Blain, W. R.	0	5	0
Fawthorp, Joah	0	5	0
Forbes, James W.	0	10	6
Hart, James	1	1	0
Mather, James	0	10	6
Phillips, Sidney (Horwich)	0	5	0
Bombay (India).			
Davies, Richard	0	5	0
Prebble, John G.	0	5	0
Bonnyrigg.			
Hutcheon, W.	0	5	0
Boston (Lincs).			
Allen, Thompson	0	5	0
Bell, E. W.	0	2	6
Grimble, Albert	0	5	0
Haller, F. W.	0	5	0
Kent, B. J.	0	5	0
Pilley and Son	0	5	0
Boulogne-sur-Mer.			
Parsons, J. Vincett	0	5	0
Bourne (Lincs).			
Mills, Robert M.	0	10	6
Bournemouth.			
Beale, J. H. T.	0	5	0
Bilson, F. E.	0	5	0
Bridge, G. E.	1	1	0
Dobell, Dr. Horace	1	1	0
Duncan, Alexander	1	1	0
Endle, Frederick	0	10	6
Gilbert, William	0	5	0
Hardwick, Stewart	0	10	6
Hazard, James D.	0	5	0
Noble, James	0	5	0
Shipman, John J.	0	5	0
Spinney, Frank	0	10	6
Taylor, George	0	5	0
Toone, J. A.	0	10	6
Williams, W. L.	0	2	6
Worth, Edwin	1	1	0
Bowness-on-Windermere.			
Birkett, Charles	0	6	0

Bradford (Lancs).	£	s.	d.
Lambert, Thomas	0	5	0
Bradford (Yorks).			
Beanland, Samuel	0	5	0
Bell, Francis	0	10	6
Blackburn, Bailey	2	2	0
Butterworth, Albert	0	10	6
Cocker, Justus J.	0	5	0
Harrison, Parkinson and Co.	2	2	0
Houfe, R. W.	0	5	0
Lister, Simeon (Great Horton)	0	10	6
Rimmington and Son	1	1	0
Rogerson and Son	1	1	0
Stephenson, Robert	0	5	0
Watts, John	0	10	6
Wilson, Albert	0	5	0
Bradford-on-Avon.			
Cooper, Albert H.	0	10	6
Braintree.			
Baker, Sydney G.	0	2	6
Row, George C.	0	5	0
Brampton.			
Younger and Ridley	0	5	0
Branscombe.			
Cooper, George	0	10	6
Braughing.			
Franklyn, Thomas	0	5	0
Brecon.			
Meredith, John	0	10	0
Morris, J. C. B.	0	5	0
Bridgend.			
Jenkins, D.	0	5	0
Jones, M. H. (Garw Valley)	0	2	6
Lloyd, John	0	5	0
Williams, M. (Pencoed)	0	5	0
Bridgnorth.			
Cooper, H. S.	0	2	6
Hughes, Hubert	0	5	0
Steward, William	0	10	6
Bridgwater.			
Basker, J. A	0	5	0
Llewellyn, Lewis H.	0	2	6
Smith, Sidney	0	2	6
Woodward, John L. L.	0	5	0
Bridlington.			
Gatenby, Robert	0	5	0
Woodliffe, Alfred	0	2	6
Wrack, F. G.	0	2	6
Bridlington Quay.			
Dickins, Mary	0	5	0
Jackson, Henry J.	0	5	0
Bridport.			
Beach and Barnicott	1	1	0
Beach, James	0	10	0
Beach, Thomas E.	0	2	6
Jones, Frederick	0	2	6
Brightlingsea.			
Cooper, George B.	0	5	0
Brighton.			
Arnold, J.	0	2	6
Barton, Charles	0	10	6
Barton, Henry	0	10	6
Bullen, Thomas	0	10	6
Cant, Evans	0	5	0
Chambers, Herbert	0	2	6
Chapman, F.	0	10	6
Colby, Mrs. G.	0	10	6
Cook, H. F.	0	2	6
Cox, Arthur H.	1	1	0
Crassweller, W. E.	0	2	6
Damant, Arthur A.	0	2	6
Douglas, W.	0	2	6
Edwards, J.	0	5	0
Ellis, C. J.	0	2	6
Else, William	0	10	6
Everard, A. G.	0	2	6
Gibson, W. H.	0	5	0
Glaisyer, Thomas	0	10	6
Grinsted, J.	0	2	6
Guy, Frederick	0	10	6
Gwatkin, James Ross	0	10	6
Hardcastle, S. B.	0	10	6
Harris, E. R.	0	5	0
Hickley, G.	0	10	6
Hornsby, George G.	0	10	6
Jeeves, Thomas	0	10	6

Brighton—continued.	£	s.	d.
Kemp, John	0	10	6
Leigh, Marshall	1	1	0
Levett, H.	0	5	0
Llewellyn, Peter H.	0	5	0
Metherell, K.	1	1	0
Muston, G. G.	0	5	0
Padwick, John	0	10	6
Parris, T. W.	0	5	0
Perress, J. C.	0	5	0
Roberts, A. T.	0	5	0
Robson, Thomas	0	10	6
Salmon, E. F.	0	5	0
Salmon, F. W.	0	10	6
Savage and Son	1	1	0
Smith, Walter Henry	1	1	0
Smithson, J.	0	10	6
Stableforth, J. W.	0	5	0
Vizer, Edwin B.	0	10	6
Ward, Charles T. (Southwick)	0	2	6
Williamson, J.	0	5	0
Brill (Bucks).			
Tottenham and Holmes	0	10	6
Bristol.			
Ackerman, Theophilus	1	1	0
Allen, Benjamin	0	10	6
Bamfield, John	0	5	0
Barton, J. B. (Kingswood)	0	5	0
Bennett, Joseph	0	5	0
Berry, William	0	10	6
Boucher, John	1	1	0
Bramald, F. D.	0	5	0
Butler, Samuel	1	1	0
Callaway, Lemuel	0	10	6
Cox, Arthur	0	2	6
Cuff, Robert C.	0	5	0
Dibble, J. W.	0	10	6
Freestone, R. H.	0	5	0
Freestone, Thomas M.	0	10	6
Hodder, Henry	0	5	0
Howell, Henry	0	5	0
Isaac, G. W.	0	10	6
Jeffery, Henry	0	10	6
Jennings, Thomas H.	0	5	0
Jones, William W.	1	1	0
Keen, Benjamin	0	10	6
Latrobe, Henry	0	5	0
Llewellyn, David	0	2	6
Long, John T.	0	10	6
Munk, F. A.	0	5	0
Newman, Robert	0	10	6
Pitchford, William	0	10	6
Pitman, John	1	1	0
Plumley, James G.	0	5	0
Presley, Edward	0	5	0
Schacht, G. F.	1	1	0
Spill, Thomas	0	10	6
Stroud, John	1	1	0
Thomas, J., D.D. (donation)			0
Towerzey, Alexander	0	10	6
Townsend, Charles	1	1	0
Townsend, Henry H.	0	10	6
Troake, R. J.	0	10	6
Turner, George T.	0	10	6
Wade, Thomas T.	0	2	6
Walton, Frederick M.	0	5	0
Warren, Algernon	1	1	0
Watson, E. M.	1	1	0
White, James W.	0	10	6
Wretts, John R.	0	10	6
Briton Ferry.			
Olive, W. T.	0	5	0
Bromley (Kent).			
Goulden, Herbert	0	5	0
Shillcock, George	0	5	0
Skinner, Richard	0	10	6
Bromyard.			
Jones, Charles	0	5	0
Broughty Ferry.			
Fleming, E.	0	5	0
Brynmawr.			
Evans, Alfred E.	0	5	0
Jones, Alfred M.	0	10	6
Buckingham.			
Kingerlee, George	1	1	0
Bungay.			
Owles, C. E.	0	2	6
Burnham (Bucks).			
Heald, Alfred J.	0	10	6

Burnham (Essex).	£	s.	d.
Ellis, William	0	5	0
Burnham Market.			
Spencer, William Henry	0	5	0
Burnley.			
Barlow, Joseph A.	0	2	6
Cowgill, Brian H.	0	10	6
Evans, Thomas	0	5	0
Francis, Charles E.	0	5	0
Heaton, Martha	0	2	6
Hitchin, Robert	0	5	0
Holden, John	0	5	0
Munn, Robert	0	5	0
Parkinson, I.	0	5	0
Parkinson, William	0	5	0
Smith, John Jeremiah	0	2	6
Walker, Sandford	0	5	0
Wilks, Maurice	0	2	6
Wright, John W.	0	2	6
Burntisland.			
Gilmour, Andrew	0	5	0
Burslem.			
Blackshaw, Thomas	0	10	6
Leicester, Thomas	0	10	6
Oldham, William	0	10	6
Wardle, Thomas	0	2	6
Burton-on-Trent.			
Ottey, Thomas	0	5	0
Wright, George	0	10	6
Bury.			
Bowker, Ellis	0	10	6
Crompton, Alfred	0	5	0
Mather, J. H.	0	5	0
Bury St. Edmunds.			
Allan, Henry	0	5	0
Brain, F. S.	0	5	0
Clark, Owen A.	0	2	6
Crassweller, W. E.	0	5	0
Kirkham, Thomas	0	2	6
Last, A. J.	0	2	6
Portway, John	0	2	6
Summers, Frank	0	5	0
Summers, Thos. D.	0	5	0
Youngman, Edward	0	2	6
Buxton (Derbyshire).			
Thresh, Arthur	0	5	0
Thresh, Dr. John C.	1	1	0
Wright, Robert	0	10	0
Cambridge.			
Beall, George	0	5	0
Beall, Samuel S.	0	5	0
Church, H. J.	1	1	0
Deck, Arthur	0	10	6
Field, Ebenezer	0	5	0
Gillett, C.	0	5	0
Greenwood, Dennis	0	5	0
Hoare, W. P.	0	5	0
Ivatt, Albert	0	5	0
Pain, Walter E.	0	5	0
Sturton, Richard	1	1	0
Throssel, John	0	5	0
Yeomans, John	0	5	0
Canterbury.			
Amos, Daniel	0	10	6
Biggleston, E. R.	0	5	0
Bing, Charles	0	5	0
Bing, Edwin	0	10	6
Harris, F. R.	0	10	6
Pittock, Dr. F. W.	0	5	0
Thomas, James (Bridge)	0	5	0
Canton (China).			
Brunt, G. H.	0	10	6
Cape Town.			
Tebb, Henry	1	1	0
Cardiff.			
Anthony, David	0	10	6
Coleman, Alfred	0	10	6
Coleman, E. J.	0	10	6
Collier, J. A.	0	5	0
Davies, G.	0	2	6
Drane, Robert	0	10	6
Duck, Richard W.	0	5	0
Furnival, William	0	5	0
Greaves, John	0	5	0
Hagon, Albert	0	5	0
Harris, D.	0	5	0
Hicks, W. T.	0	5	0
Howell, Thomas	0	5	0

Cardiff—continued.	£	s.	d.
Jones, J. A.	0	2	6
Jones, John T.	0	5	0
Joy, F. J. J.	0	5	0
Lloyd, David	0	5	0
Mumford, Richard	0	5	0
Munday, John	0	10	6
Phillips, John	0	2	6
Prust, Richard	0	2	6
Rees, John	0	5	0
Robb, John	0	5	0
Sanders, W. J.	0	5	0
Simpkins, George	0	5	0
Whineray, Edward	0	5	0
Williams, E. W.	0	2	6
Williams, Jesse	0	5	0
Williams, R. E.	0	2	6
Williams, Thomas	0	10	6
Williamson, J. E.	0	5	0
Yorath, T. B.	0	5	0
Carlisle.			
Bell, John	0	5	0
Fisher, Catherine Hodgson	0	5	0
Foster, James	0	5	0
Hallaway, John	0	5	0
Martlew, Thomas	0	5	0
Parker, Edward J.	0	5	0
Parker, William	0	5	0
Robson, John	0	5	0
Thompson, Andrew	0	10	6
Todd, Joe	0	5	0
Carluke.			
Hinksman, John	0	5	0
Carmarthen.			
Davies, Richard Morgan	0	5	0
Lloyd, Walter	0	5	0
Smith, John H.	0	5	0
Carnarvon.			
Francis, James	0	2	6
Jones, David	0	5	0
Jones, John	0	5	0
Lloyd, William	0	5	0
Owen, G. C. R	0	2	6
Carshalton.			
Carter, Francis	0	10	6
Castle Cary.			
Moore, Francis S.	0	5	0
Castle Douglas.			
Veitch, A.	0	5	0
Chapel Allerton.			
Saville, William	0	5	0
Chard.			
Churchouse, W. B.	0	5	0
Charlestown-of-Aberlour.			
Smith, John	0	2	6
Chatham.			
Crofts, Holmes C.	0	10	6
French, Miss	0	10	6
Lamb, Thomas C.	0	5	0
Modlen, Robert	0	5	0
Morgan, Alfred W.	0	5	0
Thompson, George Alfred	0	5	0
Cheddar.			
Allen, Samuel	0	5	0
Chelmsford.			
Baker and Wright	0	10	6
Metcalfe, Wilson	0	10	6
Tomlinson, James	0	10	6
Cheltenham.			
Balcomb, John	1	1	0
Barron, William	0	10	6
Beetham and Son	1	1	0
Board, Thomas F.	0	2	6
Butcher, Thomas	1	1	0
Cooper, A.	0	2	6
Dolman, William	0	5	0
Edwards, W. P.	0	2	6
Fletcher and Palmer	1	1	0
Fletcher, John	1	1	0
Hands, William	0	5	0
Hill, Arthur	0	5	0
James, Joseph	0	2	6
Jeffrey, Thomas A.	0	10	6
Kite, W. T.	0	10	6
Lucas, E. W.	0	5	0
Macdonald, E.	0	2	6
Mansbridge, M. C.	1	1	0

Cheltenham—continued.	£	s.	d.
Pattison, Thomas	0	10	6
Power, J. H.	0	5	0
Proekter and Forth	1	1	0
Purnell, Henry A.	0	5	0
Sanderson, W.	0	2	6
Smith, Nathaniel. and Co.	1	1	0
Smith, William H.	0	5	0
Stewart, James	0	10	6
Sumner, W.	0	5	0
Thomas, Brothers	0	10	6
Walters, John	0	10	6
Watson, R. T.	0	5	0
Wood, Frederick	0	10	6
Woodward, Solomon	0	10	6
Chepstow			
Tame, Thomas	0	5	0
Chertsey.			
Boyce, George	0	5	0
Flintan, F. R.	0	5	0
Chester.			
Baker, —	0	5	0
Baxter, George	0	10	6
Bowers, James D.	0	5	0
Caldecott, Clement G.	0	5	0
Grindley and Son	0	10	6
Guy, John (Broughton)	0	5	0
Hodges, William	0	10	6
Huke, James W.	0	5	0
Mills, John	0	5	0
Roberts, R. M.	0	5	0
Shrubsole, G. W.	0	5	0
Spencer, J. H.	0	5	0
Chesterfield.			
Barfoot, J. R. D.	0	2	6
Booth, George	0	10	6
Elliott, Thomas	0	5	0
Furness, Thomas	0	2	6
Greaves, A. W.	0	5	0
Lancaster, Wm. G.	0	5	0
Lowe, A.	0	5	0
Sampson, George	0	2	6
Windle, John T.	0	5	0
Wright, G.	0	2	6
Wyatt, Wm.	0	5	0
Chester-le-Street.			
Greenwell, Richard Henry	0	10	6
Chew-Magna.			
Milton, Thomas	0	5	0
Chichester.			
Baker and Son	0	10	6
Batchelor, C. J. H.	0	5	0
Ellidge, John W.	0	10	6
Chippenham.			
Coles, John C.	0	10	6
Turpin, A. B.	0	5	0
Chipping Ongar.			
Ward, David	0	10	6
Chipping Sodbury.			
Jones, Richard	0	10	6
Chislehurst.			
Wing, Lewis	1	1	0
Chorley.			
Hill, William	0	5	0
Christchurch.			
Green, John	0	5	0
Chulmleigh.			
Joint, Robert James	0	6	0
Cirencester.			
Griffiths, Waldron	0	10	6
Kinch, Edward	0	10	6
Paternoster, J.	0	5	0
Clacton-on-Sea.			
Mann, William	0	2	6
Claycross.			
Lloyd, Robert	0	10	6
Smith, John	0	5	0
Clun.			
Darroll, William	1	1	0
Coatbridge.			
Mowat, J. W.	0	5	0
Cobham.			
Redfern, John	1	1	0

Cockermouth.	£	s.	d.
Bowerbank, Joseph	1	1	0
Brown, R. F.	0	2	6
Cooper Brothers	0	2	6
Robinson, William	0	5	0
Straughton, Joseph	0	2	6
Codnor (near Derby).			
Farnsworth, Thomas	0	5	0
Colchester.			
Barritt and Son	0	10	6
Bates, Thomas W.	0	5	0
Cole, Fred A.	0	5	0
Cordley, W. B.	0	5	0
Davies, Rees	0	5	0
Hammerton, Edward	0	5	0
Hopkins, W. R.	0	2	6
Prosser, Mrs.	0	5	0
Shenstone, J. C.	0	5	0
Simpson, Hales	0	5	0
Weddell, Arthur	0	5	0
Congleton.			
Cole, Frederick	0	5	0
Connah's Quay.			
Jones, Kendrick L.	0	2	6
Cork.			
Selkirk, James	0	10	6
Corris.			
Thomas, Maurice	0	5	0
Corwen.			
Jones, William	0	10	6
Coventry.			
Axford, J. W.	0	5	0
Bird, Frederick	0	5	0
Brown, John	0	2	6
Clarke, William	0	2	6
Glover, Henry	0	2	6
Hinds, James	0	10	6
Jelly, George William	0	2	6
Loveitt, Mrs.	0	2	6
Makepeace, A. J.	0	2	6
Mason, D.	0	2	6
Newton, Alfred H.	0	2	6
Sellors, Thomas	0	2	6
Thompson, A. L.	0	2	6
Wyleys and Co.	2	2	0
Cowbridge.			
Thomas, John	0	5	0
Cowes (Isle of Wight).			
Beaven, George A.	0	10	0
Fennings, Alfred	1	1	0
ditto (donation)	5	5	0
Cranbrook.			
Turner, John	0	5	0
Crawley.			
Leach, John	0	5	0
Webb, W. J.	0	5	0
Weedon, Joseph	0	5	0
Crediton.			
Jackson, William	1	1	0
Jackson, W. H.	0	5	0
Crewe.			
Bayley, William	0	10	6
Harrop, Wm. H.	0	5	0
Crewkerne.			
Catford, O. W.	0	5	0
Criccieth.			
Bowen, Joseph W.	0	2	6
Cromer.			
Priest, Edward R.	0	10	6
Croydon.			
Clarke, Josiah	1	1	0
Clarke, Walter	0	5	0
Culverwell, John S.	0	5	0
Dixon, W. R.	0	5	0
Harwood, Charles	0	5	0
Long, Henry	0	10	6
Padwick, W. G.	0	5	0
Roberts, D. P.	0	10	6
Sergent, William	0	5	0
Williams, James	0	10	6
Cullen (N.B.)			
Buchanan, John	0	2	6
Seivwright, George	0	10	6

Dalton-in-Furness.	£	s.	d.
Preston, William L.	0	5	0
Darlington.			
Best, George	0	2	6
Best, J. W.	0	5	0
Cranston, John	0	5	0
Nicholson, Richard	0	5	0
Raw, James H.	0	5	0
Robinson, James	0	5	0
Swenden, James	0	10	6
Walton, Frederick G.	0	2	6
Dartford.			
Wilson, R. E.	0	5	0
Dartmouth.			
Humphrey, Horatio	0	5	0
Rees, Colin A.	0	5	0
Rees, William H.	0	10	6
Deal.			
Dunn, George S.	0	5	0
Green, John	0	10	6
Denton (Lancs).			
Arrandale, William	0	10	6
Derby.			
Bishop, E. J.	0	5	0
Clifton, Frederick	0	10	6
Cope, J. A.	1	1	0
Frost, George	0	10	6
Hefford, Charles	0	5	0
Hughes, John S.	0	2	6
Monkhouse, Henry	0	5	0
Nicklinson, Thomas	0	5	0
Sherwin, T.	0	2	6
Stevenson, Richard W.	0	5	0
Wilson, Joseph	0	5	0
Devizes.			
Clark, Robert	0	10	6
Edwards, T. R.	0	2	6
Devonport.			
Codd, Francis	0	5	0
Lamble, John A.	0	2	6
Didsbury.			
Bates, John F.	0	5	0
Richardson, Allen	0	5	0
Diss.			
Cupiss, Francis	0	10	6
Gostling, T. P.	0	10	6
ditto (donation)	3	3	0
Thrower, Edward A.	0	10	6
Whitrod, H. F.	0	5	0
Doncaster.			
Atkinson, Stephen (Arksey)	0	10	6
Connor, Thomas H.	0	5	0
Dunhill and Stiles	1	1	0
Hasselby, Thomas J.	0	5	0
Hough, William	0	5	0
Howorth, James	0	10	6
Parkin, Charles	0	5	0
Pickering, John (Crowle)	0	5	0
Dorchester.			
Durden, H.	0	5	0
Evans, Alfred J.	0	5	0
How, William	0	5	0
Pearce, William L.	0	7	6
Watts, E. P.	0	5	0
Dorking.			
Clark, W. W.	0	10	6
Clift, Joseph	0	10	6
Doubleday, F. W.	0	10	6
Douglas (Isle of Man).			
Brearey, A. W.	0	10	6
Brearey, Wm. A.	1	1	0
Gore, J. R. A.	0	5	0
Greensill, T. S.	1	1	0
Dover.			
Adams, R. W.	0	5	0
Barnes, William James	0	5	0
Bolton, J.	0	5	0
Bottle, Alexander	1	1	0
Brown, Joseph Fred.	1	1	0
Clarke, Herbert	0	5	0
Cotterell, W. B.	0	2	6
Dickeson, Sir Richard	1	1	0
Ewell, Richard M.	0	5	0
Forster, Robert Henry	0	10	6
Hambrook, John Barber	0	5	0
Leigh, H. M.	0	2	6

Dover—continued.	£	s.	d.
Peake, Henry	1	1	0
Thompson, Edward	0	10	6
Wyles, William	1	1	0
Downham.			
Porter, Samuel E.	0	2	6
Driffield.			
Bordass, James	0	5	0
Parkinson, Thomas	0	5	0
Dublin.			
Bowles, Charles A.	0	10	6
Dudley.			
Green, William	0	2	6
Thompson, John W. (Sedgeley)	0	10	6
Dufftown (N.B.).			
Sangster, William	0	5	0
Dumbarton.			
Babtie, John	0	5	0
Campbell, Colin	0	5	0
Dumfries.			
Allan, William	0	5	0
Dundee.			
Hardie, James	0	10	6
Hardie, James M.	0	10	6
McMillan, James	0	10	6
Dunfermline.			
Gilmour, David	0	2	6
Seath, Alexander	0	10	6
Dunkeld.			
McDonald, Kenneth	0	10	6
Dunse.			
Veitch, James	0	10	6
Dunstable.			
Flemons, Joseph	0	5	0
Durham.			
Bowman, S.	0	2	6
Burdon, John	1	1	0
Cormack, George	0	5	0
Leighton, Mrs.	0	10	6
Longbotham, Joseph (Sacriston)	0	5	0
Palmer, John G.	0	2	6
Rollin, John G.	0	10	6
Sarsfield, John	0	2	6
Sarsfield, William	0	10	6
Scawin and Burn	0	10	6
Wise, Joseph N.	0	5	0
Ealing.			
Curtis, Fred. G.	0	10	6
Hayles Brothers	1	1	0
Hucklebridge, J. M.	0	5	0
Jacks, D. R.	0	5	0
Luff, A. P.	0	10	6
Earlstown.			
Hogg, Andrew	0	2	6
Peake, Arthur	0	5	0
Eastbourne.			
Andrews, H. T.	0	10	6
Andrews, J. F.	0	10	6
Brown, Henry R.	1	1	0
Crook, Herbert	1	1	0
Earnshaw, B. K.	0	10	6
Gibbs, Joseph	1	1	0
Gilbert, Wm. John	0	10	6
Hall, Samuel	1	1	0
Harmer, A. D.	0	5	0
Neve, Miss Annie	0	5	0
East Dereham.			
Peck, Edward	0	5	0
East Grinstead.			
Dixon, W. H.	0	2	6
Tully, John	0	2	6
East Molesey.			
Glazier, W. H.	1	1	0
Parrott, John	0	10	6
Ebbw Vale.			
Orchard, Arthur B. C.	0	5	0
Eccleshall.			
Smith, Edgar R.	0	10	6

Edinburgh.	£	s.	d.
Ainslie, Wm. W.	0	2	6
Aitken, James	0	5	0
Aitken, William	0	5	0
Alexander, H. D.	0	5	0
Arthur, Charles	0	5	0
Baildon, Henry B.	1	1	0
Boa, Peter	0	5	0
Bowman, Edmund	0	5	0
Brown, Robert	0	5	0
Brown, Robert S.	0	5	0
Bruce, Alexander G.	0	5	0
Buchanan, James	1	1	0
Chemists' Assistants and Apprentices' Association	1	1	0
Clark, Alexander G.	0	5	0
Clark, Dr. William Inglis	0	10	6
Coates, Edwin	0	5	0
Coats, J. T.	0	5	0
Cowie, George	0	3	0
Crow, William	0	5	0
Crowden, S. G.	0	5	0
Dewar, F. L.	0	5	0
Dick, Robert	1	1	0
Dick, Robert Gibson	0	5	0
Dott, David B.	0	5	0
Duncan, Adam	0	2	0
Duncan, William	0	5	0
Dunlop, J. B.	0	2	6
Easton, John	0	2	6
Ewing, James L.	0	10	6
Forret, John A.	0	5	0
Fraser, Alexander	0	2	6
Fraser, J. I.	0	5	0
Gamley, David	0	5	0
Gardner and Ainslie	1	1	0
Gardner, W.	0	5	0
Gilmour, William	1	1	0
Gorrie, Daniel	0	5	0
Gray, E. H.	0	2	6
Hall, R. T.	0	2	6
Hannay, L. W. C.	0	10	6
Henderson, W. E.	0	2	6
Hendry, R. L.	0	5	0
Hill, John R.	0	5	0
Keith, Sydney	0	5	0
Laird, George H.	0	10	6
Lockerbie, James	0	5	0
MacAlley, Robert	0	5	0
MacCallam, A. I.	0	5	0
Macdonald, A. M.	0	5	0
Macfarlan and Co.	2	2	0
Macfarlane, Andrew Y.	0	7	6
McGibbon, G. L.	0	5	0
McGlashan, J.	0	5	0
MacLaren, David	0	5	0
Macnair, R. H.	0	2	6
McPherson, Colin A.	0	5	0
Morison, John	0	10	6
Pinkerton, William	0	10	6
Pottage, J. C.	0	10	6
Prentice, John	0	5	0
Purves, Samuel	0	5	0
Raimes, Blanshard and Co.	2	2	0
Robertson, John	0	5	0
Robertson, James and Co.	1	1	0
Scobie, James	0	5	0
Scott, James	0	10	6
Smiles, James	0	5	0
Smith, Thomas	1	1	0
Smith, William	0	5	0
Spence, William	0	5	0
Stephenson, Frederick	0	5	0
Stephenson, J. B.	0	10	6
Steward, A. K.	0	2	6
Stoddart, T. G.	1	0	0
Suttar, John	0	2	6
Symington, Thomas	0	10	6
Thomson, Isaac W.	0	5	0
Thomson, Robert	0	10	0
Turnbull, W. S.	0	2	6
Wilson, James M.	0	5	0
Wylie, David N.	0	5	0
Egham.			
Bartholomew, William	0	10	6
Elgin.			
Robertson, William	0	5	0
Ely.			
Ellis, H. A.	0	2	6
Heading, H. H.	0	10	6
Lincoln, William	0	10	6
Pate, Henry T.	0	10	6
Emsworth.			
Waters, Henry Griffith	0	5	0

Epping.	£	s.	d.
Rowland, Thos.	0	10	6
Rowland, T. W.	0	2	6
Epsom.			
Oxley, Frederic	0	5	0
Tottle, Henry John	0	5	0
Eton.			
Lewis, Charles E.	0	5	0
Evesham.			
Dingley, R. L.	0	5	0
Pumphrey, J. H.	0	5	0
Exeter.			
Bard, Jane	0	2	6
Bottling, Charles	0	5	0
Brailey, Charles	0	5	0
Bromfield, Charles	0	5	0
Broom, W. W.	0	5	0
Bulley, William H.	0	2	6
Cooper, C.	0	5	0
Fouraker, Thomas E.	0	5	0
Gadd, Henry	0	10	6
Harris, Henry W.	0	10	6
Hunt, Arthur	0	5	0
Lake, John H.	1	1	0
Lemmon, Eric	0	5	0
Milton, Thomas C.	0	10	6
Napier, George L.	0	5	0
Newbury, Frank	0	5	0
Pasmore, George	0	5	0
Sanders, W. F.	0	2	6
Stocker, George	0	10	6
Stone, Frederick W.	0	10	6
Tighe, Henry W.	0	10	6
Wearing, W. H.	0	5	0
Wright, Robert F.	0	5	0
Eye.			
Bishop, Robert	0	10	6
Eynsham.			
Howe, Henry A.	0	5	0
Falkirk.			
Lyon, Thomas	0	10	6
Murdoch, David	0	10	6
Falmouth.			
Newman, Walter F.	0	5	0
Solomon, W. H.	0	10	6
Fareham.			
Batchelor, Alfred E.	0	5	0
Batchelor, Charles	0	5	0
Franklin, Alfred	0	10	6
Faringdon.			
Ballard, Arthur	0	10	6
Ballard, Edwin	0	5	0
Farnham.			
Cullingford, L. J.	1	1	0
Griffith, J.	0	10	6
Fenton.			
Massey, Stephen	0	5	0
Weston, Joseph	0	2	6
Fishguard.			
Vaughan, William	0	2	6
Fiji.			
Powell, E. G. B.	0	10	6
Flint.			
Jones, Michael	0	5	0
Jones, O. W.	0	5	0
Florence (Italy).			
Rigden, George	0	2	6
Folkestone.			
Giles, John J.	0	10	6
Goodliffe, George	0	10	6
Lea, Frederick J.	0	5	0
Lea, John	0	10	6
Stainer, John	0	10	6
Fordingbridge.			
Haydon, Frederick W.	0	5	0
Forfar.			
Ranken, James A.	0	5	0
Ranken, John	0	5	0
Fortune's Well.			
Grant, Donald	0	5	0
Foulsham.			
Maddison, Mary	0	5	0
Fraserburgh.			
Burnett, Robert	0	5	0

Frittenden (Kent).	£	s.	d.
Worsley, A. G.	0	5	0
Frome.			
Hodder, G. W.	0	2	6
Gainsborough.			
Forrest, Richard Wm.	0	10	6
Marshall, John Ferris	0	10	6
Garstang.			
Thomas, J. J.	0	5	0
Gateshead-on-Tyne.			
Elliott, Robert	0	10	6
Greenwell, William C.	0	5	0
Smith, E. B.	0	2	6
Glasgow.			
Brodie, Robert	0	5	0
Clarke, Joseph A.	0	5	0
Currie, John (Sauchiehall Street)	0	5	0
Dickie, James	0	10	6
Duncan, Joseph	0	10	6
Dunlop, Thomas	0	5	0
Fenwick, John	0	5	0
Foster, John	0	5	0
Frazer, Daniel	1	1	0
Garry, George	0	2	6
Glasgow Apothecaries' Co.	1	1	0
Glen, Robert	0	5	0
Harrower, Peter	0	5	0
Henderson, John	0	5	0
Illingworth, George S.	0	5	0
Jaap, John	0	10	6
Kinninmont, Alexander	1	1	0
Lawrence, John	0	10	6
McMillan, John	1	1	0
Miller, J. W.	0	5	0
Paris, Walter	0	5	0
Peacock, John R.	0	2	6
Pettigrew, J. W.	0	5	0
Rose, Alexander	0	10	6
Thompson, M. F.	0	5	0
Wallace, William	0	10	6
Ward, William A.	0	5	0
Whitelaw, James	1	1	0
Glass (N.B.).			
Aberdein, James	0	2	0
Glastonbury.			
Diggens, Edward D.	0	2	6
Hulbert, S. J.	0	5	0
Gloucester.			
Berry, Edward	0	5	0
Foulkes, W. H.	0	10	6
Franklin, James	0	5	0
Hughes, Evan G.	0	5	0
Jenkins, Henry	0	5	0
Meadows, Henry	0	10	6
Sadleir, John	0	10	6
Stafford, William	0	10	6
Trigg, James W.	0	5	0
Ward, Joseph	0	10	6
Goole.			
Bentley, J. T.	1	0	0
Gorton.			
Plant, Frank G. L.	0	5	0
Gosforth.			
Gaitskell, James	0	5	0
Gosport.			
French, Benjamin	0	10	0
Hunter, John	0	10	6
Mason, Philip H.	1	1	0
Mumby, Charles and Co.	1	1	0
Smith, W. B.	0	5	0
Wells, A. J.	0	2	6
Govan.			
Skinner, John	0	5	0
Grantham.			
Gibson, John B.	0	10	0
Stewart, James	0	2	6
Whysall, William	0	10	6
Grantown (N.B.).			
Duncan, William	0	5	0
Gravesend.			
Bacon, Henry J.	0	2	6
Bulgin, William	0	5	0
Clarke, Richard F.	0	5	0
Lucas, Joseph M. M.	0	5	0
Spencer, Charles	1	1	0
Grays.			
Kirby, Samuel John	0	5	0
Great Bedwyn.			
Gerard, George R.	0	10	6
Great Grimsby.			
Cook, Robert, jun.	0	5	0
Mason, William D.	0	2	6
Robinson, Jonathan Scott	0	2	6
Great Malvern.			
Goodsell, Philip G.	0	5	0
Greenock.			
Wilson, Alexander	0	5	0
Guildford.			
Jefferies, Henry	1	1	0
Martin, Edward W.	0	10	6
Thompson, Thomas	0	5	0
Warman, H. T.	0	2	6
Wheeler, Frederick	0	5	0
Guisborough.			
Fairburn, Robert W.	0	5	0
Haddington.			
Watt, James	0	5	0
Halesworth.			
Gostling, John H.	0	5	0
Halifax.			
Brook, Robert	0	10	6
Dyer, William	0	5	0
Jessop, Jonathan	0	5	0
Swire, Jabez	0	5	0
Halstead.			
Hoddy, Benjamin	0	2	6
Marlar, John F.	0	2	6
Hampton.			
Thomas, J. H.	0	2	6
Hanley.			
Charles, Thomas	0	2	6
Cornwell, T. C.	0	5	0
Eardley, James F.	0	5	0
Furnival, John D.	0	5	0
Insull, E. S.	0	5	0
Jones, Edmund	0	5	0
Moore, John William	0	5	0
Scarlett, William	0	5	0
Harleston.			
Goodchild, Alfred C.	0	5	0
Woods, Charles	0	5	0
Harrogate.			
Coupland, Joseph	0	10	6
Davis, Richard H.	0	10	6
Greenwood, Charles	0	10	6
Greenwood, John	0	10	6
Potter, Charles	0	5	0
Pullan, John R.	0	10	6
Reynolds, Freshfield	0	10	6
Hartlepool.			
Jackson, William George	1	1	0
Harwich.			
Harding, Joseph	0	5	0
Worts, Augustine	0	5	0
Haslingden.			
Blayney, Joseph J.	0	5	0
Hastings and St. Leonards.			
Beck, Albert N.	0	5	0
Bell, J. A.	0	10	6
Bolton, Thomas	0	5	0
Brooker, Algernon	0	6	0
Brooks, Frederick	0	5	0
Feaver, John	0	10	6
Jameson, W. E.	1	1	0
Jenner, H. A.	0	5	0
Kernot, Dr. G. C.	0	10	6
Keyworth, G. A.	0	10	0
Maggs, F. W.	0	5	0
Maggs, Samuel B.	0	10	6
Neve, Francis C.	1	1	0
Ripley, E.	0	2	6
Rossiter, Frederick	0	10	6
Snowdon, Robert	0	5	0
Tree, Frederick	0	2	6
Haverfordwest.			
Jenkins, Jabez (Lysyfrân)	0	5	0
Phillips, T. M.	0	5	0
Saunders, Charles P.	0	5	0
Saunders, David P.	0	10	6
Hawick.			
Craig, John	0	5	0
Kennedy, D.	0	10	6
Maben, Thomas	1	1	0
Hay.			
Davies, John Lutwiche	0	5	0
Heaton Chapel.			
Thorp, John	1	1	0
Hebden Bridge.			
Hey, David	0	10	6
Hey, Thomas K.	0	10	6
Heckington.			
Sumners, Michael Cole	0	5	0
Heckmondwike.			
Booth, John	1	1	0
Stead, Walter	0	5	0
Helensburgh.			
Harvie, George	0	4	0
Helmsdale.			
Fraser, John	0	2	6
Helmsley.			
Allenby, W.	0	5	0
Helston.			
Troake, M. H.	0	5	0
Wakeham, Charles	0	5	0
Hemel Hempstead.			
Argue, James	0	5	0
Henley-on-Thames.			
Hunn, Benjamin	0	5	0
Hereford.			
Chave and Jackson	0	10	6
Clarke, Thomas W.	0	5	0
Gay, E.	0	5	0
Guy, E.	0	5	0
Haines, W. E.	0	5	0
Walker, John	1	1	0
Williams, W. and H. B.	0	10	6
Hertford.			
Lines, George	0	10	0
Hexham.			
Gibson, J. P.	1	1	0
Richardson, George	0	5	0
Riddle, W. R.	0	5	0
Heywood.			
Beckett, William	0	10	6
Hitchin.			
Cave, J. R.	0	2	6
Gatward, Oswald	0	5	0
Marchant, Rev. F. G.	0	2	6
Perks and Llewellyn	1	1	0
Ransom and Son	1	1	0
Hobart (Tasmania).			
Gould, Henry T.	0	2	0
Mason, Michael	0	5	0
Hoddesdon.			
Green, William G.	0	5	0
Holme-upon-Spalding Moor.			
Edwards, F. W.	0	5	0
Hong Kong.			
Crow, W. E.	1	1	0
Woolnough, H. A.	0	10	6
Horncastle.			
Betts, William	0	5	0
Carlton, E. P.	0	5	0
Horndean.			
Bettsworth, Henry T.	0	5	0
Horsforth.			
Wynn, Frederick	0	5	0
Huddersfield.			
Higgins, Tom Sellers	0	10	6
King, William	0	10	6
Swift, C. H.	0	5	0
Sykes, Henry	0	5	0
Wheatley, Charles	0	10	0

Hull.	£	s.	d.
Allison, E. and H.	1	1	0
Bell, Charles B.	1	1	0
Bousfield, W. M.	0	5	0
Campbell, Charles	0	5	0
Chapman, E. J.	0	5	0
Chapman, Joseph	0	2	6
Creasser, Matthew	0	5	0
Desforge, J. H.	0	5	0
Dobson, J. B.	0	5	0
Dolling, Alfred	0	5	0
Dyson, George	0	5	0
Gibson, C. P. (Trustees of)	0	5	0
Gregory, Mrs.	0	2	6
Grindell, John	0	10	6
Hall, Henry R. F.	0	5	0
Hammond, William H.	0	5	0
Hart, George William	0	10	6
Hay, W.	0	2	6
Hebblethwaite, G. A.	0	2	6
Hollingsworth, James	0	5	0
Hoyles, George	0	2	6
Kenny, Thomas	0	5	0
Linford, John S.	1	1	0
Lofthouse and Saltmer	1	1	0
Oldham, James	0	5	0
Parsons H. J.	0	2	6
Raynor, A.	0	5	0
Shaw, Ward	0	5	0
Shepherdson, Welburn	0	10	6
Souter, Jas. S.	0	10	6
Staning, Walter	0	5	0
Staning, William	0	2	6
Stoakes, Benjamin M.	0	5	0
Wokes and Ellis	0	5	0
Hunstanton.			
Twiss, Wm.	0	10	6
Huntingdon.			
Baxter, Robert	0	10	6
Huntly (N.B.).			
Chalmers, G.	0	2	6
Hurstpierpoint.			
Hudson, Alfred W.	0	2	6
Hyde.			
Oldfield, Henry	0	10	6
Hyères (France).			
Powell, Walter A.	0	5	0
Hythe.			
Lemmon, R. A.	1	1	0
Ilfracombe.			
Crang, Walter	0	10	6
Wheeler, James	0	5	0
Ilkeston.			
Potts, Charles	1	1	0
Ilkley.			
Worfolk, G. W.	0	5	0
Ingatestone.			
Stuart, Henry James	0	2	6
Inverness.			
Fraser, John	0	5	0
Galloway and Son	0	10	6
MacRitchie, David	0	5	0
Mitchell, H.	0	5	0
Ipswich.			
Anness, Samuel R.	0	10	6
Chapman and Pain	1	1	0
Clifton, E. S.	0	5	0
Cornell, William	1	1	0
Cossey, James D.	0	5	0
Grimwade, Ridley and Co.	0	10	6
Lyon, Robert	0	5	0
Matcham, Edward	0	5	0
Miller, T. T.	0	5	0
Nunn, C. G.	0	5	0
Spurgeon, Fredk. J.	0	5	0
Wiggin, J. C.	0	10	6
Younger, Robert E.	0	5	0
Irvine.			
Gillespie, James	0	5	0
Isleworth.			
Reece, James	0	5	0
Jarrow-on-Tyne.			
Hooper, Richard	0	2	

Jersey.	£	s.	d.
Baker, John T.	0	5	0
Cole, George	1	1	0
Ereaut, George	1	1	0
Ereaut, John, jun.	1	1	0
Millais, Mrs.	1	1	0
Miller, Henry	0	5	0
Poingdestre, C. R.	0	10	6
Keighley.			
Midgley, Walter	0	5	0
Robinson, Whiteley (Haworth)	0	5	0
Kelso.			
Maxton, William Murray	0	5	0
Kendal.			
Bateson, Thomas	1	1	0
Burton, Matthew	1	1	0
Hind, Thomas W. L.	1	1	0
Rigg, G. F.	0	10	6
Severs, Joseph	1	1	0
Kenilworth.			
Barton, Henry Emlyn	0	10	6
Keswick.			
Townley, Thomas W.	0	10	6
Kettering.			
Denston, John Thomas	0	5	0
Moore, Jonathan R.	0	5	0
Thursfield, John F.	0	4	0
Kew.			
Edwards, J. E.	0	10	6
Kidsgrove.			
Griffiths, Edwin H.	0	10	6
Kilmarnock.			
Borland, John	1	1	0
Borland, John, jun.	0	10	6
Kimberley (South Africa).			
Helmore, W. H.	0	5	0
King's Lynn.			
Atmore, George	0	5	0
Cocher, John A.	0	5	0
Count, Sidney	0	5	0
Kingston-on-Thames.			
Bond, C. R.	0	10	6
Brewster, William	0	10	6
Higgs, Alfred	0	5	0
Walmsley, Samuel	0	5	0
Whaley, Edward	0	10	6
Kington.			
Venables, Samuel H.	0	5	0
Kirby Wiske.			
Wilson, K. J.	0	2	6
Kirkcaldy.			
Storrar, David	1	1	0
Kirkham.			
Buckley, F. H.	0	2	6
Kirton-in-Lindsey.			
Kirk, William P.	0	5	0
Knaresborough.			
Lawrence, W. P.	0	5	0
Thompson, George	0	5	0
Knutsford.			
Silvester, Henry T.	0	5	0
Lancaster.			
Arkle, William	0	5	0
Dickinson, John G.	0	2	6
Holmes, Edward (Bentham)	0	5	0
Troughton, Henry	0	5	0
Vince and Dickinson	0	2	6
Wilcock, John	0	5	0
Landport.			
Alderslade, William	0	5	0
Gall, Frederic	0	2	6
Hackman, Leonard L.	0	10	6
Perfect, George	0	5	0
Langholm.			
Beattie, Thomas	0	5	0

Langport.	s.	d.
Chant, Herbert A.	0	10	6
Hobbes, A. E.	0	5	0
Langtofts.			
Lowther, M. K.	0	2	6
Largs (N.B.).			
Fraser, Alexander	0	5	0
Launceston.			
Downing, Frederick	0	5	0
Love, Charles	0	10	0
White, Thomas	0	10	6
Wise, William	0	5	0
Leamington.			
Barnitt, John	0	10	6
Barrett, Josephus T.	1	1	0
Davis, Benjamin	0	5	0
Holloway, E. A.	0	2	6
Leath and Woolcott	1	1	0
Norman, William F	0	5	0
Pullin, William H.	0	10	6
Robinson, J. J.	0	5	0
Sansom, Henry	0	10	6
Smith, Samuel A.	1	1	0
Smith, Samuel H.	0	5	0
Spilsbury, James	0	5	0
Stanley, Herbert	0	10	6
Ledbury.			
Freeman, Ernest	0	10	6
Leeds.			
Abbott, James	1	1	0
Archer, Joseph S.	0	2	6
Bilbrough, A.	1	1	0
Branson, F. W.	0	10	6
Briggs, George	0	5	0
Brown, Edward	0	10	6
Brown, E. O.	0	5	0
Cole, E. H.	0	10	6
Exley, George	0	5	0
Fawthorp, James	0	5	0
Fourness and Son	0	10	6
Goodall, Backhouse and Co.	2	2	0
Greasley, M. F.	0	10	6
Hardcastle, John	0	5	0
Harvey, William (Headingley)	1	1	0
Hirst, Brooke and Hirst	2	2	0
Hirst, David	0	5	0
Holmes, Francis	0	5	0
Holmes, Joseph	0	10	6
Iredale, Thomas	0	5	0
Morgan, Edward	0	5	0
Payne, E. S.	0	5	0
Reynolds, Richard	1	1	0
Reynolds, Richard F.	0	5	0
Smeeton, William	0	10	6
Smithson, F. W.	0	10	6
Taylor and Fletcher	1	1	0
Taylor, Samuel	1	1	0
Leek.			
Blades, Josiah B.	0	2	6
Johnson, William	0	5	0
Leicester.			
Berridge, Alfred	0	5	0
Broof, R.	0	10	0
Burford, S. F.	0	5	0
Butler, E. H.	0	7	6
Butler, T. E.	0	5	0
Cadoux, S. H.	0	5	0
Carr, William	0	10	6
Clark, E. A.	0	5	0
Clark, John W.	2	2	0
Clark, Walter B.	0	10	6
Cleaver, Samuel	0	5	0
Cooper, Henry	0	5	0
Cox, S. G.	0	10	6
Ellis, George	0	5	0
Esam, Richard	0	5	0
Freeland, A. J. (Kibworth)	0	2	6
Garrett, John	0	5	0
Harvey, William R.	1	1	0
Lloyd, T. H.	1	1	0
Pickering, Henry	0	5	0
Puckey, William	0	5	0
Sharp, Edward K.	0	5	0
Wand, Stephen	0	10	6
West, J. L.	1	1	0
Wilby, Frederick W.	0	10	6
Woolley, G. J. B.	0	5	0
Leigh.			
Bennett, John W.	0	5	0

Leighton Buzzard.	£	s.	d.
Herington, Joseph	1	1	0
Leith.			
Bowman, J.	0	10	6
Crichton, Alexander	0	5	0
Duncan, Flockhart, Powell and Co.	0	10	6
Finlayson, Thomas	0	5	0
Hutchinson, M. H.	0	5	0
McDougall, R. I.	0	5	0
Mair, Alexander	0	5	0
Smith, Wilson and Sutherland	0	10	6
Lenton.			
Wilson, Thomas	0	5	0
Leominster.			
Davis, David F.	1	1	0
Sandiland, Robert B., jun.	0	5	0
Lerwick.			
Porteous, Arthur A.	0	2	6
Leven.			
Gibson, Adam	0	10	6
Lewes.			
Briscoe, Charles (West Firle)	0	5	0
Head, John	0	10	6
Head, John T.	0	10	6
Leyland.			
Hackforth, Frederick	0	10	6
Lincoln.			
Battle, Son and Maltby	0	10	6
Tomlinson, Charles K.	0	10	6
Woodcock, Page D.	0	5	0
Liskeard.			
Young, Richard	0	5	0
Little Brighton.			
Walker, Joseph	0	5	0
Little Chishill.			
Jefferson, Thomas	0	10	6
Littlehampton.			
Longman, J. H.	0	2	6
Smart, C. F.	1	1	0
Little Sutton.			
Sherlock, John	0	5	0
Liverpool.			
Abraham, Alfred Clay	1	1	0
Abraham, Thomas Fell	1	1	0
Adams, Thomas E.	0	10	6
Adams, T. E., jun.	0	5	0
Albright, Henry	0	10	0
Alexander, George	0	5	0
Alexander, John	0	10	6
Allan, James H.	1	1	0
Ashbourne, C.	0	10	6
Ayrton and Saunders	0	10	6
Bain, John	0	5	0
Billington, Frederic	0	5	0
Blabey, J. J. (Woolton)	0	10	6
Blackbourn, H. J.	0	5	0
Blood, Charles (Formby)	0	5	0
Blundell, John	0	10	6
Brown, Edwin	0	2	6
Brown, Joseph	0	2	6
Buck, Richard C.	0	5	0
Chemists' Trade Association	2	2	0
Clark, F.	0	5	0
Clay, Dod and Co.	1	1	0
Coupland, Henry	0	10	6
Dale, John	0	10	6
Dickins, B.	0	5	0
Dod, Thomas H.	1	1	0
Drawbridge, Joseph G.	0	10	6
Drawbridge, T. F.	0	5	0
Driver, John G.	0	5	0
Ellams, George	0	10	0
Elliott, Robert John	0	10	6
Ellis, G. W.	0	5	0
Evans, Sons and Co	5	5	0
Fergusson, W. and J.	0	10	6
Fidler, T. W.	0	5	0
Field, C.	0	10	6
Fleming, Mrs.	0	5	0
Flint, John	0	10	6
Fowler, George	0	5	0
Furniss, Thomas	0	5	0
Greenall, Alfred	1	1	0
Hackett, Thomas	0	10	6

Liverpool—continued.	£	s.	d.
Hanson, Christopher	0	5	0
Hodges, E. G.	0	5	0
Hunt, Thomas	0	10	6
Jackson, H.	0	10	6
James, John	0	5	0
Johnson, E. E.	0	2	0
Johnson J. H. and S.	2	2	0
Jones, R. H.	0	5	0
Lee, Samuel W.	1	1	0
Lett, Arthur J.	0	5	6
Macdonald, John	0	2	6
McGuffie and Co.	1	1	0
MacKinlay, F. J.	1	1	0
Maskery, Samuel	1	1	0
Midgley, John E.	0	2	6
Morgan, H. B.	0	5	0
Parkinson, Richard	0	10	6
Parry, R.	0	5	0
Parry, William	0	5	0
Pershouse, E.	1	0	0
Pheysey, Richard (Waterloo)	0	10	6
Richardson, Richard T.	0	10	6
Ridgway, T. E.	0	5	0
Sawden, Alfred	0	10	6
Sleggs, G. R.	0	5	0
Smith, Henry	0	5	0
Smith, J. J. (Walton-on-the-Hill)	0	5	0
Smith, R. G.	0	5	0
Symes, Charles	3	3	0
Thomas, Robert	0	10	6
Thompson and Capper	1	1	0
Thompson and Co.	1	1	0
Troughton, Christopher	0	5	0
Watson, T. L.	1	0	0
Williams, William	0	5	0
Woodhead, H. C.	0	10	6
Wright, William	0	10	6
Wyatt, H.	0	5	0
Wyatt, H., jun.	0	5	0
Llandilo.			
Williams, W. J.	0	2	6
Llandudno.			
Burton, Joseph	1	1	0
Sinclair, Mrs. M. A.	0	10	6
Llanelly.			
Evans, Gwilym	0	10	6
Jones, W. E.	0	2	6
Llangollen.			
Jones, Humphrey	0	5	0
Llanidloes.			
Jones, Thomas Pryce	0	2	6
Llanrwst.			
Jones, Owen	0	2	6
Loddon.			
Ellis, T. W.	0	10	6
London.			
Allden, John	1	1	0
Allen, Charles B.	2	2	0
Andrews, Frederick	0	10	6
Applegate, Edwin	0	10	6
Arkinstall, William	1	1	0
Arrowsmith, G. W. T.	0	10	6
Ashton, Charles S.	0	5	0
Atkinson, James	0	2	6
Atkinson, John G.	0	5	0
Attwood, Henry E.	1	1	0
Austin, Henry Felix	1	1	0
Babb, James	0	5	0
Bains, Wm. H.	0	10	6
Baker, Alfred P.	0	10	6
Ball, The Chemists', per R. Bremridge	12	12	0
Barnard, John	1	1	0
Barnes, James Benjamin	1	1	0
Barnes, James Burden	0	5	0
Barret, Edward Louis	1	1	0
Barron, Frederick	5	5	0
Barry, Frederic	0	5	0
Bartle, W. F.	0	5	0
Bartlett, G. F. H.	0	5	0
Bartley, George A.	0	10	6
Bascombe, Frederick	0	5	0
Bascombe, William	0	5	0
Bate, Henry	1	1	0
Bathe, Robert S.	0	10	6
Baxter, William	1	1	0
Beasley, Frederick	0	5	0
Beddard, John	1	1	0

London—continued.	£	s.	d.
Bedford, C.	1	1	0
Bell, Matthew W.	1	1	0
Bell, William H.	1	1	0
Bennett, George	0	5	0
Bennett, Thomas	0	5	0
Bently, William Jas.	0	10	6
Bessell, J. W.	0	5	0
Best, James	0	10	6
Bettinson, W. T.	0	5	0
Bevan, William	0	5	0
Bigg, Thomas	1	1	0
Bindloss, G. F.	0	10	6
Bingley, Richard	0	10	6
Birch, Henry C.	1	1	0
Bird, Augustus	2	2	0
Bird and Storey	1	1	0
Bird, Robert	0	10	6
Bishop, Henry	0	2	6
Bishop, W. M.	0	2	6
Blake, Charles A.	0	10	6
Bland, John	0	10	6
Blyth, Utton	0	5	0
Boothby, H. N.	0	5	0
Botwood, Chas W.	0	5	0
Bourdas, Isaiah	1	1	0
Boutall, G. S. (donation)	5	5	0
Bowen, John W.	1	1	0
Brand and Co.	1	1	0
Branford, A. J.	0	2	6
Bridges, C. W.	0	5	0
Bright, Frederick	0	5	0
Brodribb, J. B.	0	10	6
Brookes, Samuel	0	10	6
Brown, Alfred James	0	10	6
Brown, Edgar M.	0	2	6
Buckle, Christopher Francis	0	10	6
Bull, E. John	0	5	0
Bullock, J. Lloyd and Co.	2	2	0
Bunker, James	0	2	6
Burgess, Willows and Francis	1	1	0
Burgoyne, Burbidges, Cyriax and Farries	2	2	0
Burn, Henry	0	5	0
Burnett, J. F.	0	5	0
Burton, Joseph	0	5	0
Bush, Arthur	0	5	0
Butler, Charles	0	10	6
Butler, E. D. Barry	0	10	6
Butt, Edward Northway	5	5	0
Butterfield, E.	0	9	0
Butterworth, John	0	5	0
Cadman, Daniel C.	1	1	0
Campbell, E. K.	0	3	0
Carteighe, Michael	1	1	0
Cartwright, William B.	0	10	6
Caseley, Thomas	0	5	0
Catterns, Heneage P.	0	10	6
Cawdell, George	0	10	6
Chapman, Joseph J.	0	10	6
Chapman, Walter	0	10	6
Charity, William	0	10	6
Chesterfield, T. M.	0	2	6
Churchill, J. and A.	1	1	0
Clapham, John	0	2	6
Clapp, Edward F.	0	10	6
Clark, John A.	0	10	6
Clark, Thomas J.	0	10	6
Clarke, Isabella Skinner	0	10	6
Clarke, W. L.	0	5	0
Clift and Crow	1	1	0
Cocker and Son	0	10	6
Cocksedge, H. B.	0	10	6
Colchester, William M.	0	5	0
Colchester, William M., jun.	0	5	0
Cole, A. C.	1	1	0
Coleman and Co.	0	5	0
Coles, Ferdinand	0	10	6
Coles, J. W.	0	10	6
Collett, Chas. B.	0	5	0
Collier, Henry	0	5	0
Constance, Edward	0	10	6
Constance, Herbert E.	0	10	6
Constance, Sidney W.	0	10	6
Cook, W. R.	0	5	0
Cooper, Albert	1	1	0
Cooper, Henry	0	10	6
Cooper, Wm. Henry	0	10	6
Cooper, William Temple	0	10	6
Corbyn, Stacey and Co.	1	1	0
Cosway, Edwin C.	0	10	6
Cottrill, John W.	0	10	6
Couper, F.	0	10	6
Cox, F. H.	0	2	6
Cracknell, Herbert	0	5	0
Cranwell, W. B.	1	1	0
Cripps, R. A.	0	5	0
Crosby, John	0	2	6

London—continued.	£	s.	d.
Croyden, Charles	0	10	6
Cryer, Henry	0	5	0
Cull, Joseph	0	10	6
Cullen, Harry H.	0	5	0
Dampney, Richard S.	0	10	6
Darby and Gosden	2	2	0
Davenport, Horace	2	2	0
Davenport, J. T.	2	2	0
Davies, E. C. J.	0	5	0
Davies, Llewelyn	0	2	6
Davies, Robert H.	1	1	0
Davis, H. S. E.	0	10	6
Davy, Yates and Routledge	2	2	0
Deacon, Frederick G.	0	5	0
Dean, S.	0	5	0
De Peare, John Thomas	0	5	0
Dewar, Mary Ann	0	10	6
Dinneford and Co.	2	2	0
Doulton and Co.	1	1	0
Drury, Sydney	0	5	0
Dymott, Francis	0	5	0
Dyson, William B.	1	1	0
Eade, George	0	10	6
Eade, James	0	10	6
Eastman, J. E.	0	10	6
Edwards, Charles	1	1	0
Edwards, William Staples	0	5	0
Elliott, J. D.	0	10	6
Ellwood, T. A.	0	5	0
Elvey, Thomas	1	1	0
Emslie, Joseph	0	5	0
Emson, William N.	0	5	0
Epps, James	1	1	0
Evans, Lescher and Webb	1	1	0
Evershed, G. S.	0	5	0
Fallowfield, Jonathan	1	1	0
Farmer, John	0	10	6
Farr, Edward H.	0	10	6
Feltwell, John	0	10	6
Ferguson, W. H.	2	2	0
Fitch, Robert Owen	0	10	6
Fitt, Francis E.	0	10	6
Forrest, Richard	1	1	0
Fox, William	1	1	0
Francis, G. Bult	1	1	0
Francis, George Baggett	1	1	0
Francis, Matthew R.	0	10	6
Francis, W. H.	0	10	6
Frith, E. J.	0	5	0
Froom, William Henry	1	1	0
Frost, John H.	0	5	0
Frost, W. T.	0	10	6
Fryer, Arthur	0	5	0
Gadd, Charles	0	10	6
Gadd, Robert	0	10	6
Gale, Samuel	1	1	0
Gange, George	0	5	0
Garman, C. E.	0	5	0
Garner, James	0	10	6
Garner, Thomas	0	5	0
Garnham, A. W.	0	5	0
Gaunt, Rann Dolphin H.	1	1	0
Gedge, William S.	0	10	6
Gerrard, A. W.	1	1	0
Glasspoole, H. G.	0	10	6
Godfrey, H. E.	0	5	0
Godolphin, George F. A.	0	10	6
Goff, Richard	0	5	0
Golding, John F.	1	1	0
Golds, L. G.	0	10	6
Goodall, William A.	0	5	0
Goodger, David	0	10	6
Goodwin, John	1	1	0
Gorton and Sons	0	10	6
Gossling, William R.	0	5	0
Gossop, George K.	0	5	0
Gower, A. J.	0	5	0
Gradidge, James H.	0	2	6
Granger, Edwin John	1	1	0
Green, Samuel	0	5	0
Green, W. J.	0	10	6
Greenish, H. G.	0	10	6
Greenish, Thomas	1	1	0
Greenish, T. Edward	0	10	6
Greig, William	0	2	6
Griffiths, Alfred William	0	10	6
Griffin, J.	0	2	6
Grinstock and Co.	1	1	0
Groves, H. F.	2	2	0
Gudgen, Frederick G.	0	5	0
Gulliver, William	0	10	6
Gulliver, W. F.	0	5	0
Haddock, James	0	5	0
Hadfield, H. M.	0	5	0
Hairsine, H. S.	1	1	0
Hall, Ralph	0	10	6
Hampson, Robert	1	1	0
Hanbury, Cornelius	1	1	0
Hardy, Samuel C.	1	1	0
Harris, Daniel R.	0	10	6
Harris, Frank William	0	5	0
Hart, Thomas	0	5	0
Harvey, Edward	1	1	0
Harvey, John William	0	5	0
Harvey, William	0	5	0
Harwood, Charles	0	10	6
Hatfield, George B.	0	10	6
Hatfield, George W.	0	5	0
Hawkins, Thomas	0	10	6
Hayhoe, W.	0	5	0
Hayward, Charles	0	10	6
Hearn, John	0	5	0
Heath, Frederick D.	0	5	0
Heathcoat, Thomas	0	10	6
Hemingway, Alexander	2	2	0
Henty, Henry Martin	0	5	0
Herbert, William	0	5	0
Hewlett, J. C.	1	1	0
Hickey, Evan Lewis	0	10	6
Hickman, William	0	10	6
Hicks, Alexander	0	2	6
Higgins, James	0	10	6
Hill, Arthur B.	1	1	0
Hill, Arthur S.	2	2	0
Hill, William	0	5	0
Hillen, John	0	10	6
Hills, Henry William	0	10	6
Hills, Thomas Hyde	10	10	0
Hills, Walter	2	2	0
Hobbs, John K.	0	5	0
Hodgkinson, George A.	0	10	6
Hodgkinson, Stead and Treacher	2	2	0
Hodgkinson (Thomas), Prestons and King	2	2	0
Hodgkinson, William	1	1	0
Hodgson, Alfred	0	5	0
Hodsoll, Thomas W. H.	1	1	0
Hogg, E. G.	0	10	6
Hogg, Robert	0	10	6
Holford, T. Constantine	0	10	6
Holl, Edmund	0	5	0
Holmes, Alfred J.	0	10	6
Holmes, Walter M.	0	10	6
Hooper, Leonard	0	10	6
Hopkin, William King	2	2	0
Hora, Henry Whinfield	1	1	0
Hora, W. T.	0	5	0
Horne, John	0	5	0
Horncastle, John	1	1	0
Horsley, Thomas W.	0	10	6
Howard, E.	0	5	0
Howard, George	1	1	0
Howell, Maurice	0	10	6
Howes, W. F.	0	5	0
Howlett, Samuel	1	1	0
Hudson, T. F.	0	5	0
Huggett, Sydney	0	10	6
Huggins, Richard	0	10	6
Hughes, Evan	0	10	6
Hugill, John	1	1	0
Hugill, John H.	1	1	0
Humpage, Mrs.	0	10	6
Hunt, Charles	1	1	0
Huskisson, Henry Owen	1	1	0
Hyslop, John Cahill	1	1	0
Icke, Henry S.	0	10	6
Idris and Co.	2	2	0
Ingham, John	0	5	0
Ingram and Royle	1	1	0
Ive, William	1	1	0
ditto (donation)	5	5	0
Izod and Son	1	1	0
Jackson, Charles	0	10	6
Jackson, Christopher	0	10	6
Jackson, Walter	0	5	0
Jackson, William F.	0	10	6
Jameson, W. G., jun.	1	1	0
Jarvis, John S.	0	10	6
Jay, Daniel Harmer	0	5	0
Jenkins, Henry	1	1	0
Jobson, Thomas	0	10	6
Johnson and Sons	1	1	0
Jones, Edwin	0	5	0
Jones, George	0	5	0
Jones, Henry Stevens	0	5	0
Jones, John H.	0	10	6
Jones, Llewellyn	0	5	0
Jones, Thomas	0	5	0
Jones, William	0	10	6
Jones, William	0	5	0
Jones, William	0	5	0
Jones, William	0	2	6
Jones, William John	0	10	6
Jones, William O.	0	10	6
Keeling, A. G.	0	10	6
Keer, Thomas H.	0	10	6
Kelly, Philip A.	0	5	0
Kemp, Robert	0	10	6
Kent, James S.	0	10	6
Kent, Thomas	0	10	6
Kent, Thomas Ramsey	0	10	6
King, Henry	0	10	0
King, William	0	5	0
Kingsford, Frederick	1	1	0
Kinross, W. M.	0	5	0
Kirk, Snowden	0	10	6
Kirkham, Frank	0	2	6
Lance, W. N. G.	0	10	6
Langley, Frank C.	0	5	0
Lavers and Son	0	10	6
Laws, John	0	10	6
Layng, R. C.	0	5	0
Leath and Ross	2	2	0
Legg, H. A.	0	10	6
Lescher, Joseph S.	1	1	0
Lewinton, Alexander B.	1	1	0
Littlejohn, A.	0	5	0
Llewhelin, Ivor V.	0	2	6
Lloyd, Thomas	0	10	6
Long, Henry	1	1	0
Longley, Charles	0	5	0
Lovegrove, G. E.	0	5	0
Lowe, William E.	2	2	0
Luff, Richard	0	10	6
Lynn, John R.	0	2	6
Lyon, James	0	10	6
MacCrindle, Thomas	1	1	0
McDiarmid, F.	0	5	0
Macdonald, Alexander	0	5	0
McDougall, James	0	2	6
MacEwan, Peter	0	10	6
MacGeorge, William	0	10	6
McIntyre, William	0	10	0
McKnight, John	0	5	0
Madeley, E. S.	0	10	6
Maizey, E.	0	10	6
Mallett, Thomas J.	0	10	6
Marks (Henry) and Sons	1	1	0
Marsh, E. R.	0	10	6
Marshallsay, Richard James	0	5	0
Marston, John Thomas	0	10	6
Marten, Frederic	0	5	0
Martindale, William	1	1	0
Mason, H. C.	1	1	0
Mathews, Henry	0	10	6
Mathews, J. H.	0	10	6
Matthews, E. S.	0	10	6
Matthews, J. H.	0	5	0
Maw, Charles	1	1	0
Maw, C. Trentham	1	1	0
Maw, Son and Thompson	2	2	0
Meggeson and Co.	1	1	0
Mellin, Charles J.	0	5	0
Menhinick, C. H. F.	0	2	6
Merrell, James	1	1	0
Michie, Charles C.	0	5	0
Middleton, Francis	1	1	0
Miller, Cecil B.	0	5	0
Miller, Charles S.	0	5	0
Miller, F.	0	5	0
Millhouse, H. H.	0	5	0
Mills, W. D.	0	2	6
Minshull, Flora	0	5	0
Minshull, Rose C.	1	1	0
Moore, John	0	5	0
Morrell, F. K.	0	5	0
Morrell, Thomas	0	5	0
Mortiboy, John	1	1	0
Moss, Thomas A.	0	2	6
Mowatt, J. Rodman	0	5	0
Mutch, John Pratt	0	5	0
Muter, Dr. John	3	3	0
Myers, William	0	5	0
Naylor, W. A. H.	0	10	6
Newton, T. A. C.	0	10	6
Newzam, Henry Samuel	0	10	6
Nicholls, Reginald E.	0	5	0
Nicholson, Thomas T.	0	5	0
Nicholson, W. O.	0	10	6
Nind, George	0	10	6
Ninnis, T. M.	0	5	0
Nobbs, W. M.	0	10	6
Norburn, A. H.	0	5	0
Northen, Charles	0	5	0
Notcutt, W. B.	0	5	0
Ord, Septimus W.	0	5	0
Orpe, Thomas M.	0	10	6
Padman, Dr. Thomas	0	10	6
Palmer, Francis	0	10	6
Palmer, Frank T.	0	2	6
Palmer, Robert	1	1	0

London—continued.	£	s.	d.
Paramore, Dr. R.	0	5	0
Parker, Robert Henry	0	10	6
Parkes, J. C.	0	10	6
Parkes, J. P.	1	1	0
Parkinson and Son	1	1	0
Parrott, Joseph	0	10	6
Parry, C. D.	0	5	0
Parsons, G. H.	2	2	0
Pasmore, J. H.	0	10	6
Passingham, G. W.	0	10	6
Pattison, George	1	1	0
Peacock, George	0	5	0
Peat, Joseph	0	5	0
Peel, Alfred	0	10	6
Penrose and Son	1	1	0
Pepper, John	0	10	6
Pettinger, Elmer	0	5	0
Pharmacy Club (per Richard Bremridge, Hon. Sec.)	10	10	0
Phillips, A. J.	0	5	0
Phillips, A. W.	0	2	6
Philpott, F. W.	0	5	0
Pickard, William	2	2	0
Pidduck, J. W.	0	10	6
Pinyon, William	0	10	6
Plaister, W. J.	1	1	0
Plowman, Sidney	1	1	0
Pond, B. C.	0	5	0
Pope, A. H.	0	5	0
Potts, Robert A.	1	1	0
Powell and Sons	1	1	0
Powell, T. H.	1	1	0
Preston, Richard	0	10	6
Pretty, Charles	0	5	0
Price, Robert John	0	2	6
Prichard. Edward	1	1	0
Prime, Thomas R.	0	10	6
Pumphrey, Arthur	0	2	6
Puntan, H. H. C.	0	2	6
Radermacher, C. J.	0	10	6
Ragg, William	1	1	0
Ragg, W. W.	0	10	0
Rawlinson, Ralph	1	1	0
Read, John Henry	0	5	0
Reed, Charles W.	0	10	6
Rees, Harding	0	10	6
Richardson, James	0	5	0
Richardson, John	0	5	0
Ridding, William	0	10	6
Roach, H. W.	1	1	0
Roach, Pope	1	1	0
Robertson, George	0	10	6
Robinson, Charles J.	0	10	6
Robinson, R. A.	0	10	6
Robinson, William P.	0	10	6
Rogers, James	0	10	6
Rose, Alfred	1	1	0
Rouse, F. W.	0	10	6
Rowntree, Thomas	0	10	6
Rowson, Henry	1	1	0
Rutter, Edmund Yates	1	1	0
Rutter, John	0	5	0
Sadler, William	0	10	6
Sadler, William, jun.	0	5	0
Sandell, Thomas O.	0	10	6
Sanders, Francis T.	0	5	0
Sandford, Geo. W.	2	2	0
Sandy, Frederick William	0	10	6
Sangster, Arthur	1	1	0
Saunders, C.	0	10	6
Saunders, Thos. S.	1	1	0
Savory and Moore	3	3	0
Scoley, Thomas E.	0	5	0
Sedcole, J. W.	0	10	6
Sell, W. H.	0	10	6
Selleck, Edward	0	10	6
Senier, Harold	0	10	6
Shacklock, J. H.	0	5	0
Shapcott, W. H. P.	0	2	6
Sharman, Wm.	0	5	0
Shaw, J. W.	0	10	6
Shephard, Thomas F.	0	10	6
Shepley, Frederick Thos.	0	5	0
Sherburn, Thomas	0	10	6
Sherwood, N.	0	5	0
Shields, R. H.	0	5	0
Shirley, J. G.	2	2	0
Shirley, S. S.	0	10	6
Silverlock, Henry	5	5	0
Silvers, Francis T.	0	10	6
Sims, C. R. H.	0	5	0
Skinner, Robert	0	10	6
Slack, Josiah W.	0	10	6
Slipper, James	0	10	6
Smart, John	0	10	6
Smart, W.	0	10	6
Smith, Harry J.	0	2	6
Smith, James W.	0	5	0
Smith, John Ord	1	1	0
Smith, Percy John	1	1	0
Smith, William	0	10	6
Smith, William Frederick	1	1	0
Smith, William L.	0	10	6
Snell, Charles H.	0	5	0
ditto (donation)	5	5	0
Soole, J. H.	0	5	0
Spyer, Newton	0	10	6
Squire and Son	5	5	0
Stacey, Samuel Lloyd	1	1	0
Stacy, Frederick	0	5	0
Stammwitz, Louisa	1	1	0
Stamp, Edward B.	0	10	6
Stansfield, Richard	0	5	0
Starkie, Richard S.	1	1	0
Steed, Robert O.	0	5	0
Stenson, Joseph	0	5	0
Stephens, Henry I.	0	5	0
Stevens, Felix	0	5	0
Stevens, Peter Augustus	0	10	6
Stickland, W. H.	1	1	0
Stoneham, Philip	0	10	6
Strachan, John	0	10	6
Streater, James H.	0	10	6
Strickett, John	0	10	6
Strongitharm. W. G	0	5	0
Strother, C. J.	0	10	6
Sugden, W. A.	0	5	0
Summers, James R.	0	10	6
Swift, Francis	0	10	6
Symons, William H.	1	1	0
Tanner, A. E.	0	10	6
Taplin, William Gilbert	1	1	0
Taubman, Robert	0	10	6
Taylor, George S.	1	1	0
Taylor, Horatio	0	10	6
Taylor, John	0	10	6
Taylor, Peter	0	5	0
Tebbutt, Edwin	0	15	0
Tharle, C. A.	0	2	6
Thomas, Harry A.	1	1	0
Thomas, Henry	1	1	0
Thomas, Horace	1	1	0
Thomas, Richard	0	10	6
Thompson, Arthur S.	0	5	0
Thompson, C.	0	10	6
Thompson, Henry	0	10	6
Thompson, Henry Ayscough	1	1	0
Thompson, John	1	1	0
Thorn, John James	1	1	0
Tijou, Tom	0	5	0
Tingle, Ellen	0	5	0
Tomlinson, Thomas	1	1	0
Tompsett, Leighton S.	0	5	0
Trask, Thomas	1	1	0
Tregear, A. F.	0	5	0
Trick, William B.	0	10	0
Trotman, Alfred C.	0	10	0
Truman, H. V.	0	5	0
Tudor, W. T.	0	2	6
Tugwell, Ernest H.	0	10	6
Tugwell, William H.	0	10	6
Turner, Charles E.	0	10	6
Turner, Edward A.	1	1	0
Turner, R. C.	0	5	0
Tyrer, Peter	0	10	0
Upjohn, Francis W.	0	5	0
Van, Frederick W. S.	0	5	0
Vaughan, John	0	5	0
Vialls, J. B.	1	1	0
Vincent and Son	1	1	0
Walker, Byatt A.	0	5	0
Walker, Charles	0	5	0
Walker, Troke and Co.	1	1	0
Wallbridge, H. A.	0	5	0
Wallis, John T. W.	0	10	6
Wallis, Owen	0	10	6
Ward, Francis	0	10	6
Waring, A. W.	0	5	0
Warren, Frederick	0	5	0
Warren, William	0	10	6
Wastie, Francis	0	10	6
Watson, William	0	10	6
Watts, Alfred	0	5	0
Watts, Edward	0	5	0
Watts, Harry G.	0	5	0
Watts, J. N.	1	1	0
Watts, John W.	0	10	6
Wavell, Edward	1	1	0
Wegg, W. N.	0	5	0
Wells, Thomas	0	5	0
Weston, Samuel John	1	1	0
Westrup, Joseph B.	0	10	6
Whiffen, Thomas	5	5	0
Whigham, Robert L.	0	5	0
White, Charles	1	1	0
White, Charles E.	0	5	0
Whittle, Elias C. C.	0	5	0
Wickham, W.	0	10	6
Wigg, Henry J.	1	1	0
Wigg, L. N.	0	2	6
Wiggins, Henry	0	10	6
Wigginton, Alfred	0	5	0
Wilde, Francis	0	2	6
Wilkes and Rich	0	10	6
Wilkinson, Benjamin John	0	10	6
Wilkinson, Robert	0	2	6
Wilkinson, Thomas	1	1	0
Wilkinson, William	0	10	6
Wilkinson, W. H.	0	5	0
Will, William W.	0	5	0
Willats, Richard	0	5	0
Williams, Alfred	0	2	6
Williams, Hugh	0	5	0
Williams, John	2	2	0
Williams, Joseph J.	0	5	0
Williams, J. W.	1	1	0
Williams, Stephen	0	5	0
Williams, Thomas H.	0	10	6
Wilson, Alexander W.	0	5	0
Wilson, James	1	1	0
Wilson, John C.	0	10	6
Wilson, Joseph	0	5	0
Wilson, Thomas W.	0	10	6
Wisken, Robert	0	5	0
Wodderspoon and Co.	1	1	0
Wood, C. H.	0	10	6
Woodland, John	1	1	0
Woolldridge, John	0	10	6
Woollings, Frank	0	2	6
Wooster, J. R.	1	1	0
Wootton, Alfred C.	2	2	0
Wright, Layman and Umney	2	2	0
Wyatt, Francis J.	0	10	6
Wylde, George	0	10	6
Yates, Samuel P.	0	5	6
Yeatman, F. J.	0	2	6
Young, George	0	5	0

Long Bennington.

Bemrose, John	0	10	6

Longton.

Prince, Arthur G.	0	10	0

Looe.

Poad, John	0	5	0

Lossiemouth.

Bremner, James	0	5	0

Loughborough.

Handley, Thomas	0	10	6
Scrase, Richard	0	5	0

Louth.

Hurst, John	0	5	0
Moody, S. W.	0	5	0

Lowestoft.

Chaston, Anna Maria	0	10	6
Good, Thomas	0	10	6
Moverley, Robert	0	10	6

Ludlow.

Cocking, George	0	5	0
Marston, Alfred	0	5	0
Nickson, James	0	5	0
Smith, F. W.	0	2	6
Woodhouse, George	0	5	0

Luton.

Hall, Ephraim	0	5	0
Webb, John H.	0	2	6

Lutterworth.

Brown, Thomas	0	10	6

Lyme Regis.

Henley, George	0	5	0

Lymington.

Allen, Adam U.	0	5	0
Badcock, Henry	0	5	0

Lymm.

Evans, Isaac H.	0	5	0
Henshall, James	0	5	0

Lytham.	£	s.	d.
Crozier, R.	0	5	0
Hartley, John	0	5	0
Macclesfield.			
Bates, William I.	0	10	6
Bower, John	0	5	0
Charge, A. W.	0	5	0
Cooper, Thomas	0	5	0
Duncalf, Thomas H.	0	10	6
Wood, Richard	0	10	6
Maidenhead.			
Barry, Thomas S.	0	10	6
Cottingham, Joseph J.	0	5	0
Walker, John W.	0	5	0
Walton, Ralph	0	10	6
Maidstone.			
Corfe, Alfred	0	5	0
Ridley, Charles H.	0	5	0
Rogers, William	0	5	0
Rowcroft, Albert E.	0	5	0
Simpson, John W. G.	0	10	6
Stonham, Thomas G.	0	10	6
Maldon (Essex).			
Crick, George E.	0	10	6
Elsey, Charles	0	5	0
Wallworth, David	0	10	6
Malmesbury.			
Ratcliffe, H. N.	0	10	6
Malton (Yorks).			
Buckle, James	0	5	0
Hardy, George	0	5	0
Harrison, William	0	10	6
Laverack, W. H.	0	5	0
Malvern.			
Coldwell, David B.	0	10	6
Fox, T.	0	5	0
Malvern Wells.			
Clark, Edward J.	0	5	0
Wakefield, Cecil H.	1	1	0
Manchester.			
Ashworth, R.	0	5	0
Balmforth, A.	1	1	0
Bates, Frederic W.	0	5	0
Benger, F. Baden	1	1	0
Bew, John	1	1	0
Billington, John	0	2	6
Bird, F. C. J.	0	2	6
Blyton, John	0	10	6
Boor, Frederick	0	10	6
Booth, William G.	0	10	6
Breadner, C. G.	0	2	6
Brown, William Scott	1	1	0
Bushby, Thomas	0	5	0
Carter, William	0	10	6
Casey, Edward	0	2	6
Darling, William	1	1	0
Dawson, Robert	0	5	0
Elborne, William	0	5	0
Gibbons, Thomas G.	1	1	0
Gibbons, Walter	0	10	6
Gibson, Robert	1	1	0
Hall, Henry Stacey	0	5	0
Hart, James	1	1	0
Hughes, Evan G.	0	10	0
Jackson, George	0	10	6
Jackson, Thomas	0	10	6
Jones, P. V	0	5	0
Kemp, Harry	0	5	0
Lane, William	0	5	0
Marsden, Thomas B. (Withington)	0	5	0
Maunder, Robert	0	10	6
Morris, J. L.	0	5	0
Mundey, H.	0	5	0
Newbould, Thomas A.	0	10	6
Nuttall, R. H.	1	0	0
Oakey, Joseph	0	5	0
Paine, Standen	1	1	0
Pickup, Robert L.	0	10	6
Pidd, Arthur J.	0	10	6
Pigot, Samuel	0	2	6
Roberts, W. R.	0	5	0
Rowland, E. E.	0	5	0
Royle, John	0	5	0
Saunderson, George C.	0	10	0
Scaife, Samuel	0	10	6
Standring, Son and Co.	1	1	0
Sugden, Samuel	0	5	0
Sutcliffe, C. H.	0	5	0
Swinn, Charles	1	1	0
Teasdale, C.	0	10	6
Terry, Thomas (Withington)	0	5	0
Turner, W. S.	0	10	6
Twemlow, Richard	0	10	6
Wealthall, Alfred	0	10	0
West, Thomas	0	5	0
Westmacott, George H.	0	10	6
Wheeldon, James	0	5	0
Whittaker, Ellis (Salford)	0	10	6
Wilkinson, George	0	5	0
Wilkinson, William	1	1	0
Williams, J. B.	0	5	0
Woolley, Sons and Co.	3	3	0
Wright and Barnaby	1	1	0
Yates, Ebenezer	0	5	0
Mansfield.			
Adams, Benjamin	1	1	0
Oldham, John	0	10	6
Patterson, Douglas J.	0	10	0
March.			
Davies, Peter H.	0	5	0
Vawser, Jesse	0	2	6
Margate.			
Baily, John	0	10	6
Candler, Joseph T.	0	10	6
Compton, Arthur	0	5	0
Gale, Henry	0	10	6
Harvey, William S.	0	10	6
Wootton, Edward S.	0	10	6
Market Drayton.			
Cooke, William H.	0	5	0
King, William George	0	10	6
Market Harborough.			
Deacon, Fanny E. (Fleckney)	0	5	0
Maryport.			
Cockton, John	0	5	0
Masham (Yorks).			
Barker, Mathew M.	1	1	0
Matlock Bath.			
Platt, William	0	5	0
Mayfield.			
White, Edward A.	0	5	0
Melbourne (Victoria).			
Cunningham, Oscar W.	0	2	6
Jackson, A. H.	1	1	0
Melrose.			
Bogie, Thomas	0	5	0
Middlesborough.			
Buck, Thomas	0	5	0
Harrington, P. J.	0	5	0
Hume, William A.	0	5	0
Sowerby, Richard	0	5	0
Taylor, H. H.	0	5	0
Taylor, William R.	0	5	0
Millom.			
Roberts, John L.	0	2	6
Minchinhampton.			
Simpkins, John	0	10	6
Mintlaw (N.B.).			
Hardie, Alexander	0	5	0
Mirfield (Yorks).			
Crook, Charles	0	5	0
Mold.			
Evans, William	0	5	0
Montrose.			
Burrell, George	0	5	0
Davidson, A.	0	5	0
Morecambe.			
Birkett, John	0	5	0
Morpeth.			
Marshall, G. T.	0	5	0
Mussoorie (India).			
Graham, Henry	0	5	0
Samuel, James B. and Edward	1	1	0
Nantwich.			
Manley, Henry (Aston)	0	2	6
Naples.			
Bateman, J. M.	1	3	11
Neath.			
Hutchins, Charles	0	2	6
Needham Market.			
Harrington, Allen	0	10	6
Nelson.			
Collins, M. A.	0	5	0
Newark.			
Bennett, William	0	5	0
Cooling, W. J.	0	5	0
Fisher, Harry	0	5	0
Foster, H. P.	0	5	0
March, William	0	5	0
Taylor (John) and Son	0	10	0
New Barnet.			
Young, Robert Fisher	0	10	
New Brighton.			
Rose, Charles	0	5	0
New Brompton (Kent).			
Willis, Henry J.	0	5	
Newbury.			
Davis, Henry J.	0	5	0
Hickman and Metcalf	0	10	6
Pratt, Thomas H.	0	5	0
Newcastle-on-Tyne.			
Bolan, John	0	10	6
Coates, John M.	0	10	6
Coxon, I.	0	2	6
Dean, Edward	0	2	6
Forster, J. R.	0	5	0
Frater, G.	0	5	0
Gooderham, Rev. A.	1	1	0
Hunter, Frederick W.	0	5	0
Ismay and Sons	0	10	6
Mann, Robert	0	10	6
Marley, William	0	10	6
Martin, N. H.	1	1	0
Mawson, T. O.	0	10	6
Owen, William	0	10	6
Proctor, Barnard S.	1	1	0
Proctor, William	0	5	0
Rheeder, T.	0	5	0
Richardson, Alexander	0	5	0
Richardson, George	0	5	0
Robinson, John T.	0	2	6
Scott, Walter	0	5	0
Smith, G. F.	0	5	0
Spargo, H.	0	5	0
Stuart, Charles E.	0	10	6
Ward, Benjamin	0	5	0
Watson, John	0	5	0
Watson, Mason	0	10	6
Weddell, George	0	10	6
Wilkinson, T. T.	0	5	0
Wray, E.	0	2	6
Wright, Alfred	0	10	6
Newcastle-under-Lyne.			
Cartwright, William	0	10	6
Heathcote, Thomas S.	0	10	6
New Clee.			
Barker, William	0	5	0
Newhaven.			
Miller, Alexander	0	3	0
Newmarket.			
Barrow, Frank A.	1	1	0
Sheffield, A. J.	0	5	0
Newport (Isle of Wight).			
Millidge, Alfred	0	5	0
Shepperd, William J.	0	2	6
Smith, Robert	0	5	0
Newport (Mon.).			
Atkins, A. E.	0	5	0
Evans, David	0	5	0
Faulkner, H.	0	5	0
Garrett, T. P.	0	5	0
Gratte, Henry J.	0	5	0

Newport (Mon.).—continued.	£	s.	d.
Paine, Charles	0	10	6
Phillips, James W.	0	5	0
Phillips, John	0	10	6
Seys, James A.	0	5	0
Smith, Albert	0	5	0
Young, John	0	10	6
Newport (Salop).			
Picken, Thomas William	0	10	6
Newport-on-Tay.			
Gardiner, David	0	2	6
New Quay.			
Davies, David	0	2	6
New Radford.			
Jenkins, John Thomas	0	5	0
Newton Abbot.			
Stiling, John E.	0	10	6
Wright, W.	0	5	0
Newton Stewart.			
Keith, John	0	2	6
Newtown (Mont.).			
Morgan, Richard	0	10	6
Norbiton.			
Greenwood, J.	0	10	0
Normanton.			
Cowburn, William	0	5	0
Farnsworth, W.	0	5	0
Northallerton.			
Fairburn, Joseph	0	10	6
Northampton.			
Ashford, Evan Charles	0	5	0
Barry, James	1	1	0
Bingley, John	0	10	6
Gulliver, George E.	0	5	0
Kirby, Frederick	0	5	0
Mayger, William D.	1	1	0
Negus, Samuel T.	0	5	0
Saul, W. B.	0	2	6
Sindall, J. W. (Executors of)	0	5	0
Thorpe, T. F.	0	5	0
Woolston, Thomas H.	0	5	0
North Kelsey.			
Dixon, James	0	3	0
North Walsham.			
Bailey, George Wm.	0	5	0
Northwich.			
Lee, William	0	5	0
Norwich.			
Betts, George	0	10	0
Caley, Albert J.	0	10	6
Corder, Edward	0	10	6
Corder, Octavius	1	1	0
Cossey, John	0	5	0
Cripps, Johnson (Hackforth)	0	5	0
Dyson, Archibald	0	5	0
Gardiner, W.	0	5	0
King, H. A.	0	5	0
Mallett, H. P.	0	5	0
Nuttall, Edwin	0	10	6
Playford, F. W.	0	2	6
Robinson, James	0	5	0
Sutton, Francis	0	10	6
Taylor, H. E.	0	5	0
Thompson, H.	0	5	0
Watson, J. E. H.	0	10	6
Nottingham.			
Beilby, A. E.	0	5	0
Beverley, R. H.	0	5	0
Dadley, Elijah	0	10	6
Fletcher, Thomas B.	0	5	0
Flowerdew, W. C.	0	2	6
Gill, William	0	5	0
Lumby, Fred	0	5	0
Manfull, H. J.	0	5	0
Middleton, A.	0	5	0
Oakland, Charles	0	5	0
Parker, W. H.	0	10	0
Pearson, Edward	1	1	0
Rayson, J. T.	0	5	0

Nottingham—continued.	£	s.	d.
Roberts, Herbert	0	2	6
Robinson, Joseph	0	10	6
Shippam, Henry	0	2	6
Smithurst, John	0	5	0
Taylor, Thomas C.	0	10	6
Watkinson, Thos.	0	2	6
Whitworth, John	0	10	6
Wilford, J.	0	10	6
Nuneaton.			
Iliffe, George	0	5	0
Lester, Henry	0	5	0
Oakham.			
Wellington, James	0	10	6
Odiham.			
Woodman, George	0	5	0
Oldbury.			
Homes, Joseph P.	0	5	0
Oldham.			
Bagshaw, Henry B.	0	10	6
Bagshaw, William	0	10	6
Bates, Henry	0	10	6
Bates, Hiram	0	5	0
Berry, Thomas	0	5	0
Braddock, George	1	1	0
Brelsford, James	0	10	6
Glover, John S.	0	10	6
Hargraves, H. L.	0	10	6
Haslop, William	0	5	0
Hurst, James	0	5	0
Lord, Robert B.	0	5	0
Wilson, Alexander G.	0	5	0
Olney (Bucks).			
Wright, Mrs. Ann	0	5	0
Ormskirk.			
Garside, S. A.	0	5	0
Oswestry.			
Evans, John	0	5	0
Pierce, R. W. C.	0	5	0
Roberts, William Carey	0	2	6
Smale, Mary E.	0	5	0
Smale, Richard B.	0	5	0
Vaughan, David	0	10	6
Otley (Yorks).			
Pratt, Richard M.	0	10	6
Oundle.			
Roper, Henry E.	0	5	0
Over Darwen.			
Shorrock, R.	0	5	0
Oxford.			
Bloxham, W. E.	0	5	0
Clayton, C.	0	2	6
Court, G. F.	0	5	0
Druce, George C.	0	5	0
Hill, James H.	0	5	0
Houghton, Thomas	0	10	6
How, R. E.	0	5	0
Jenkins, Alexander	0	5	0
Luff, William	0	5	0
Prior, George T.	0	10	6
Squire, James	0	5	0
Thurland, Henry	0	10	6
Walsh, Edward	0	10	6
Wilson, William J.	0	2	6
Padiham.			
Brewerton, Thomas	0	5	0
Paignton.			
Sherriff, George	0	5	0
Paisley.			
McNichol, John	0	5	0
Partick (N.B.).			
Rait, Robert C.	0	10	6
Pau (France).			
Jarvis, John	1	1	0
Paulton (Somerset).			
Bush, Thomas	0	5	0
Pembroke Dock.			
Lane, William	0	5	0

Penarth.	£	s.	d.
John, W. D.	0	5	0
Pendleton.			
Jeans, Thomas R.	0	5	0
Robinson, Benjamin	0	5	0
Penrith.			
Biggs, F. W.	0	2	6
Redfern, Tom	0	10	6
Penzance.			
Buckett, A. H.	0	5	0
Shakerley, Benjamin	0	5	0
Pershore.			
Smith, Arthur W.	0	2	6
Perth.			
Blair, R. P.	0	5	0
Donald, David	0	10	6
Farquhar, James	0	2	6
Peterborough.			
Bloodworth, Thomas	0	2	6
Bodger, J. W.	0	2	6
Bright, Richard H. D.	0	5	0
Carlton, Arthur	0	10	6
Dye, C. P.	0	5	0
Heanley, Marshall	0	10	6
Knight, W. T.	0	9	0
Pearson, John H.	0	5	0
Saunders, J. E.	0	5	0
Sturton, J. R.	0	10	6
Turner, R. P.	0	2	6
Whitwell, Ewen	0	5	0
Willson, Stephen J.	0	10	6
Petersfield.			
Nichols, Frederic B.	0	5	0
Pinner.			
Trist, Richard	0	5	0
Plymouth.			
Adams, W. T.	0	5	0
Allen, Joseph	0	10	6
Bailey, John H.	0	5	0
Balkwill, A. P.	1	1	0
Barge, John	0	5	0
Cocks, James	0	2	6
Foster, F. H.	0	10	6
Goodwin, Medmer	0	10	6
Hearder, H. P.	0	10	6
Hetherington, A. H.	0	5	0
Hill, Richard C.	1	1	0
Luke, R. S.	0	5	0
Martyn, Edwin R.	0	2	6
Maurice, James	0	10	6
Roper, R. F.	0	5	0
Sloggett, Thomas C.	0	5	0
Turney, Samuel B.	0	5	0
Woods, W. H.	0	5	0
Woods, William	0	10	0
Pocklington.			
Boyden, John A. C.	0	2	6
Pontefract.			
Bratley, William	0	5	0
Pontypool.			
Ford, Edward B.	0	10	6
Pontypridd.			
Key, W. H.	1	1	0
Poole.			
Atkins, T. W.	0	5	0
Hamilton, Julius	0	5	0
Penny, William	0	5	0
Pomeroy, F. T.	0	5	0
Port Elizabeth (Cape Colony).			
Walsh, Albert	1	1	0
Willet, John A.	0	5	0
Porth.			
Evans, Mrs. Annie	0	5	0
Porthcawl.			
Thomas, J. J.	0	5	0
Portishead.			
Frowd, Edward F.	0	10	6

Portland.	£	s.	d.
Childs, Joseph L.	0	5	0
Porto Alegre (Brazil).			
Hallawell, Joseph	1	1	0
Portobello.			
Kemp, David	0	10	6
Nesbit, John	1	1	0
Portsea.			
Phillips, Thomas	0	10	6
Portsoy.			
Clark, James	0	2	6
Poulton-le-Fylde (Lancs.).			
Blade, E.	0	5	0
Preston.			
Arkle, C. A.	0	2	6
Carter, James (Bamber Bridge)	0	5	0
Parker, Thomas	0	5	0
Sharples, George	0	5	0
Willan, William	0	5	0
Queenstown (Cape Colony).			
Mager, W. K.	0	10	6
Ramsey (Hunts.).			
Palmer, Frederick W.	0	5	0
Ramsgate.			
Baily, Edward	0	5	0
Franks, Alfred	0	5	0
Gadd, W. F.	0	5	0
Jones, W. S.	0	5	0
Morton, Henry	0	5	0
Saunders, Charles J. H.	0	2	6
Reading.			
Bradley, Charles	0	10	6
Brunsden, Edward	0	2	6
Butler, B. H.	0	5	0
Cardwell, E.	0	10	6
Craft, James	0	2	6
Cross, John	0	2	6
Hayward, William G.	0	5	0
Knowles, J. H.	0	5	0
Loam, J. G.	0	5	0
Powell, J. A.	0	5	0
Rowell, John C.	0	5	0
Tunbridge, Frederick	0	5	0
Young, J. M. (Theale)	0	5	0
Redditch.			
Moule, William	0	5	0
Redhill.			
Foster, Edward M.	1	1	0
Ralling, Ernest L.	0	10	6
Sillitoe, F. S.	1	1	0
Retford.			
Baker, William	0	10	6
Rhyl.			
Davies, Thomas M.	0	5	0
Lawrence, George R.	0	5	0
Rhymney.			
Dixon, Franklin	1	1	0
Roberts, William (Pontlottyn)	0	2	6
Rhuddlan.			
Hughes, Roger	0	5	0
Richmond (Surrey).			
Bletsoe, F. F.	0	10	6
Bletsoe, John	0	10	6
Clarke, Thomas M.	0	10	0
Hornby, Alfred	1	1	0
Mumbray, R. G.	0	10	0
Thacker, William	1	1	0
Richmond (Yorks).			
Thompson, John Thomas	0	10	6
Ripley (Derbyshire).			
Shephard, William A.	0	5	0
Ripon.			
Parkin, J. B.	0	10	6
Thornley, F.	0	5	0
Rochdale			
Bamford, J. W.	0	5	0
Hadfield, James	0	5	0

Rochdale—continued.	£	s.	d.
Highley, William	0	5	0
Kerr, William	0	2	6
Mason, Arthur	0	5	0
Mercer, Thomas W.	0	5	0
Partington, William	0	2	6
Porter, T.	0	5	0
Scott, W. A.	0	5	0
Taylor, Edward	0	5	0
Taylor, John	0	2	6
Whittaker, J. W.	0	2	0
Rochester.			
Hewitt, Joseph S.	0	5	0
Rock Ferry.			
Dutton, John	0	10	6
Roehampton.			
Swain, James	0	5	0
Romford.			
Lasham, John W.	0	10	6
Romsey.			
Blissett, William	0	10	6
Francis, George	0	10	0
Ross.			
Ackrill, George	0	5	0
Rothbury.			
Farrage, Robert	0	10	6
Rotherfield.			
Field, William	0	5	0
Rotherham.			
Bradshaw, C. H.	0	10	6
Rothesay.			
Duncan, William	0	5	0
Macintosh, Archibald	0	5	0
Ruthin.			
Magin, Arthur E.	0	2	6
Rouw, T. J.	0	5	0
Ryde (Isle of Wight).			
Brown, William Henry	0	2	6
Dixon, Henry	0	10	6
Gibbs, William	0	10	6
Pollard, Henry H.	0	10	6
Smith, Tenison	0	10	6
Smith, William	0	2	6
Wallis, George	0	5	0
Rye (Sussex).			
Smith, Alfred W.	0	5	0
Waters, William A.	0	10	6
Saffron Walden.			
Machon, H.	0	15	6
St. Albans.			
Allenby, Henry	0	2	6
Ekins, Arthur E.	0	10	6
St. Andrews.			
Kirk, John J.	0	2	6
St. Bees.			
Broomfield, R. W.	0	10	6
St. Clears.			
Johns, John	0	2	6
Williams, Evan	0	10	6
St. Davids.			
David, Albert	0	2	6
St. Day.			
Corfield, Charles	0	10	6
Corfield, Thomas J. T.	0	10	6
St. Helens.			
Harrison, James	0	5	0
Sherlock, Thomas	0	5	0
St. Just.			
Wearing, John	0	2	6
St. Leonards. See Hastings.			
St. Mary Cray.			
Heath, Thomas	0	5	0

St. Neots.	s.	d.
Mellor, J. G.	0	5	0
Wise, James	0	5	0
Sale.			
Smith, Allen	0	5	0
Salisbury.			
Atkins, Samuel Ralph	1	1	0
Atkins, William R.	0	10	6
Dewing, James E.	0	5	0
Firman, H. B.	0	5	0
Hardy, R. E.	0	5	0
Knapp, Charles R.	0	5	0
Newton, J. W.	0	10	6
Orchard, E. J.	0	10	6
Rowe, J	0	5	0
Saltash.			
Mathew, William H.	0	5	0
Saltburn-by-the-Sea.			
Taylor, William	0	10	6
San Remo (Italy).			
Squire, Frank R.	1	1	0
Sandgate.			
Jenner, William M.	0	5	0
Kennett, Edward	0	2	6
Sandwich.			
Baker, Frank	0	10	6
Dixon, William (Ash)	0	5	
Scarborough.			
Chapman, Henry	0	5	0
Clare and Hunt	1	1	0
Cuttle, Arthur E.	0	2	6
Hill, R. M.	0	2	6
Hughes, John E.	0	10	6
Jones, Alfred	0	5	0
Smith, John F.	0	5	0
Whitfield, John	1	1	0
Seacombe.			
Hinkley, E.	0	2	6
Holt, Richard W.	0	5	0
Seaham Harbour.			
Storey, W.	0	5	0
Seaton.			
Skinner, A. J. P.	0	5	0
Selby.			
Cutting, Thomas John	0	5	0
Selkirk.			
Dunn, Thomas	0	5	0
Settle.			
Shepherd, J. W.	0	10	6
Shanklin (Isle of Wight).			
Brown, Andrew Henry	0	10	0
Deeks, W. T.	0	2	6
Sheepshed.			
Moore, Thomas	0	5	0
Sheerness.			
Hills, William	0	2	6
Prosser, David	0	10	6
Rayner, William	0	5	0
Sheffield.			
Bradwall, J. H.	0	5	0
Carr, George	0	5	0
Clayton, William	0	10	6
Cubley, G. A.	0	10	6
Dobb, J. T.	0	10	6
Dunnill, G. H.	0	5	0
Ellinor, George	0	10	6
Elliott, John G.	1	1	0
Fallding, A.	0	5	0
Fletcher, Howard Bennett	0	10	6
Fox, A. R.	0	10	6
Froggatt and Son	0	5	0
Furness, Joseph M.	0	5	0
Maxey, W. H.	0	5	0
Miller, John T.	0	5	0
Morrison, C. O.	0	5	0
Newsholme, G. T. Wilkinson	1	1	0
Preston, Job	0	10	6
Priestley, Henry	0	10	6
Salisbury, John M.	0	10	6
Ward, William	0	10	6
Watson, H. G.	0	5	0
Watson, Robert W.	0	10	6
Watts, J.	0	5	0
Westbrook, Dr. Charles	1	1	0
Wiles, Edwin	0	5	0

Shepton Mallet.	£	s.	d.
Cottrill, Gilbert Jones	0	5	0
Fudge, Charles William	0	5	0
Shields, North.			
Burn, Thomas	0	2	6
Corder, Walter S.	0	10	6
Gibson, James	0	10	6
Hogg, Joseph F.	0	2	6
Stobbs, Robert	0	10	6
Shields, South.			
Forrest, Robert	0	10	6
Mays, Robert J. J.	0	10	6
Noble, John	0	5	0
Walker, James	0	2	6
Shifnal.			
Clarke, Thomas E.	0	5	0
Shrewsbury.			
Adams, William	0	5	0
Blunt, T. P.	1	1	0
Cross, A. R.	0	5	0
Cross, William G.	1	1	0
Gouldbourn, William	0	10	6
Longhurst, Edward	0	5	0
Perkins, Christopher	0	5	0
Pyefinch, John	0	5	0
Salter, Joseph B.	1	1	0
Sidcup.			
Gordelier, Frank H.	0	10	6
Sidmouth.			
Chessall, Rowland	0	5	0
Silverdale.			
Wilson, Edward	0	5	0
Sittingbourne.			
Cocking, T. S.	0	5	0
Gordelier, William G.	1	1	0
Sleaford.			
Harrison, T. E.	0	5	0
Slough.			
Elliman, Sons and Co.	1	1	0
Griffith, Richard	0	10	6
Smallthorne.			
Fletcher, Thomas	0	10	6
Snaith.			
Bean, John	0	10	6
Southam.			
Archer, Thomas	0	2	6
Southampton.			
Bishop, Samuel	0	5	0
Borchert, Heinrich T. G.	1	1	0
Dawson, Oliver R.	0	10	6
Fletcher, J. B. (Totton)	0	10	0
Hughes, J. H.	0	5	0
Humby, Lewis W.	0	5	0
Madge, James C.	0	10	6
Mumford, Alfred	0	10	6
Pell, John	0	5	0
Powell, Edward	1	1	0
Randall, William B.	1	1	0
Rubie, J. T.	0	5	0
Spearing, James	0	10	6
Wedge, George D.	0	2	6
Southborough.			
Rogers, Oliver	0	5	0
Southend.			
Dawson, George R.	0	5	0
South Molton.			
Swingburn, Richard H.	0	10	6
South Petherton.			
Wellington, Frederick G. N.	0	5	0
Southport.			
Ashton, William	1	1	0
Ball, Henry	0	5	0
Elliott, Stephen J.	0	2	6
Gillett, Joseph	1	1	0
Hay, David	0	5	0
Horsefall, John	0	10	6
Joy, Joseph	0	5	0
Loadman, James	0	5	0
Mainwaring, R.	0	10	6
Southport—continued.			
Neame, H. A.	0	2	6
Radley, William V.	0	10	6
Righton, James	0	10	6
Round, Frederick	1	1	0
Surr, Edward	0	10	6
Sykes, Thomas H.	0	10	6
Watson, W. M.	0	2	6
Whitworth, James	0	10	6
Wimpenny, James M.	0	5	0
Southsea.			
Childs, James L.	0	10	6
Cruse, Thomas H.	1	1	0
Futcher, Alfred J.	0	10	6
Lowther, W.	0	10	6
Rogers, Sydney	0	5	0
Rowell, Robert H.	0	10	6
Sangster, John G.	0	5	0
Stephens, N.	0	2	6
South Stockton.			
Ronchetti, T. A.	0	5	0
Southwell.			
Downing, J. H.	0	5	0
Southwold.			
Critten, Robert P.	0	2	6
Sowerby Bridge.			
Stott, William	0	10	6
Spalding.			
Asling, Brelsford	0	5	0
Donington, Robert	0	5	0
Steeper, Samuel	0	5	0
Spennymoor.			
Burden, Thomas A.	0	5	0
Stafford.			
Averill, Henry Alcock	0	10	6
Averill, John	0	10	6
Stalybridge.			
Simpson, Allwood	0	5	0
Stamford.			
Dickinson, Frederick	0	10	6
March, Frederick	0	5	0
March, Richard	0	5	0
Snartt, Frederick M.	0	5	0
Stanford, J. H.	0	5	0
Stevenage.			
Fresson, Lewis Francis	0	10	6
Stockport.			
Hart, Thomas	0	5	0
Johnson, Thomas J.	0	5	0
Kay, Brothers	2	2	0
Sidley, Thomas I.	0	10	6
Towle, Samuel	0	5	0
Stockton-on-Tees.			
Bainbridge, Robert R.	0	2	6
Stoke-on-Trent.			
Adams, Frank	0	10	6
Adams, William H.	0	10	6
Guest, George C.	0	2	6
Harris, Robert H.	0	5	0
Jones, John	0	10	0
Smith, Arthur H.	0	10	6
Wilson, Clement Fisher	0	5	0
Stoke (Surrey).			
Ratheram, William	0	5	0
Stone (Staffs).			
Jenkins, Thomas H.	0	10	6
Slater, Thomas	0	10	6
Slater, Thomas, jun.	0	5	0
Stoneham.			
Sutton, Charles W.	1	1	0
Stonehouse (Devon).			
Maitland and Son	0	5	0
Netten, Henry J. T.	0	5	0
Stony Stratford.			
Cashmore, James F.	0	5	0
Cox, Julia Jane	0	10	6
Robinson, William H.	0	10	6
Stourbridge.			
Bland, Thomas F.	0	10	6
Burgess, William	0	5	0
Clark, Thomas P.	0	5	0
Hughes, Samuel	0	10	0
Jones, Rowland G.	0	5	0
Loverock, Henry	0	5	0
Perks, Francis	0	10	6
Selleck, W. R.	0	10	6
White, John T.	0	5	0
Stowmarket.			
Gostling, George J.	1	1	0
Simpson, Robert G.	0	5	0
Wilson, Thomas	0	5	0
Stradbroke.			
Foulsham, Harry B.	0	5	0
Stratford-on-Avon.			
Ashfield, Armishaw	0		0
Gaskin, John H.	0	2	6
Stratton.			
Pickard, Henry	0	5	0
Strood.			
Picnot, Charles	1	1	0
Stroud.			
Coley, Samuel J.	0	10	6
Sunderland.			
Aslin, John	0	5	0
Fairman, George P.	0	10	6
Harrison, John	0	10	6
Harrison, W. B.	0	10	0
Leadbetter and Son	0	2	6
Mitchinson, John	0	2	6
Purse, Alfred D.	0	5	0
Ranken, Charles	0	5	0
Sunninghill (Berks).			
Taylor, Thomas E.	0	5	0
Surbiton.			
Acfield, William	0	5	0
Lowe, Charles	0	10	0
Sutton (Cheshire).			
Dangerfield, W. H.	0	5	0
Sutton Coldfield.			
Organ, Edward	0	5	0
Sutton-in-Ashfield.			
Briggs, G. W.	0	5	0
Sutton (Surrey).			
Waugh, Mrs. E.	0	10	6
Swaffham.			
Bell, Frederick R.	0	5	0
Christopherson, Fred	0	5	0
Finch, Jacob	0	10	6
Swansea.			
Atkins, John	0	5	0
Bonnett, Frederick	0	2	6
Davies, J. M.	0	5	0
Davies, John (31, High Street)	0	5	0
Davies, John (75, Oxford Street)	0	2	6
Davies, John (Walters Road)	1	1	0
Davies, William	0	5	0
Evans, D.	0	2	6
George, William	0	10	6
Grose, Nicholas M.	1	1	0
Hughes, James	0	5	0
Jones, Moses	0	10	6
Keall, F. P.	0	10	6
Lloyd, John W.	0	5	0
Lowther, H.	0	5	0
Richards, J.	0	5	0
Roberts, J. K.	0	5	0
Trick, M.	0	5	0
Williams, J. T.	0	10	6
Yorath, C.	0	5	0
Swindon.			
Green, John	0	5	0
Tarporley.			
Aston, Walter	0	5	0
Taunton.			
Burn, B. P.	0	2	6
Copestake, Henry H.	0	5	0
Field, W. C.	0	5	0
Gregory, George H.	0	5	0
Hambly, Charles J.	0	5	0
Kirkpatrick, Mrs.	0	5	0
Redman, Sidney	0	5	0
Sargent, John C.	0	10	6

Tavistock.	£	s.	d.
Doble, H. T.	0	5	0
Gill, William	0	2	6
Teignmouth.			
Cocking, Frederick J.	0	5	0
Cornelius, Joseph	0	5	0
Evans, Joseph J. O.	0	5	0
Pryer, H.	0	5	0
Tenbury.			
Slade, John	0	10	6
Tenby.			
Davies, Moses P.	0	4	0
James, George	0	5	0
Williams, William	0	10	6
Tewkesbury.			
Barlow, G. R.	0	2	6
Wilkes, D. T. (Bredon)	0	2	6
Thame.			
Sutton, W. D.	0	5	0
Thetford.			
Pechey, Thomas P.	0	5	0
Thirsk.			
Ayre, George	0	10	6
Ayre, Harry	0	2	6
Thornhill (N.B.).			
Fingland, James	0	5	0
Thornton Heath.			
Knott, Samuel	0	5	0
Thrapston.			
Pars, R. C.	0	10	6
Ticehurst.			
Corke, Edward	0	10	6
Titchfield.			
Smith, W. O.	1	1	0
Tiverton.			
Havill and Son	0	5	0
Reeves, W. R. (Poole Anthony)	0	10	0
Rossiter, Thomas E.	0	5	0
Tritton, C. E.	0	5	0
Todmorden.			
Stevenson, W.	0	2	6
Topsham.			
Ellis, Frederick	0	2	6
Torquay.			
Bathe, William	0	5	0
Bridgman, William Louis	0	5	0
Cocks, John W.	0	5	0
Guyer, James B.	0	10	6
Horton, Thomas	0	5	0
Knight, Benjamin	0	5	0
Ness, Thomas H.	0	5	0
Riches, Thomas	0	5	0
Shapley, Charles	0	10	0
Sloman, Richard	0	10	6
Smith, Edward	0	10	6
Smith, William	0	2	6
Taylor, John	0	10	6
Totnes.			
Butland. Charles	0	5	0
Cooke, E. H.	0	2	6
Lloyd, Henry	0	2	6
Morse, C. H. Stafford	0	5	0
Tredegar.			
Phillips, Charles L.	0	5	0
Truro.			
Anstey, J. U.	0	5	0
Bucher, W. H.	0	5	0
Feaver, Samuel	0	10	6
James, Hamilton	0	5	0
Newby, Richard I.	0	10	6
Percy, Thomas B.	0	10	6
Tunbridge.			
Gower, Alfred	0	5	0
Millidge, Thomas E.	0	10	6
Wardley, S. F.	0	10	6
Tunbridge Wells.			
Arnold, Spencer	0	10	6
Batting, Thos. G.	0	10	6
Cheverton, George	1	1	0
Dunkley, Edward	0	10	6
Hayllar, J.	0	2	6
Howard, George W.	0	10	6
Howard, Richard	0	10	6
Tunbridge Wells—continued.			
Sells, Robert J.	0	10	6
Whitrow, Benjamin	1	1	0
Williams, James	0	10	6
Tunstall.			
Keightley, Joseph	0	5	0
Tutbury.			
Green, Isaac	0	5	0
Twickenham.			
Alexander, William	0	5	0
Bishop, Thomas	1	1	0
Peake, Henry F.	0	5	0
Shelley, Henry	0	10	6
Twyford.			
Brooker, A. W.	0	5	0
Tynemouth.			
Atkinson, Joseph	0	5	0
Uckfield.			
Salter, Benjamin	1	1	0
Ulverston.			
Kitchin, John	0	5	0
Willan, Robert	0	10	6
Upton-on-Severn.			
Gibbs, John	0	10	6
Urmston.			
Duncalf, Richard	0	5	0
Usk.			
Marsh, G. W. F.	0	10	6
Uttoxeter.			
Jaques, George	0	5	0
Johnson, John B.	0	10	6
Parker, Alfred	0	10	0
Woolrich, Charles B.	0	10	6
Uxbridge.			
Brooks, Thomas	0	5	0
Ventnor (Isle of Wight).			
Littlefield, J. W.	1	1	0
Nicholls, A. L.	0	2	6
Smith, C. A.	1	1	0
Weston, Charles	1	1	0
Wadebridge.			
Philp, J.	0	5	0
Wakefield.			
Cardwell, James	0	5	0
Chaplin, John Lambert	0	10	6
Clarkson, B. F.	0	5	0
Duffin, Thomas	0	10	6
Hudson, Frank	0	5	0
Ibbotson, Fred	0	5	0
Moorhouse, Walter	0	5	0
Pollard, William	0	5	0
Saville, George	0	10	6
Shaw, Mary	0	10	6
Smith, G. E.	0	10	6
Thornton, E.	0	5	0
Wice, J. H.	0	10	6
Winter, William	0	10	6
Wallingford.			
Ashmall, George	0	5	0
Payne, Sidney	1	1	0
Upton, Eustace J.	0	10	6
Wallington.			
Wood, Edward	0	10	6
Wallsend.			
Brand, Roger	0	5	0
Walmer.			
Wood, William Henry	0	5	0
Walsall.			
Elliott, George	0	5	0
Walsham-le-Willows.			
Harrington, Arthur	0	5	0
Waltham.			
Teat, Thomas	0	5	0
Waltham Abbey.			
Griffiths, J. M.	0	10	6
Marshall, A.	1	1	0
Walton-on-Thames.			
Davies, C. E.	0	5	0
Power, William	0	10	0
Wantage.			
Marks, F. C.	0	5	0
Ware.			
Medcalf, Benjamin	0	10	6
Medcalf, Benjamin Pearce	0	10	6
Wareham.			
Harman, E. S.	0	5	0
Randall, Thomas	0	10	6
Warminster.			
Rogers, John M.	0	5	0
Warrington.			
Greenough, H. F.	0	2	6
Young, John R.	0	10	6
Watchet.			
Daymond, Samuel	0	2	6
Watford.			
Chater, Edward M.	1	1	0
Chater, Matthew Taylor	1	1	0
Cottle, Alfred James	0	5	0
Lees, James	0	5	0
Maries, H. D.	0	5	0
Parrott, W. S.	0	10	6
Widdowson, G. W.	0	2	6
Wath-upon-Dearne.			
Hick, Allan	1	1	0
Watton.			
Knight, G. E.	0	5	0
Vincent, Lacey A.	0	10	6
Weaverham.			
Manifold, John J.	0	10	6
Wednesbury.			
Gittoes, Samuel J.	0	10	6
Wellingborough.			
Smith, John T.	0	2	6
Wells (Norfolk).			
Rump, Robert R.	0	10	6
Wells (Somerset).			
Manning, Richard James	0	10	6
Slater, Jonathan	0	5	0
Welshpool.			
Griffiths, Thomas	0	5	0
Welton.			
Myers, George Henry	0	5	0
Welwyn.			
Lawrance, Edmund	0	10	6
West Bromwich.			
Bullus, John	0	5	0
Tunley, John	0	5	0
Westbury-on-Trym.			
Paine, William	0	5	0
Westgate-on-Sea.			
Bessant, Frederick R.	0	10	6
West Malling.			
Stedman, Richard B.	0	5	0
Stedman, Walter	0	2	6
Weston-super-Mare.			
Cooper, John	0	5	0
Duckett, F. W.	0	10	6
Parkes, Harry C.	0	5	0
Wetherby.			
Jackson, John	0	5	0
Weybridge.			
Griffin, Thomas	0	10	6
Weymouth.			
Cole, W. B.	0	5	0
Groves, Thomas B.	0	10	6
Stedman, Samuel S.	0	5	0
Targett, Charles G.	0	5	0
Whitby.			
Corner, Thomas B.	0	10	6
Frank, John	1	1	0
Stevenson, John	0	10	6
Whitehaven.			
Wilson and Kitchin	1	1	0
Wick (N.B.).			
Miller, Kenneth	0	5	0
Wigan.			
Eckersley, M.	0	5	0
Johnson, Thomas	0	10	6
Kellett, Richard E.	0	5	0
Phillips, Jonathan	0	10	6
Worsley, W.	0	5	0

	£	s.	d.
Wilmslow.			
Charnley, Charles	0	10	0
Wimbledon.			
Day, Thomas S.	0	10	6
Dowdeswell, Jonathan	0	5	0
Pooley, John D. S.	0	10	6
Spencer, W. G.	0	5	0
Winchcombe.			
Hall, Alfred L.	0	5	0
Winchester.			
Barratt, F. J.	0	5	0
Bolton. Edgar D.	0	5	0
Knight, George E. Moses	0	5	0
Powell, Edward F.	0	10	6
Windsor.			
Collins, Henry G.	0	5	0
Grisbrook, Edward	0	5	0
Russell, Charles J. L.	0	10	6
Wokes, T. S.	0	2	6
Wood, Robert	0	5	0
Wingate.			
Cross, John T.	0	10	6
Wingham.			
Palmer, Henry B.	0	5	0
Winslow.			
Parrett, Edward	0	5	0
Wisbeach.			
Maxey, John T.	0	5	0
Wishaw.			
Macfarlane, T. B.	0	5	0
Witham.			
Green, Robert P.	0	10	6
Witney.			
Purdue, Thomas	0	5	0
Wokingham.			
Spencer, Thomas	0	10	6
Wolverhampton.			
Cannell, William	0	10	6
Coleman, William	0	10	6
Gibson, F. J.	0	5	0
Hamp, John	0	5	0
Stanway, Edward Thomas	0	10	6
Weaver, Alfred C.	0	10	6
Woodbridge.			
Betts and Son	0	10	6
Worboys.			
Nichols, Arthur F.	0	2	6
Worcester.			
Clower, John	0	5	0
Ferneley, Charles	0	10	6
George, Henry	0	10	6
Hall, Frederick J.	0	5	0
Hinks, John	0	10	6
Horniblow, W. T.	0	5	0
Masters, Charles	0	5	0
Silk, Thomas	0	10	6
Steward, John A.	0	10	6
Twinberrow, John	0	10	6
Virgo, Charles	1	1	0
Workington.			
Mason, Joseph R.	0	5	0
Worksop.			
Baxter, George	0	5	0
Jones, George W.	0	5	0
Worthing.			
Berry, H. J.	0	5	0
Burt, James	0	5	0
Chaplin, Alfred	0	10	6
Cortis, A. B.	0	10	6
Worthing—continued.			
Frost, William	1	1	0
Gulliver, W. I.	0	10	6
Stone, T. W.	0	5	0
Wycombe.			
Wilford, J.	0	5	0
Wyke.			
Drake, William	0	5	0
Wymondham.			
Skoulding, William	0	5	0
Yarm.			
Holt, John	0	5	0
Reed, George	0	10	0
Yarmouth.			
Clows, John E.	0	10	6
Mornement, H. J.	0	5	0
Poll, W. S.	0	2	6
Pratt, Edward J.	0	5	0
Steward, Alfred	0	5	0
Williams, C. E.	0	2	6
Yaxley.			
Farr, Joseph	0	10	6
Yeadon.			
Blatchley, Thomas	0	10	6
York.			
Batty, Thomas	0	10	6
Coates, Henry	0	5	0
Croskell, C.	0	10	6
Parker, Thomas	0	10	6
Saville, John	1	1	0
Sowray, J.	0	5	0
Wand, Thomas	0	5	0
Wisker, R. H.	0	2	6

ANONYMOUS DONATION.

S. J. P. £2 2 0

LEGACIES.

George Ringrose, Plumstead ... ... £100.
John Barnwell Herring, 40, Aldersgate Street, London, E.C. ... ... £50.

The Pharmaceutical Journal.

SATURDAY, MARCH 5, 1887.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

IMPORTANT DECISION UNDER THE PHARMACY ACT.

THE report of the case lately tried at Edinburgh, as given in full at page 732, *et seqq.*, of the present number, is of sufficient importance to be worth careful perusal; but as it is very lengthy and encumbered by the technicalities of Scotch law, a brief *résumé* of the main facts will probably be acceptable to our readers. The prosecution was instituted by the Pharmaceutical Society, under the 15th section of the Pharmacy Act, for infringement of the provisions of that section by WILLIAM BAILLIE, who as an unregistered person kept an open shop for the retailing, dispensing and compounding of poisons, and on the 17th December sold a scheduled poison in contravention of the provisions of the Act. The shop in question was not kept in the name of WILLIAM BAILLIE, but under the style of CENTER and Co., and it appeared that there is a kind of partnership between WILLIAM BAILLIE and a Mr. CENTER, who is a registered chemist. The nature of this partnership, as stated in evidence, is somewhat peculiar, inasmuch as the whole capital in the business, including cash in bank, goodwill, stock-in-trade, utensils, fittings, prescription books, etc., belong to Mr. BAILLIE, while Mr. CENTER'S interest in the business is merely a participation in the profits to a specified extent, and Mr. BAILLIE has the power to terminate the contract on giving three months' notice to that effect. Consequently the position of Mr. CENTER was held by the counsel for the prosecution to be practically nothing more than that of a person receiving a certain annual salary, who might be dismissed on three months' notice; that hence the business of CENTER and Co. was to all intents and purposes the property of Mr. BAILLIE, and upon that ground he was prosecuted under the 15th section of the Act for keeping open shop as well as for the sale of a scheduled poison.

At the opening of the case, however, the counsel for the defence took objection to the charge that two offences had been committed as the complaint averred, and to the liability of the accused to two penalties founded on the same Act. This objection was admitted by the Sheriff to be well founded. He held that he could not convict on both counts of the complaint, and that there could not be a double penalty for the same offence under the same enactment. As a result of this technical objection it became necessary to strike out part of the charge, and on the claim of the counsel for the defence that he should know at that stage what particular charge was relied upon, the second count of keeping open shop was abandoned. Another objection, that no offence was constituted under the 15th section, and that the charge was not made under the first section of the Act constituting an offence was overruled by the Sheriff.

In the trial of the case the facts alleged by the prosecution as to the sale of a scheduled poison were established in evidence. For the defence it was contended the facts proved in evidence did not amount to a contravention of the statute on the ground that the sale had been by or for a company, and though the hand that dispensed the drug was the hand of one who was not a qualified person in the terms of the Act, he was a servant, and at the time acting as the agent of the company whose sale it was. In pursuance of this argument it was shown that there is nothing in the Pharmacy Act to prevent persons forming a company or association for the purpose of dispensing the articles which are dealt with by the Act, and it was contended that the only thing necessary was that the business should be carried on under the charge of a competent man with sufficient practical knowledge. It was also urged that the statute was not one that had been introduced for the sake of chemists; but one for the protection of the public, and that the question was whether the safeguards intended by the statute to prevent mischief had been observed or not. Such safeguards, or what was tantamount to them, it was contended by the counsel for the defence had been observed. According to his view, the case was not one where the parties were trying to evade the statute, and putting themselves in a position that could only be held by men qualified according to the conditions of the statute, because the firm had as one of its partners a man who was entitled to deal with the drugs mentioned in the Act. In support of this argument reference was made to Lord SELBORNE'S judgment in the case of the Pharmaceutical Society against the Supply Association, where he said "It "is true that the Legislature has in the Acts required "for the benefit of the public this safeguard that "there should be an assistant duly qualified; but "the Legislature says that having that case in view, "it was not thought necessarily inconsistent with "the object and policy of the Act that the members "or proprietors of the business, the persons deri- "ving profit from it, or to whom those actually "selling the drugs would be responsible, might be "unqualified persons provided there was in the busi- "ness a duly qualified assistant. It by no means

"follows that all the drugs would necessarily be sold "by that duly qualified assistant, or that he might "not be under the general superintendence of a "manager not himself duly qualified. All that "is left open." These remarks it was contended had a direct bearing upon the present case, since they might be taken to mean that it was left open to the Court to consider whether, after all, looking to the arrangements in connection with the business in question, reasonable precautions were taken for the safe-guarding of the public. This was maintained to be the condition of things in the present case, and the copartnership of such a nature as might be expected where an arrangement was made between capital on the one hand and skill on the other.

The Sheriff, in giving judgment, said that owing to one count of the charge having been struck out, it would be unnecessary to consider whether the partnership contract really tended or was an attempt to evade the provision of the 15th section of the Pharmacy Act; but in regard to the other count he held that the purpose of the Act being to impose restrictions on the sale of poison for the protection of the public it was just to prevent persons who had no knowledge of these matters from being allowed to dispense them to the public, and there was no doubt that there had been a sale of a poison by a person not duly registered and within the very letter of the provisions of the 15th section of the statute. In reference to the quotation from Lord SELBORNE's judgment and to the argument based on the fact that one of the partners was qualified the Sheriff held that it was not doubtful the opinion of Lord SELBORNE and the other judges was that a person who sells drugs or poisons must be duly qualified, although he may be employed by a corporation or a person who has not a qualification. Any practice of a contrary nature he held would be wrong, and should be put an end to, and in the present case, as it had been proved that poison was sold by an unqualified person, he found for the prosecution, and fined the accused in a nominal penalty. Application was made for a case for appeal, and this was granted by the Sheriff; but we have been informed that this has since "been departed from by the accused."

We learn from the *Sei-i-Kwai* Medical Journal that Japan has adopted another mark of Western civilization, and has now an official Pharmacopœia. The work is the compilation of a Committee appointed in 1880, consisting of twenty-one members, the majority of whom were natives, but including such Europeans as the late Dr. Geerts, Dr. Eykman, Dr. Langgard, and Dr. van der Heyden. The work, which consists of nearly four hundred octavo pages, is described as being divided into three parts, the Preface, the Pharmacopœia, and the Appendix. The Preface contains a history of the proceedings of the Committee and the rules followed in the compilation, together with definitions of the principal technical and other terms used. It is also therein stated that the work was originally written in the German language, as being understood by most of the members of the Committee, but that nevertheless the Japanese version is to be considered the official text. It is intended to publish the work eventually also in Latin. The Pharmacopœia contains 475 articles, nearly all of which are official in the British, German, and United States Pharmacopœias. Each article is arranged in alphabetical order according to the Latin name, but this is preceded by the Japanese name. The Latin nomenclature adopted resembles pretty closely that of the British and United States works, but shows traces of German proclivities in the use of such forms as Kalii, Natrii, and Chininum. Under the title of each article is given a description of its appearance and taste, tests for its purity, and method of preparation. In the formulæ for compounds the proportions are given in parts, but the metric system forms the basis of all measurements. The Appendix contains lists of dangerous and powerful remedies, doses, solubilities, etc.

* * *

The next Evening Meeting of the Pharmaceutical Society will be held on Wednesday, the 9th instant, when Emeritus-Professor Redwood, in a "Note on Linimentum Terebinthinæ and Sapo Mollis," will deal with a subject that has evoked considerable discussion in these columns. The other papers will be "A Contribution to the Pharmacognosy of Strophanthus," by Mr. W. Elborne, and "Notes on Strophanthus," by Mr. H. Helbing. The chair will be taken at eight o'clock, but the theatre will be open an hour previously for the exhibition of donations to the Museum and other articles of interest, and the Curator will be in attendance to give information respecting them.

* * *

In the opinion of the editor of the *American Druggist* the supply of the natural oil of wintergreen or birch will soon cease to be of any commercial importance, since the artificial product (salicylate of methyl), to which reference was made recently in these columns, is now being prepared of such good and uniform quality that it will undoubtedly replace the natural oil. Moreover, the artificial article can be produced at a cost below that at which the natural oil can be distilled profitably.

* * *

Some samples of an efflorescence occurring on the soil in California, examined by Professor Attfield, have been found to consist of thenardite (sodium sulphate) more or less pure.

* * *

A meeting of the London Section of the Society of Chemical Industry will be held at Burlington House on Monday evening next, March 7, when papers will be read by Messrs. Cross and Bevan on "M. Hermite's System of Electrolytic Bleaching," and by Mr. Jas. Mactear on I. "Castner's Sodium Process," II. "A New Method of Elevating Liquids Specially Applicable to Acids." The discussion on the papers will be taken on April 4th.

* * *

The ninth annual dinner of the Chemists' Assistants' Association will be held at the Holborn Restaurant on Wednesday, the 16th instant, at 8 p.m. The chair will be taken on this occasion by the President of the Pharmaceutical Society.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, March 2, 1887.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT.

Messrs. Allen, Atkins, Borland, Bottle, Butt, Cross, Greenish, Hampson, Hills, Radley, Richardson, Robbins, Savage, Schacht, Southall, Symes, Williams and Woolley.

The minutes of the previous meeting were read and confirmed.

The PRESIDENT said he had received a letter from the Vice-President saying he was unable to attend owing to a slight attack of bronchitis. He was sure the whole Council would join in the hope that Mr. Gostling would soon be restored to his usual state of health.

DIPLOMAS.

The following, being duly registered as pharmaceutical chemists, were respectively granted a diploma stamped with the seal of the Society:—

Barnes, William Robert.
Bury, James Edward.
Edwards, Alfred Egbert.
Parkinson, William.
Puckey, William.
Stark, Arthur Campbell.
Wood, Arthur William.

ELECTIONS.

MEMBERS.

Pharmaceutical Chemists.

The following, having passed the Major examination and tendered their subscriptions for the current year, were elected "Members" of the Society:—

Barnes, William Robert .....Plaistow.
Edwards, Alfred Egbert.....London.
Lewis, Arthur John.....Abergavenny.
Parkinson, William .....Driffield.
Puckey, William .....Leicester.
Robb, David.....Horbury.
Stark, Arthur Campbell .....London.
Wood, Arthur William .....Harrogate.

Chemists and Druggists.

The following, who were registered as being in business on their own account before August 1, 1868, having tendered their subscriptions for the current year, were elected "Members" of the Society:—

Fuller, John .....Willesden.
Ing, John .....Aldeburgh.

ASSOCIATES IN BUSINESS.

The following, having passed the Minor examination, being in business on their own account, and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society:—

Bell, Edward Wrightman .....Boston.
Branston, John William.....Spalding.
Cormack, George .....Newcastle-on-Tyne.
Neal, William .....Croydon.
Oliver, John Robert.....Great Yarmouth.
Parrott, John .....East Molesey.
Snoxell, Samuel .....Guildford.
Thomas, Daniel G. .....Cardigan.
Williams, Ernest B. Billing ...Ponders End.

ASSOCIATES.

Minor.

The following having passed their respective examinations and tendered (or paid as Apprentices or Students) their subscriptions for the current year, were elected "Associates" of the Society:—

Anderson, George Harwell.....Edinburgh.
Blankley, George William .....Arnold.
Catterall, Cuthbert George.....Pontefract.
Clark, William Alfred .....Southampton.
Clayton, John .....Scorton.
Crossling, Frank .....Newcastle-on-Tyne.
Elsdon, Herbert William .....Wells.
Emerson, Richard Wm. James.Hull.
Flint, Richard .....Loughborough.
Harwood, Henry Webster .....Portsmouth.
Heaton, Simon Wood .....Leeds.
Hobson, Edmund.....Cheadle.
Kneale, James Coole .....Douglas.
Lamplough, James William ...London.
Lawrence, Arthur Frederick .. Cambridge.
McRither, Alexander Buchan ..Dundee.
Millen, Herbert Alfred .....Peckham.
Milner, Henry Robert.....Doncaster.
Parish, William .....Cleator Moor.
Sinclair, William Austin.....Leamington.
Sowden, Joseph .....Bowling.
Thomas, John .....Oswestry.
Walden, Henry Ernest .....Southampton.
Wallace, William.....Edinburgh.
Wilson, John .....Aberdeen.
Wilson, John Anderton .....Chorley.

Modified.

Duff, William .....Edinburgh.

APPRENTICES OR STUDENTS.

The following, having passed the Preliminary examination, and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Beadle, Thomas Alfred .....London.
Beales, Walter William .....Eye.
Botterill, Frederick William ...Otley.
Bunn, John Edwin James .....Newent.
Callaway, James Thomas .....London.
Carter, Henry .....Kendal.
Choat, Joseph Newsom .....Lynn.
Daniel, John, jun. .....Dumfries,
Dewing, Charles .....New Malton.
Evans, David John .....Machynlleth.
Gibson, Ernest .....South Shields.
Gough. John.....Shrewsbury.
Hamlin, Charles Booth .....Crediton.
Hindman, John .....Kirkintilloch.
Knowles, Louis .....Leicester.
Laycock, William Frederick ...Lowton.
Martlew, Ernest Hercules .....Southsea.
Peach, Charles William .....London.
Popham, Henry Nicholas .....South Shields.
Pye, Alexander Greig .....Atherstone.
Raimes, Richard, jun.....Edinburgh.
Reid, David .....Bathgate.
Rollett, Harry .....Lincoln.
Stanley, James .....Bulwell.
Stokes, William Charles .....Weymouth.
Thorp, Walter Thomas .....Glossop.
Walters, Edwin .....Ashton-under-Lyne
Watson, Henry.....Spennymoor.
Watson, Lindley Arthur.....Beccles.
Webster, John William .....Dewsbury
West, David Dudley .....London.
Williams, Thomas John .....Plymouth.
Wippell, Alice Mary .....Perth.
Woodward, Moses Mellor .....Nottingham.

Several persons were restored to their former status in the Society upon payment of the current year's subscription and a fine.

ADDITION TO THE REGISTER.

The Registrar reported that—
Joseph Shaw, 1, Queen Street, Hurst, Ashton-under-Lyne,

having made a statutory declaration that he was in business before the passing of the Pharmacy Act, 1868, and this declaration having been duly supported, his name had been placed on the Register.

The PRESIDENT read a letter from Mr. J. B. Stephenson, acknowledging the resolution of thanks passed at the last meeting of Council.

THE CONVERSAZIONE.

The PRESIDENT also stated that a letter had been received from the Science and Art Department saying that the South Kensington Museum would be placed at the disposal of the Society on Wednesday evening, May 18, for the Conversazione.

REPORTS OF COMMITTEES.

FINANCE.

The report and recommendations of this Committee were received and adopted on the motion of the President, who said the only item calling for special notice was the printing account for the Register, which was usually nearly covered by the sales during the year.

BENEVOLENT FUND.

The report of this Committee included a recommendation of the following grants :—

£10 to a former member (1843 to 1864), (aged 70). Applicant has had twelve previous grants. (Sussex.)

£5 to a registered chemist and druggist (aged 50). In bad health, and unable to earn anything. (Scotland.)

£15 to the widow (aged 51) of a member. Applicant has three children dependent on her. (Kent.)

£15 to the widow (aged 56) of a member and subscriber, entirely without means and dependent on her friends. (Yorkshire.)

£10 to the widow (aged 50) of a registered chemist and druggist. Applicant has had five previous grants; has two children dependent on her. (Lincolnshire.)

Two cases had not been entertained, and two had been deferred for further inquiries.

Mr. ROBBINS moved the adoption of the report, and explained one of the cases which had not been entertained.

After some discussion on one case it was referred back to the Committee.

With this exception the report was adopted.

LIBRARY, MUSEUM, LABORATORY AND HOUSE COMMITTEE.

Library.

The report of the Librarian had been received, including the following particulars :—

	Attendance.	Total.	Highest.	Lowest.	Average.
January.	Day . . .	377	23	1	14
	Evening .	151	13	2	7

Circulation of books.	Town.	Country.	Total.	Carriage paid.
January. . .	139	127	266	£1 12 5½

The undermentioned donations to the Library had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors :—

For the Library in London—

Newcastle-upon-Tyne Public Libraries, Supplementary Catalogue, 1887. From the COMMITTEE.

Shimoyama (Y.), Beiträge zur Kenntniss des japanischen Klebreises, Mozigome, 1886. From the AUTHOR.

Thomson's Conspectus, adapted to the British Pharmacopœia of 1885, new ed., 1887. From the PUBLISHERS.

Bentley (R.), Manual of Botany, 5th ed., 1887. From the AUTHOR.

British Pharmaceutical Conference, Year-Book of Pharmacy, 1886, 2 copies. From the CONFERENCE.

Ephemeris of Materia Medica, etc., vol. 3., no. 1. From Dr. E. R. SQUIBB.

American Pharmaceutical Association, Proceedings, 1886. From the ASSOCIATION.

Royal Gardens, Kew, Bulletin of Miscellaneous Information, no. 1, 1887. From the DIRECTOR.

For the Library in Edinburgh—

Ephemeris of Materia Medica, etc., vol. 3, no. 1. From Dr. E. R. SQUIBB.

American Pharmaceutical Association, Proceedings, 1886. From the ASSOCIATION.

British Pharmaceutical Conference, Year-Book of Pharmacy, 1886. From the CONFERENCE.

The Committee recommended the purchase of the undermentioned works :—

For the Library in London—

British Pharmacopœia, 1885, corrected edition.
Kelly's Directory of Chemists and Druggists.
Life and Labours of John Mercer, 1886.
Hayward, Botanist's Pocket-Book, 5th ed., 1887.
Oliver, Lessons in Elementary Botany, new ed., 1886.
Smith, Domestic Botany, 1883.
Radcliffe, A new Departure in Science, 1886.
Lockyer, Chemistry of the Sun, 1887.
Goebel, Outlines of Classification and Special Morphology of Plants, 1887.
Hay, Handbook of British Fungi.
Flora of Leicestershire.
American Homœopathic Pharmacopœia, 3rd ed., 1885.

For the Library in Edinburgh—

Abney, Treatise on Photography.

Museum.

The Curator's report had been received, and included the following particulars :—

	Attendance.	Total.	Highest.	Lowest.	Average.
January	Morning .	362	24	4	14
	Evening .	94	14	1	4

The following donations had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors :—

Specimen of Mwavi Bark, and two Strophanthus pods. From Mr. J. W. MOIR, Edinburgh.

A collection of Native Remedies used at the Cape of Good Hope, and thirty-nine herbarium specimens of the same.
From the ACTING COMMISSIONER, Cape of Good Hope Court, Colonial and Indian Exhibition.

Two trunks of Cinchona Trees from Ceylon. From Mr. THRING.

Twelve bottles of essential oils prepared from Queensland plants.
From Sir J. L. GARRICK, K.C.M G., Q.C., Agent-General for Queensland.

Nine photographs of microscopical sections of plant stems, etc.
From Mr. J. MILTON OFFORD, F.R.M.S.

A specimen of Guadaloupe Vanilla. From Mr. J. C. FILLAN, Dominica.

Two pods of Strophanthus. From Messrs. BURROUGHS and WELLCOME.

Specimen of the essential oils of *Pastinaca grandis*, *Nardostachys Jatamansi*, and Daroo wood. From Mr. D. S. KEMP.

Specimen of malformed Lemons grown at Mentone. From Mr. E. S. BALCHIN.

Specimen of pure Aconitine. From Messrs. HOPKIN and WILLIAMS.

Specimen of recrystallized Proteacin, and of Phloroglucin obtained from Kino (*Pterocarpus Marsupium*).
From Dr. THEODOR SCHUCHARDT, Goerlitz.

Specimen of fasciated stem of Daphne.

From Mr. H. H. POLLARD, Ryde.

Specimen of Resin from the ruins of Tepaneh in Egypt.

From the COMMITTEE of the Egyptian Exploration Fund.

The Assistant Secretary, Mr. J. Rutherford Hill, had reported the following donation to the Museum of the Society in Edinburgh :—

Specimen of the inner bark of the New Zealand Ribbon Tree (*Plagianthus betulinus*), resembling lace bark.

From Mr. J. NICHOL, Waikaka, New Zealand.

The Curator further reported that one hundred and twenty materia medica specimens for the Museum of the Pharmaceutical Society of Australasia had been forwarded through Messrs. Rocke, Tompsett and Co. Twenty-six specimens of materia medica and fifty-two specimens of medicinal plants had been forwarded to the Oldham Chemists' Assistants' Association. A series of duplicate specimens of colonial drugs had been forwarded to the Museum of the Royal Gardens at Kew.

Professors Attfield and Dunstan had attended and reported on their respective classes.

The purchase of some bottles for the Museum and Laboratory, and some necessary repairs in the Library were recommended.

The PRESIDENT moved the adoption of the report and recommendations, which was unanimously agreed to.

CONVERSAZIONE.

The report of this Committee stated the arrangements which had been made for the issue of tickets, refreshments, music, etc., at the ensuing Conversazione, which were substantially the same as on previous occasions.

The PRESIDENT moved the adoption of the report, which was unanimously agreed to.

LAW AND PARLIAMENTARY.

Pharmacy Bill and Early Closing Bill.

The report of this Committee stated what had been done by the President with regard to the introduction of the Pharmacy Acts Amendment Bill into the House of Lords, the Bill having been read a first time on the motion of Lord Milltown.

The Early Closing Bill introduced in the House of Commons by Sir John Lubbock had been considered, and the Committee recommended that it be authorized to take steps for procuring the entire exemption of pharmaceutical chemists and chemists and druggists from the operation of this Bill if carried.

The PRESIDENT moved the adoption of the report. With reference to the first part of it, he said the members would probably have seen that the Bill had been introduced into the House of Lords, and the noble lord who had charge of it endorsed from his knowledge of the law and parliamentary procedure everything asked for, and thought it a right and reasonable proposition, and he had expressed himself to the effect that he could not see that either the Lord President or the Legislature generally would take exception to its provisions. Probably by the next meeting of the Council there might be something further to report on this subject. At present the Bill was waiting for the second reading, and for consideration by the Privy Council. With regard to the Early Closing Bill, he approached it with a considerable amount of delicacy, because everyone interested in the advancement of pharmacy would be only too happy to find some way by which excessive labour in pharmacy should be done away with, and opportunity given both for relaxation in the fresh air and for study. But when they considered the duty cast upon them by the Legislature and the public, they could not shut their eyes to the fact that there were difficulties in the way. The principle of the Bill was that all shops should be closed at eight o'clock on ordinary days, and at ten on one other day, presumably Saturday in most places, and that on the demand of two-thirds of the shopkeepers in a district the local authority might compel the closing of all shops, including those of pharmacists, from two o'clock in the afternoon on one day in the week. It was quite obvious that if the chemists and druggists thought it disadvantageous to be closed at two o'clock in the afternoon they might be outvoted, and therefore, they must assume that where this provision was brought into operation it would have the effect of closing chemists' shops at two o'clock. The position taken up by the Committee, which commended itself to his judgment, was this. They had in that Society and elsewhere by voluntary measures improved the position of pharmacists as principals, and the position of those who for the time being happened to be assistants. They had advocated in every way reasonable facilities for recreation and study during apprenticeship. Many round that table had been the first in London and in the country by voluntary arrangements to shorten the hours of labour. Indeed, in this Bill the author had felt his difficulty with regard to registered chemists and druggists, and he had, therefore, said that such men should not be liable to any fine under the Act for supplying medicines, drugs, or medical appliances after the hour appointed for closing, but this section was not to be deemed to authorize chemists to keep open shop after the said hour. Now, he considered all those engaged in pharmacy, as well as in many other occupations, might be divided into two classes, those who did all they could to promote the general welfare of people about them, and those who were callous, indifferent or impecunious. Now the class most difficult to deal with by any voluntary scheme for closing would have the same opportunity under this exception of doing all that they did now. The shops would be closed under the statute, but there would be a business carried on under the guise of selling medical appliances, which could not be strictly limited, and there would be just the same difficulty as now with regard to finishing work. The shutters or blinds would be down, but the business would be carried on under that exemption clause, and practically there would be one set of men conscientiously carrying out the provisions of the Act, because it was on the statute book, not because they were liable to a fine, and another set which would evade it as much as possible. He did not believe that, if the statute were passed, it would effect what was contemplated, and, therefore, he thought it better it should not be passed at all. Then came the much larger question, how far those who had been trained in a particular way by passing examinations, etc., should be interfered with in matters of this kind. They existed for the benefit of the public, and they must be at the beck and call of the public, and it was a mere question of degree whether the blinds were down or up. He thought they should accept the full responsibility of being, like medical men and others, at the service of the public at all hours of the day or night. On these grounds they claimed to be remunerated, and they must not expect, therefore, that their work could stop short at any given time. If it were possible that the public should cease to want anything they supplied from eight o'clock at night until eight the next morning, they would all be very glad to accept that position; but when the Bill implied by the exception that there must be an attendance after the prescribed hours for supplying these necessities, and inasmuch as in the majority of chemists' shops there was not a staff of assistants, he felt certain that if the Bill passed it would not relieve the assistants or apprentices, except so far as the good feeling and right-mindedness of the principal would allow him to sacrifice himself for their benefit. That being so, he said the proper way was not to interfere with the principal by enactment, but to leave him to do what he would voluntarily. In many parts of London a large part of the business was done at a time

when many people were in bed. It might be said that this could be prevented, but he did not think it could, at any rate in all towns. It must be remembered that in many neighbourhoods small quantities of remedies for the toothache, doses of castor oil, Epsom salts, and so on, very trivial from a financial point of view, but very important to the poor, were wanted very late at night or early in the morning. He had always understood that, at all events outside London, means were usually given for either a rest or recreation in the morning, or some other portion of the day. He thought if that were done it was as much as practically could be done at the present time. Under those circumstances, having regard to the fact that the exemption proposed would practically not achieve the object for which it was intended, it seemed to the Committee that the Council should take the necessary steps for getting Sir John Lubbock to exempt chemists and druggists altogether from the operation of the Act.

Mr. RADLEY seconded the motion.

Mr. HAMPSON said he was glad the Committee had decided to object to the Bill being applied to chemists and druggists, but he should have been better pleased had it objected to the Bill entirely on principle. After all it appeared to him that the purchase of a beef steak was just as important as the purchase of a black draught, and sometimes more so, and he would rather take the broad view that this kind of legislation was unnecessary altogether, and especially so as applied to the calling of chemists and druggists. It would be better almost to take that line than to ask for special exemption for their own particular calling. There was no doubt a gradual and natural tendency to early closing, and a great improvement had taken place in this respect all over the country, but it seemed unwise to bring about, by Act of Parliament, any hard and fast line with regard to the shutting of shops. The present was a time of what might be almost called cannibal competition, and those who had to struggle most required the fullest opportunity to gain their living. It would be an extraordinary hardship, especially in the East-end of London, and large manufacturing centres, where the wants of the poor were often attended to in the evening, to compel small traders to close at a particular hour. It appeared to him an unwise interference with the freedom of trade, and he should much prefer therefore to oppose the Bill on principle.

The PRESIDENT said he did not wish to stop Mr. Hampson. The view the Committee had taken was that it was stated in the press that a large number of traders in general callings wished the Bill to pass, and the members of the Committee, as chemists and druggists, though they knew their own calling, could not be supposed to know the requirements of all other trades, and therefore it was deemed wise to confine themselves to their own craft.

Mr. HAMPSON thought that chemists and druggists were intelligent enough to understand what was going on all around them. They belonged to the shop-keeping class, and knew exactly the circumstances which existed. He therefore thought the broad principle of opposition to the Bill was much better than asking for an exemption for themselves, and leaving the principle untouched as it affected other persons.

Mr. WOOLLEY said this Bill had been considered by the local association at Manchester, and those present were distinctly in favour of the Bill, provided they could not get a better Bill; their idea of an improvement was that such people as tobacconists should not be allowed to keep open. For his own part it seemed to him an interference with the liberty of the subject, which was much disregarded in these days, and it was only a little further addition to much grandmotherly government; still, at the meeting of the Manchester Association the trade was practically unanimous in favour of the Bill.

Mr. SAVAGE said there was something to be said on both sides. He had known cases where there had been perhaps three chemists in a district, two of them agreed to close at a certain time, but the other said no, and that prevented any of them closing. You could not expect any two men to close, and allow a number of those living in the neighbourhood to go to No. 3. At the same time he quite agreed in the necessity, as far as their trade was concerned, of being exempt from the operation of the Bill, though he could scarcely agree in the general view taken by Mr. Hampson. Still it was very well known that a great number objected, and a great number approved of this legislation, and he believed the majority throughout the country would be found to approve of a compulsory measure for closing, because there were always black sheep who stood in the way of reform.

Mr. RICHARDSON said the President had so fully represented the feeling of the Committee on this question that it was hardly necessary to say anything more. Mr. Hampson would admit that the Council represented the pharmacists, and he believed the butchers, bakers and candlestick makers would also make a strong protest against the Bill, and he did not think there was a chance of its ever becoming law. In the country, especially since he had the privilege of being an apprentice and a chemist in the open shop, rapid strides had been made in the interests both of apprentices and assistants. When he was an apprentice he had to commence at eight o'clock in the morning and keep on until nine, and sometimes ten at night, and on Saturday till twelve. That practice did not exist very much now. In Leicester most shops closed at eight, and on Thursdays at two o'clock. Years ago that was never dreamt of. Labour was less in every walk of life than it was ten or twenty years ago. The gentleman who brought forward this measure in the interests of traders could not know the immense strides that had been made. He had no doubt that in close premises there was a great deal of hardship, but he thought the more dignified course for the Council to take would be to object to the Bill in the interests of chemists and druggists, leaving it to other trades to oppose it on their own account.

Mr. HILLS thought it was hardly necessary to add anything to the remarks made by the President, but he could corroborate what had been said by him and by Mr. Richardson. He was utterly opposed to the principle of the Bill and entirely agreed with Mr. Hampson. There appeared to be a great difference of opinion amongst the pharmaceutical chemists and the chemists and druggists, and that being the case he thought the wisest thing for the Council to do would be to adopt the recommendation of the Committee. If there were any other opportunity for assisting shopkeepers generally to oppose the Bill he should be happy to join in doing so, but even if the Bill passed he did not think it would be worth the paper it was printed on.

Mr. ATKINS agreed as to the desirability of exempting chemists from the provisions of the Bill, but at the same time he thought there was a great deal to be said on the other side of the question with regard to its general policy. That, however, was not before the Council. No doubt the general traders and the public would take care of their own interests, and it was hardly necessary to say a word more after the complete way in which the President had put the case. He noticed the President did not commit himself to any opposition to the Bill on general principles, and when one looked at the names on the back of the Bill, including not only Sir John Lubbock, who had given the country a great boon in the Bank Holiday Act which was highly appreciated, but other representative men on both sides of the House connected with labour and with finance, he hoped that while for the reasons which have been so well expressed chemists and druggists would be exempted from this Bill, the Council would not go further and oppose the general principle.

Mr. RICHARDSON asked if public houses were to be closed.

The PRESIDENT said no, nor newsagents. The exemptions were at the end of the Bill.

Mr. ROBBINS said some time ago he was asked to sign a paper saying whether he approved of the Bill or not. He at once said it looked very much like grandmotherly government, which he did not like, but the principle the author sought to carry out was certainly very desirable. The movement in favour of early closing commenced many years ago, and it had gone on, and this was simply carrying out by Act of Parliament what was being carried out individually. It seemed to him, therefore, there was no necessity for the Bill. Mr. Woolley said that at Manchester the chemists were in favour of it, and Mr. Richardson said they already carried out in Leicester everything proposed in the Bill, so it appeared as if they liked to be good, and did not like to be forced to be good. It seemed to him it would be rather awkward if the chemists in other towns met and approved of the Bill, as they had in Manchester, and the Council opposed it. He could not say he approved of the Bill, though he approved of its object.

Mr. SYMES said he should support the recommendation of the Committee. He had always been a strong advocate of early closing, but he advocated it voluntarily. He failed utterly to see why the shops that vended luxuries such as tobacco should be allowed to remain open whilst those of chemists and druggists were obliged to close. Looking at the exempting clause, it certainly appeared at first sight that it would serve their purpose, but they all knew from experience that it was difficult to draw the line as to what was a medicine absolutely required. A person might want a bottle of medicine and a bottle of eau de cologne—one to be taken internally, and the other to be applied externally, say for a headache. But there was an evil beyond that; there were certain exemptions, such as tobacconists and newsagents, and if the public failed to be supplied with the drugs that they required in the chemist's shop these people would take to supplying them if they were outside the provisions of the Pharmacy Act, and that seemed to him a very serious matter. He thought the Bill utterly unnecessary. When he commenced business he closed at eight, notwithstanding there were twenty shops around him who kept open till nine, and he believed it did him good rather than harm. He would support the Committee strongly, and should be happy to do anything he could in his own locality, in regard to interviewing members of Parliament and otherwise, that would assist in obtaining the exemption asked for.

Mr. SOUTHALL thought it seemed a little strange for the Council to oppose this Bill for closing shops at a reasonable time seeing that chemists and druggists would have the liberty of selling anything which the public could really require. By closing their shops they only intimated to the public that they did not want to trade after eight o'clock, but they kept a night bell and were ready at any time to supply medicines. They had a Bill for education now before Parliament, which they hoped would get through, and if they were to give young men extra education they must certainly endeavour to shorten the hours of business as much as possible; and this Bill gave them the opportunity of doing so. Perhaps those who lived in the middle of a town did not need it, but those who lived in the outskirts did require a little help such as this Bill could give them in order to give them the courage they required to put up their shutters. He believed it was a great advantage to go in for early closing, and that suburban chemists would not suffer by it any more than those in the centre of a town. He hoped, therefore, the opposition would not be proceeded with.

Mr. ALLEN said he, like Mr. Atkins, should have had something to say on another side of this question, were it not that it seemed to him that the whole necessity for the Bill was taken away by an Act which came into operation in November of last year, but which seemed to have already fallen dead. He referred to the Shop Hours Regulation Bill, by which it was enacted that no young person under the age of eighteen should be employed in a shop for more than seventy-four hours per week. He could not understand, in this century at any rate, why Parliament should by any enactment interfere with the hours of labour of men and women; it seemed to him an improper interference with the liberty of the subject.

Mr. WILLIAMS said he did what he could to persuade the Committee to oppose the Bill entirely and on principle, for he had a great horror of anything like coercive legislation, unless it were absolutely essential to the safety of the people at large. Such measures should be had recourse to in the last resort only, not in the first, and therefore he entirely disagreed with the attempt to bring about even a good result by coercive means. The members of the Committee, however, came to the conclusion that it would be better to limit themselves to the considerations which affected their own body, and this was perhaps, on the whole, the wisest course to adopt.

The PRESIDENT said there seemed to be a general feeling, except on the part of Mr. Southall, in favour of the soundness of the conclusion arrived at by the Committee, and he would therefore confine himself to Mr. Southall's observations. He thought Mr. Southall looked at the matter from the point of view of an old historic house with a large staff. He did not know Birmingham very well, but he should imagine there were a number of people who were employed in Birmingham until eight o'clock; that they then went to the suburbs, and there they had to get the things which they had not time to get in the day; they must either get them very early in the morning, or after eight o'clock at night. The result was that legislation for the centre of a town was not suitable for the outskirts; what suited London did not suit other parts of the country. The average chemist and druggist simply thought he should be compelled to shut up, and he said "a good job too." But it would not be so; the shop would be shut up by statute, but the door might be open, and those who took a lax view of moral duty would go on trading vigorously under the exemption. He could take Mr Southall to places in London where a roaring business was done on Sundays, and on other days up to twelve o'clock at night, although the shop was shut up. He did not know whether the places belonged to chemists or medical men, but they were generally known as chemists' shops. You could not by any form of statute reach individuals who cared nothing for those about them, and he feared their friends were misled if they thought they were going to be taken in hand by some superior power which should make all do alike. Early closing was an individual question; every man who had any backbone could shut early if he liked, and did not want anybody to help him. When they had complaints by assistants in some houses where they were overworked, and heard of the desirability of forming a shop-hours league, to be composed solely of assistants in various trades for the purpose of coercing employers to fix certain hours, he would like to remind them of a case within his own knowledge. Some twenty years ago several members of the Council residing in London agreed that greater opportunities for study should be given to their young men, and a great many houses in a certain part of London were thenceforward closed partially at seven, and entirely at eight o'clock, and he knew of one house at least which was shut completely at seven. Now he knew a case in a street where no business of any general kind was done after seven o'clock, in which a young chemist (who not long ago was an assistant in a historic house, and of course was then a strong advocate for early closing) had started in business, and he thought it right to keep his shop well illuminated until twelve o'clock at night, and partially on Sundays. He was within a stone's throw

of several of those houses which had been doing all they could for their people for the last twenty years, but none of them would like to go and ask Parliament to compel that man to shut up. They said no, he may have a hard struggle to get a living, and he must be allowed to try in his own way. It seemed to him altogether unwise on general grounds to interfere in this matter, but the great objection which the Council had to this Bill was that it would not give the leisure and the freedom from worry and anxiety which was expected; the smallest firms as well as the largest would have to keep a representative or some one in the shop to supply medical appliances, and that being so, it was impossible by legislation to benefit the craft with regard to the actual hours of keeping open shop.

The motion was then carried.

GENERAL PURPOSES.

The report of this Committee, which was as usual read in Committee, included the usual letter from the Solicitor, stating the progress made with cases placed in his hands.

The resolution passed by the Sheffield Pharmaceutical and Chemical Society on January 12 had been considered, and it was recommended that the Society be informed that the case referred to was not one in which it was desirable to institute proceedings.

A communication addressed to the Council by a rejected candidate at a recent examination at Edinburgh had been considered, and it was recommended that the writer be informed that the Council had no power to interfere with the decision of the Board of Examiners.

On resuming, the report and recommendations were unanimously agreed to on the motion of the PRESIDENT.

THE ANNUAL REPORT.

The preparation of the Annual Report was referred to the Library and Museum Committee.

It was resolved that the Annual General Meeting be held on Wednesday, May 18, at twelve o'clock.

REPORT OF EXAMINATIONS.

February, 1887.

ENGLAND AND WALES.

	Candidates.		
	Examined.	Passed.	Failed.
Major (22nd)	7	4	3
„ (23rd)	7	3	4
	—14	—7	—7
Minor (22nd) . . .	29	11	18
„ (23rd)	27	11	16
„ (24th)	31	18	13
„ (25th)	30	13	17
	—117	—53	—64
Modified (25th) . . .	1	0	1
	132	60	72

Preliminary Examination.

Five certificates were received in lieu of the Society's Examination :—

2 University of Cambridge.
1 „ „ Glasgow.
1 „ „ Oxford.
1 Incorporated Law Society.

THE IMPERIAL INSTITUTE.

The PRESIDENT read the following letter which had been received from Sir F. Abel :—

"Imperial Institute of the United Kingdom,
the Colonies and India.
"1, Adam Street, Adelphi, London, W.C.
"*February* 7, 1887.

"Sir,—I have received the instructions of His Royal Highness the Prince of Wales to submit to you the request that you will be so good as to inform the Council of the Pharmaceutical Society of the hope entertained by His Royal Highness that they will feel disposed to invite the members to take part in the foundation of the Imperial Institute of the United Kingdom, the Colonies and India, which is being established in commemoration of the fiftieth year of the Queen's reign.

"The Prince of Wales feels sure that those whose profession, and whose interest in its advancement, are intimately interwoven with their devotion to the cultivation of those branches of science upon which its exalted position and inestimable benefit to the world at large are based, cannot fail to have the warmest sympathy for the realization of the measures included in the admirable scheme for the Imperial Institute which has been prepared by the Committee appointed by the Prince of Wales.

"That scheme has received the special approval of Her Majesty, as constituting a fitting and most acceptable monument of the respect and affection entertained for her by her subjects, and of her constant desire to promote any public movement having for its object the intellectual and natural advancement of every class and race of her people, and the promotion of the unity of her empire.

"Should your Council be willing to appeal to your members to transmit through you donations to the fund required for the establishment of the Imperial Institute the Pharmaceutical Society would become directly identified with this national tribute to the Queen on the occasion of her Jubilee.

"I beg leave to enclose a pamphlet descriptive of the nature and objects of the Institute, and shall be glad to give directions for the transmission to the Society of this and other papers for distribution among the members should the suggestion of His Royal Highness be favourably entertained by yourself and your Council.

"I have the honour to be,
"Your obedient servant,
(Signed) "F. A. ABEL,
"*Organizing Secretary.*

"The President of the Pharmaceutical
Society of Great Britain,
"17, Bloomsbury Square, W.C."

The PRESIDENT then moved :—

"That the Library, Museum, Laboratory and House Committee be requested to take such steps as may be deemed desirable to carry out the request contained in the letter from Sir F. Abel, dated February 7."

Mr. ATKINS feared the special appeal the Council was about to make on behalf of the Benevolent Fund would interfere with any large response to this appeal. It should also be remembered that appeals were being made all over the country on behalf of the Imperial Institute, and he would therefore recommend that too much should not be made of this appeal, seeing that many of their members were already dealing with it individually. He should not send out a special circular, but should be content to insert a letter in the Journal. The Council had been doing all it could in the way of granting annuities, hoping to recoup the Fund by means of the special appeal about to be made; and therefore he was not in favour of pressing the claim of the Imperial Institute beyond, perhaps, calling attention to it in a short editorial article.

Mr. SCHACHT thought this communication should be courteously acknowledged, but he thought it would be unwise for the Society to open a special fund for the Imperial Institute. He thought the answer to the letter should be that every publicity should be given to the letter, and he saw no objection to placing a copy in the hands of all the members, but that the members being distributed all over the country would probably prefer to give their contributions in their own neighbourhood, and therefore the Council thought it would be unwise to ask for special donations to a central fund.

Mr. ATKINS hoped Mr. Schacht would not ask for a copy of the letter to be sent to every member. He

thought the publication in the Journal would be quite sufficient.

Mr. SCHACHT said he had no strong opinion about that. But he should strongly oppose a special fund being opened.

Mr. RICHARDSON said that it would be very absurd if the Council were to go to the expense of distributing these documents to the whole of the craft; it would be quite sufficient if the letter were published as part of the day's proceedings, and if the President liked to head the subscription with 100 guineas no doubt many others would prefer to send their subscriptions through the Society instead of through any local channel. In his own town there was a great difference of opinion whether they should support the local list, or send their subscriptions direct on through some central body such as the Society of Arts. One gentleman had intimated that he should give £500, but he would not have it included in the Leicester list, and was going to send it to London on his own account. Some might prefer to contribute through the Pharmaceutical Society, but he should be very sorry to do anything which could be in any way antagonistic to the Benevolent Fund.

Mr. ALLEN endorsed the view that publication in the Journal would be sufficient, without sending an individual appeal to each member. Some few months ago the President jokingly remarked that the establishment of the Research Laboratory would be a fitting celebration of the Queen's Jubilee, and it really appeared to him that there was a good deal of truth in that. The Colonial Exhibition brought the Society in touch with a great many gentlemen from India and the Colonies, and it was quite evident that they found in the Society a considerable amount of help in the work they were carrying on, and hoped to carry on in future. With a research laboratory established, there would be a further aid to their work, and a still closer bond of connection between them. Such an institution must of necessity be an adjunct to the Imperial Institute, in fact, it was understood that there were to be laboratories in connection with the Institute; but in Bloomsbury Square, there would be a definite scheme which would be worked out by men thoroughly acquainted with every technicality connected with it.

Mr. SAVAGE said every town and village was being appealed to for the Imperial Institute, and many persons were getting thoroughly sick of it. At Brighton the Mayor had been appealed to; several meetings had been held and subscriptions were invited, seventy per cent. of which were to go to the Imperial Institute and the remainder to a Free Library and other things. He feared the President would have hardly anyone to appeal to except those who were already bound to subscribe elsewhere.

Mr. WILLIAMS reminded the Council of the wording of the letter, which asked if it would be willing to appeal to the members to transmit donations, so that the Society might become directly identified with this national tribute. He did not think the view taken by Mr. Allen had any bearing on the question; if carried to a logical sequence the Council would have to reply that it had already formed its own view as to the manner of celebrating the Jubilee. But that would be hardly correct, because there was no thought of the Jubilee when the Council commenced the work. He did not think a mere publication of the letter in the Journal would meet the case; but the other document referred to ought to be put before the members, and then if anyone chose to send his subscription through the Society he could do so. As far as he was concerned he had already subscribed and could not do so again, the three Chemical Societies having combined together to raise a fund.

Mr. ROBBINS said the Council was asked by the letter to do something, which it could either do or not, but it must decide at once which course to take. He was quite sure that Sir F. Abel would prefer the Council doing nothing to simply publishing his letter in the Journal. A treasurer must be appointed, and people must be told where to send their money. It would be very awkward to create all this machinery, and then have only a very trifling sum to hand over. It might be said it was not politic for certain reasons to move in the matter at all; but if anything were done, an effort should be made to send in a respectable sum on behalf of the Society.

Mr. HILLS thought if the appeal were published in the Journal, with a small leader calling attention to it, it would be far better than sending out a pamphlet specially such as every one was inundated with. The Council was only asked to appeal to the members, which it might fairly do through the Journal, and very likely a fair amount might be collected, which the Society need not be ashamed of, without any undue pressure.

Mr. HAMPSON said he did not quite understand what the Imperial Institute was, and, therefore, he could not recommend his fellow-members to subscribe to it. If they thought fit to send in money for this particular purpose, about which so little was known, he would much rather they should do it, individually, in their own localities; for he did not want the Council to take the responsibility of recommending this scheme. He was extremely glad, as they all were, that Her Majesty had lived so long; but if it was necessary to establish some great institution, it was also necessary to know where it was to be placed. There was a very great difference of opinion as to its utility, and he certainly felt indisposed to do anything towards furthering this scheme in any way whatever.

Mr. CROSS, as a loyal subject of Her Majesty, was obliged to differ from Mr. Hampson, and he should be sorry if the Pharmaceutical Society, when appealed to in its corporate capacity to further an object which was ardently supported by the heir to the throne, and which had the sanction and hearty approval of Her Majesty, should put it aside. He thought the Committee was perfectly qualified to deal with the matter, and having heard that discussion would know pretty well what were the wishes of the Council in the matter.

Mr. SOUTHALL supported the motion.

Mr. SCHACHT was not quite clear even now what was intended to be done by the Committee, and was inclined to move an amendment to the effect that a communication should be addressed to Sir F. Abel informing him that it was not deemed desirable to open a special fund for this purpose, but that the Council would be happy to do anything in its power to make the Imperial Institute known to the members of the Society, who, being distributed throughout the country, were many of them known to be already interested in local subscriptions for this purpose.

Mr. ATKINS said he should be glad to second the amendment, but he did not think it necessary, as he understood the Committee would have full power to deal with the matter.

The PRESIDENT said the motion referred the subject to the Committee to carry out the request contained in the letter.

Mr. ATKINS said he thought the Committee could do what it saw fit in the matter.

Mr. SCHACHT said he wished to bind the Committee not to invite subscriptions to a special fund.

Mr. ATKINS said he had already in his own town subscribed to the Imperial Institute, and he could not give another subscription through the Pharmaceutical Society. He had been applied to by three organizations already.

Mr. ROBBINS said he should have a number of applications from different societies also, but he should prefer to send his subscription through the Pharmaceutical Society.

In answer to a question, the PRESIDENT said if the motion were carried the Council would be bound to issue a circular and open a fund.

Mr. HILLS thought it would be a pity to have a division on this question, but the spirit of the request might be carried out without sending out a number of

pamphlets all over the country. He should prefer to subscribe as a pharmaceutical chemist rather than in any other capacity. No doubt many others would have the same feeling.

Mr. RICHARDSON was opposed to any money being spent in advertising this appeal, but he thought the subject need not be referred to the Committee at all. The Council might decide at once to open a fund.

Mr. SCHACHT suggested that it would only tend to injure local efforts. London chemists might have a fund of their own, if they liked, but they did not kuow the amount of pressure which was brought to bear in the country.

The PRESIDENT said he could not help thinking that Mr. Schacht had somewhat misunderstood the terms of the letter, and he was also mistaken in supposing that Londoners had not as many appeals as those living in the country. The Council had been asked to put this before the members, and could it refuse to do so?

Mr. SCHACHT: No.

The PRESIDENT said then the only objection was to opening a special fund. On the other hand, all the other learned societies having been appealed to, it might have been considered as a slight if the Pharmaceutical Society were not treated in the same way. He thought the matter should be dealt with in a business way, putting the invitation before the members, but exercising no pressure of any kind, and leaving it to the Committee to decide how it should be done.

After some further discussion the motion was put and carried, with two dissentients.

THE BENEVOLENT FUND.

The PRESIDENT said it might be as well in view of the resolution just passed to take the opinion of the Council whether it would be advisable to push forward the appeal for the Benevolent Fund this year, as already arranged. It was a question with many whether these Jubilee funds would not interfere with the success of their efforts.

Mr. WILLIAMS thought the annuitants would not consider it much of a Jubilee if their supplies were cut off.

Mr. ATKINS thought the Council had better go on and do the best it could.

It was therefore agreed that the arrangement made last month for the holding of the Benevolent Fund Dinner in May next should be carried out.

Mr. BOTTLE called the attention of the Council to the report in the last issue of the Journal of a meeting of the Leicester Chemists' Association, in which the president of that Association was reported—he hoped inaccurately—to have said that he denied the right of a few West-end chemists to speak for the trade at large, as they did not understand the views and requirements of provincial pharmacists. It appeared to him that that was a libel on the President and the members of the Council resident in London. No other West-end chemists had assumed any right to speak for the trade at large, and it was not only the right but the duty of the Council to give expression to the views and wants of the trade. During the thirty years he had had the honour of a seat at that Board, he had invariably found the London chemists had been as well posted in the wants of provincial pharmacists as he was himself, and that they had as much sympathy for those wants. He hoped Mr. Richardson would be able to put some other interpretation on the report and would invite him to do so.

Mr. RICHARDSON said the report in question was sent by the hon. secretary of the Society in Leicester, a very active member, who did not write shorthand, and must have prepared it mainly from memory; but he was not going to deny the substantial accuracy of what was stated, though no doubt if the whole of his remarks had been reported verbatim, there would have been a good deal which might at any rate palliate what seemed a little offensive towards the chemists of London. He was not the first person who had said publicly that the London chemists did not know the requirements of the country pharmacists; but he was free to confess, after the admirable speech they had heard that morning from the President on the Early Closing Bill, that he at any rate had a most intimate knowledge of those requirements. He was quite converted with regard to the President, and should be happy to contradict what he had said at Leicester, but he would not go so far as to say that all West end pharmacists had the same perfect knowledge. With reference to the President he confessed his error, and begged his pardon. With regard to other gentlemen—he said it out of no disrespect to them, for he esteemed them highly; but it was the grand principle of the Society that every portion of pharmacy should be represented at that Board, and he hoped that out of this large store of varied knowledge the best results for the whole would result. He hoped this explanation would be satisfactory to his friend Mr. Bottle, whom they all looked up to as a guide; he should be very sorry to say a word which would cause him the slightest pain, and if he had he would withdraw it at once.

EXAMINATIONS IN LONDON.

February 22, 23, 24 and 25, 1887.

Present—22*nd.*—Mr. Carteighe, President; Mr. Gostling, Vice-President; Messrs. Barnes, Blunt, Bowen, Corder, Fletcher, Gale, Gerrard, Greenish, Linford, Ransom, Symons, Tanner and Thresh.

23*rd* and 24*th.*—Mr. Carteighe, President; Mr. Gostling, Vice-President; Messrs. Barnes, Blunt, Bowen, Corder, Fletcher, Gale, Gerrard, Greenish, Linford, Ransom, Symons, Tanner, Taylor and Thresh.

25*th.*—Mr. Carteighe, President; Messrs. Barnes, Blunt, Bowen, Corder, Fletcher, Gale, Gerrard, Greenish, Linford, Ransom, Symons, Tanner, Taylor and Thresh.

Dr. Greenhow was present on the 22nd and 24th on behalf of the Privy Council.

MAJOR EXAMINATION.

22*nd.*—*Seven* candidates were examined. *Three* failed. The undermentioned *four* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Barnes, William Robert .....Plaistow.
Bury, James Edward .....Evesham.
Parkinson, William.....London.
Puckey, William .....Bishop's Stortford.

23*rd.*—*Seven* candidates were examined. *Three* failed. The undermentioned *four* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Edwards, Alfred Egbert .....London.
Stark, Arthur Campbell .....Norwich.
Wood, Arthur William .....London.

MINOR EXAMINATION.

22*nd.*—*Twenty-nine* candidates were examined. *Eighteen* failed. The undermentioned *eleven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Bennett, Arthur .....Widnes.
Bond, Ernest Greensill .....Liverpool.
Calvert, Albert Matheson .....Belper.
Carpenter, Frederick Ernest ...Cirencester.
Clark, William Alfred.....Southampton.
Clayton, John .....Scorton.
Coles, Arthur .....Uxbridge.
Collins, Alfred .....Bradford.
Couzens, Albert Ebenezer .....Westbury.
Crossling, Frank .....Newcastle-on-Tyne.
Dawson, Edwin .....Stamford.

23*th.*—*Twenty-seven* candidates were examined. *Sixteen* failed. The undermentioned *eleven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Elsdon, Herbert William .....Wells.
Emerson, Richard Wm. James.Hull.
Felton, William .....Maidstone.
Flint, Richard .....Loughborough.
Forbes, Alexander .....Fraserburgh.
Foulkes, Edward James.....Whitchurch.
Gourlay, Henry Hamilton .....Lytham.
Green, Herbert.....Hucknall Torkard.
Gwillim, Walter Robert.....Abergavenny.
Hamer, Edward Sidebottom ...Pendleton.
Harries, David .....Carmarthen.

24*th.*—*Thirty-one* candidates were examined. *Thirteen* failed. The undermentioned *eighteen* passed, and were declared qualified to be registered as Chemists and Druggists :—

Harwood, Henry Webster .....Portsmouth.
Heaton, Simon Wood .....Leeds.
Hildyard, William .....Woodbridge.
Hill, Ernest Victor .....Walthamstow.
Hine, Alfred Ernest .....Beaminster.
Hobson, Edmund.....Cheadle.
Jenkins, John Lewis .....St. Clears.
Jones, Maurice Howell .....Machynlleth.
Kneale, James Coole .....Douglas.
Lamplough, James William ...London.
Lance, Henry .....Bow.
Lawrence, Arther Frederick ...Cambridge.
Milner, Henry Robert.....Doncaster.
Page, William Armstrong .....Ironbridge.
Parish, William .....Cleator Moor.
Paul, Henry Stanley .....Birmingham.
Thomas, John .....Oswestry.
Young, Edward .....Sudbury.

25*th.*—*Thirty* candidates were examined. *Seventeen* failed. The undermentioned *thirteen* passed, and were declared qualified to be registered as Chemists and Druggists :—

Sinclair, William Austin.....Leamington.
Sowden, Joseph.....Bowling.
Templeman, George.....Southwell.
Thomas, Isaac Jenkin.....Aberavon.
Thompson, Henry Edward.....Sheffield.
Turner, Harold Strange .....Winchester.
Upson, Arthur .....Southampton.
Waddington, Alfred Henry ...Bradford.
Walden, Henry Ernest .....Southampton.
Wallis, Philip James .....Wellingborough.
Walshaw, Richard Carnelly ...Wakefield.
Walters, James Lewis.....Burry Port.
Wilson, Joseph.....Bradford.

MODIFIED EXAMINATION.

25*th.*—*One* candidate was examined, but failed.

PRELIMINARY EXAMINATION.

25*th.*—Certificates by approved examining boards were received from the undermentioned in lieu of the Society's examination :—

Atkinson, Alfred .....Bishopton Mills.
Crawford, David ....Rutherglen.
Smith, Rowland Roche .....Tenby.
Tovey, Arthur John Henry ...Doncaster.
West, David Dudley .....London.

Proceedings of Societies in London.

ROYAL INSTITUTION.

Sunlight Colours.

A large and interested audience was present at the Royal Institution on the 25th ult. to hear a lecture on "Sunlight Colours," delivered by Captain W. de W. Abney. The lecturer commenced by exhibiting some recent improvements in instruments for measuring coloured rays, introduced by General Festing and himself. A ray of electric light of definite intensity is intercepted by a prism and made to throw its spectrum upon a screen. Any part of this spectrum can be completely cut off at the will of the operator by passing the decomposed ray through an instrument provided with a sliding scale, the structure of which was explained by the lecturer. Thus by a suitable adjustment of the sliding scale, any single required colour can be allowed to fall upon the screen and constitutes the standard for examination in that particular colour. If a ray of light from any source be placed under examination in order to ascertain the amount of a certain colour it manifests, it is only necessary to cause two shadows to be thrown upon the screen respectively by the standard ray and the ray under examination, and then to regulate the intensity of the latter until the two shadows are identical. This regulation is effected by obstructing the course of the ray by means of a disc provided with movable fans, revolving at right angles to its path, the intensity of the light thrown upon the screen being altered by increasing or diminishing the space between the fans. Further, by means of the same instrument, Captain Abney has not only found that most persons show some deficiency in their capabilities for colour perception—that is to say, are more or less colour-blind—but he has also, by making experimental tests in each colour, constructed curves showing the capabilities of individuals in this respect. Curiously enough the lecturer stated that General Festing and himself had identically equal powers of distinguishing colours and had not been able to find anyone possessing higher capabilities. Captain Abney therefore proposed to designate the curve representing their power of perception, the normal curve. A great number of persons tested by Captain Abney have been pronounced by him deficient, several prominent artists having been found to possess two-thirds of the normal colour perception, whilst other individuals only possessed one-half or even one-third. This deficiency was most marked in the red colours. The lecturer then referred to the statement made last year by Lord Rayleigh, to the effect that in turbid mediums red rays are transmitted better than blue rays. Professor Tyndall has brought forward the same idea in his theory of the formation of the blue colour of the sky, by stating that any fine particles in the air scatter and reflect more blue light than red light. An experiment shown by Captain Abney in his lecture, however, is the best illustration of this fact yet exhibited to an audience. A ray of decomposed light was made to pass through a vessel containing a clear solution of hyposulphite of soda before being projected upon a screen. Upon the addition of hydrochloric acid to the hyposulphite of soda solution, a fine deposit of sulphur began to form, and simultaneously with its initial formation, the blue end of the spectrum disappeared. As the deposit of sulphur increased in density, the other parts of the spectrum adjacent to the blue began to disappear, until finally only the red band of the spectrum was distinguishable. Turning then to matters more directly connected with the title of his lecture, Captain Abney explained the blue haze over distant landscape to be due to the partial obstruction of the blue rays by minute particles in the air. This haze is very noticeable in England, where moisture is nearly always present in the atmosphere, either as vapour or in fine particles of water, but in Egypt or the High Alps, the lecturer stated, there was no such appearance. In the former country the absence of the phenomenon is no doubt due to the absence of moisture owing to the intense heat and nature of the country; but in the latter regions Captain Abney considered it due to the fact that the particles, having a greater density than air, sank to the lower regions, leaving the atmosphere of higher altitudes comparatively devoid of them. Another proof of the greater transmitting power of red rays in turbid mediums was pointed out by the lecturer in the appearance of the vista of lamps in long London streets lately, where, owing to the presence of some amount of fog, the apparent colour of the lamps ranged from a yellow tinge

with the nearest, to a reddish-yellow with more distant ones, and even, according to Captain Abney, to a scarlet colour. A series of photographs were then projected upon a screen, and Captain Abney pointed out that in those taken at low altitudes objects in the distance were indistinct, and the shadows not very marked, but that as higher altitudes were reached distant landscape became much more distinct and appeared nearer, whilst shadows became very definite, causing a remarkable disappearance of intermediate tints. In concluding, the lecturer made some remarks which rather discredited the results arrived at as to the colour of the sun by the observations of Professor Langley, which were embodied in a lecture before the Royal Institution last year. Although the figures given by Professor Langley apparently show a large preponderance of blue rays in sunlight, yet Captain Abney assured his hearers that even allowing these figures to be correct the amount would scarcely give a blue tinge to the sun's rays. Still, the fact that the turbid state of the earth's atmosphere does seriously affect the transmission of blue rays from the sun is evident from Captain Abney's statement that sunlight at South Kensington last December only contained one-twentieth the amount of blue rays observed in sunshine on the Riffel the previous September. The lecturer caused a pleasurable surprise at the close of his lecture by the imitation, on a minute scale, of the setting sun. Having explained that although the sun, when at an angle of 50° to its zenith passed through what was equivalent to 1·5 thicknesses of the earth's atmosphere, yet at an angle of 85° it passed through 9·2 thicknesses, and at 90° through 35·5 thicknesses of atmosphere, he pointed out that the nearer the sun approached the horizon the greater would be the exclusion of all the rays except the red, which caused the noticeable appearance of the sun at the horizon. An intense ray of electric light passed through a gradually thickening medium exhibited very well the marked gradation of the sun's change from a yellow to a bright red at sunset.

Provincial Transactions.

MANCHESTER PHARMACY STUDENTS' ASSOCIATION.

A meeting of this Association was held in the Materia Medica Museum of the Owens College, on Thursday evening, February 24, Mr. W. Lane, Vice-President, in the chair.

Mr. W. Elborne gave an interesting demonstration on "Some Drugs and Specimens from the Colonial Exhibition of Special Interest to Students." The lecture was demonstrated from the following specimens:—A log of *Guaiacum officinale*, showing the duramen or heart wood and resin exuding from the same, from Jamaica. A log of camphor wood (probably *Dryobalanops Camphora*), the source of Borneo camphor. Logs of yellow sandal wood (*Santalum album*), and of *Santalum Yasi*, the latter from the Fiji Court. A log of red sandal wood, *Pterocarpus santalinus*, nat. ord., Leguminosæ. Logs of cultivated *Cinchona officinalis* and of *C. succirubra*, showing longitudinal incisions in the bark, illustrative of the method of cultivation known as the "mossing" system. Perfect fruits of *Theobroma cacao* and of *Coffea arabica*, together with the dried seeds of the same. Nutmeg fruits incised in such a manner as to show in the interior the mace and testa of the seed. Some unusually fine fruits of *Cassia fistula*, *Ægle Marmelos*, *Ricinus communis*, and of *Gossypium barbadense*.

At the close of the lecture an interesting discussion ensued, in which the Chairman, Messrs. Husband, Wilkinson and Wilson took part.

Mr. Elborne having replied, the business of the meeting concluded.

The next, the "Annual General Meeting," was announced for March 24th.

TORQUAY CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting of this Association was held on February 23, Mr. T. Ness occupying the chair. There was a good attendance.

It was announced that Mr. A. Hoare had been placed first in the Curriculum Essay Competition.

Mr. Aplin read a paper on the Minor examination, treating the subject under four headings:—(1) When to commence study, (2) How and what to study, (3) Schools as aids to study, (4) The examination itself. The time to commence study was declared to be the same as that at which dusting was commenced; a good idea of treating the various subjects was given. Schools of pharmacy were shown to be useful as aids, as they offered facilities which were not always present in chemists' shops. Students were advised not to view the examination with alarm, or the examiners with mistrust, but to work steadily and honestly, as by so doing they had nothing to fear.

Mr. W. Smith proposed a vote of thanks to the essayist, and endorsed the chief points of the paper. Mr. Fooks seconded.

Mr. F. March while adding his testimony, offered criticisms to several details.

A vote of thanks to the Chairman terminated the meeting.

Parliamentary and Law Proceedings.

Prosecution under the Pharmacy Act.

IMPORTANT DECISION.

The case of Richard Bremridge *versus* William Baillie, touching an infringement of the 15th section of the Pharmacy Act, 1868, was heard before Sheriff Rutherfurd, in the Sheriff Court House, George IV. Bridge, Edinburgh, on Friday, February 18, at 11 a.m.

Mr. P. Morison, S.S.C., agent for Pursuer; Mr. A. J. Young, Counsel for Defender, instructed by Messrs. Liddle and Lawson, S.S.C.

The Sheriff (to Respondent): Have you a copy of the complaint?

Respondent: Yes.

Mr. Young: Before he is asked to plead I wish to take exception to the form of this complaint. As your lordship observes, it charges an offence under the Pharmacy Act of 1868, or, rather I ought to say it does not charge an offence under the statute, but simply what is said to be an offence against the 15th section of that statute——

The Sheriff: "Within the meaning of the 15th section."

Mr. Young: The complaint bears that William Baillie, residing at 12, Abbotsford Crescent, Edinburgh, has been guilty of an offence within the meaning of the 15th section of the Pharmacy Act, 1868. Now I draw your lordship's attention to this matter, that the 15th section of the Pharmacy Act does not constitute an offence. The offence is constituted by section 1 of the statute; section 15 provides for its punishment. My first contention, therefore, is that the complaint does not libel the section of the Act which creates the offence, but simply that which provides the penalty, and accordingly is deficient in the grounds upon which it proceeds. In the ordinary case, as your lordship knows, where a complaint of this kind is made, the terms of it are usually couched thus—that so and so has been guilty of an offence against such and such a statute, and the particular sections—it may be one and fifteen—thereof. Here what is founded upon in this complaint is simply section 15, which provides a certain penalty in the event of the party being guilty of the offence created by another section of the statute not referred to at all here. Now that, I would submit, is a good objection to the complaint in its present form. But I go further, and point out what I consider to be——

The Sheriff : It is a perfectly good objection, providing the 15th section does not constitute a substantive offence.

Mr. Young : Your lordship will find in the previous reports—not the last report—the case of the Pharmaceutical Society *v.* The London and Provincial Supply Association, in which Lord Bramwell, a man of eminence in London, expressly refers to section 1 and section 15 as constituting the offence and providing the punishment. It is not section 15 which introduces the offence complained of now.

The Sheriff : So far as this complaint is concerned I must read the Act as if section 1 were not there at all ; and the question is whether I can go upon this complaint.

Mr. Young : I maintain, and I maintain it particularly, that the complaint is therefore not well-founded, being rested only upon a section which does not create the offence, but which simply provides the penalty. Mark, my lord, there is in the Act a section creating the offence. Section 15 was not introduced for that purpose. Section 1 had already constituted the offence. And what was the meaning of section 15 ? Simply that it should provide a way by which the offence introduced by section 1 should be met and punished. Accordingly, I do not look upon section 15, and I do not see how anyone can, as truly constituting the offence that is made the matter of this complaint. Now, my lord, I have another objection which I think is good. There is on the face of this complaint what appears to me a bad blot, in respect that while you have in truth only one offence here two offences are charged.

Mr. Morison : I may say I do not mean to ask for a conviction on the second.

The Sheriff : You mean there are two counts in the complaint, founded on one and the same Act.

Mr. Morison : I admit that that is bad.

The Sheriff : I go so far with you, Mr. Young, that there could not be a conviction upon both of these ; it is possible there may be upon either.

Mr. Young : No ; I think it would be impossible for your lordship to find cumulatively that the accused has been guilty, as the complaint avers, of two offences in respect of which he has incurred the liability to two penalties. That is what the prayer, as your lordship will see, asks your lordship to do—"one or both"—and to adjudge him to suffer the penalties provided by the said Act.

The Sheriff : I cannot convict him on both. I am quite prepared to hold that there cannot be a double penalty for the same act, and Mr. Morison admits that.

Mr. Young : Not for the same offence.

The Sheriff : For the same act. The same act might be libelled as an offence under two different sections of the statute.

Mr. Young : We are under one.

The Sheriff : Or two different parts of the same section, which is the same thing. You understand what I mean, and of course I could not find that for the same act the party was liable in a double penalty under the same enactment. That is quite clear.

Mr. Young : But this is not one act which is capable of being charged under two names. It is not one act which you can split up into two so as to make it form the ground of two charges. Lord Selborne, who was Lord Chancellor some years ago, said, as your lordship will find in regard to this matter in the case I have again to refer to——

The Sheriff : I have it here.

Mr. Young : Then if your lordship will just look at the fifth volume English Appeal Cases, p. 866, there is a sentence which contains, I think, the kernel of my statement on this matter. Your lordship will see these words—"Keeping shop is prohibited, not as a thing apart from, but as a thing involving the particular acts of sale and compounding within the shop." What I draw your lordship's attention to is this, that the offence under the statute, therefore, according to the best authority, is truly one. The sale of the poisons is the essential element or ingredient of the offence. That is conceded indeed by the form of this complaint itself, because your lordship will find that, according to the terms of the second charge, before my friend, Mr. Morison, can obtain a conviction under it, it would be necessary for him to prove a sale, because he charges me under it with keeping open shop and selling. But what sale would that be ? Simply the sale which forms the subject of the first charge. Now this is just an example of a double charge and a double penalty out of one offence, and I therefore think, my lord, that although Mr. Morison has expressed his readiness to stand upon only one charge, I should at this stage, at all events, know upon what particular charge he is to take his stand.

Mr. Morison : I should have explained—the first.

Mr. Young : I concede to your lordship that it is in your lordship's power to strike out a part of this complaint.

The Sheriff : Under the Summary Procedure Act.

Mr. Young : And I should like to know whether it is the first or the second charge.

Mr. Morison : The second is to be struck out.

The Sheriff : The second count seems to be founded upon keeping open shop.

Mr. Morison : Yes, my lord, and I do not think I shall be able to establish that.

The Sheriff : Then that section may be deleted from the complaint, and the prayer of the complaint may be altered to this extent :—"May it therefore please your lordship to grant warrant to cite the said William Baillie, and thereafter to convict him of the said offence," and the words "one or both" will have to be put out. *Quod ultra* I am not prepared to sustain any objection stated by Mr. Young. The first objection is that the offence is truly an offence under the first section of the statute, and that that should have been libelled, and of course if it were necessary for me in disposing of this complaint to refer to the first section of the statute in considering whether the offence charged had been committed or not, there might have been great force in that objection. But it appears to me that the 15th section alone, upon which this case is founded, itself comprehends several substantive offences, independently altogether of the first section of the Act. As I read the section it specifies five separate offences, and it says that the party offending shall for every such offence be liable to pay a penalty or sum of £5. Now these words, "every such offence" imply to my mind that there is more than one offence there ; and it seems to me there are truly five. The other matter is quite plain. I go quite with Mr. Young to this extent on the second objection, that there can be only one penalty for the same act—you are not to impose a double penalty for one act, and Mr. Morison has so far conceded that point, and has deleted the count from the information. I therefore propose to ask your client, Mr. Young, to plead. (Addressing the Respondent) Have you had a copy of this complaint served upon you ?

Respondent : Yes, my lord.

The Sheriff : Do you plead guilty ?

Respondent : Not guilty, my lord.

Evidence for Complainer.

John Rutherford Hill, Assistant Secretary to the Pharmaceutical Society, sworn and examined by Mr. Morison : I am a pharmaceutical chemist, and am twenty-nine years of age. I have been a chemist since 1878. I know the accused, Mr. Baillie. I have a register of the chemists and druggists under the Acts. I produce a copy for 1885-86, and a copy for 1886-87.

The Sheriff : These are registers of pharmaceutical chemists ?

Mr. Morison : Yes ; and they are received as evidence

under the Act. The 13th section; towards the end of the Act, provides that they shall be so received—"And the absence of the name of any person from such printed register shall be evidence, until the contrary shall be made to appear, that such person is not registered.

Examination continued: The name of the Respondent does not appear in either of these registers.

It appears in no register?—No.

Mr. Young: What! neither birth, death, nor marriage?

The Sheriff: It is quite enough that it is not upon these two registers.

Examination continued: I know the shop 53, Nicolson Street, Edinburgh. I called there on December 17, 1886. When I entered I found William Baillie, the accused, there, and my assistant, Alexander Coats, and an old lady whom I did not know. There was no other person in the shop.

Did you see what was being done?

Mr. Young: I object to that question. What is specifically charged is a sale to Mr. Coats. I am not here to inquire into sales to other parties.

The Sheriff: I don't think Mr. Morison is going into that.

Mr. Morison: I wanted to avoid putting a leading question.

Mr. Young: It would shorten matters if you put it. Did you see a sale to Coats?

Mr. Morison: I thought you would have objected to that.

The Sheriff: You seem to be afraid of the old lady, Mr. Young.

Mr. Young: No, I should be glad to have the old lady here.

Examination continued: I sent Coats, who was my assistant at that time, to make the purchase, and I followed him up immediately after. I saw him make a purchase of twopenceworth of laudanum. I made a purchase myself, and then followed my assistant out. I got the bottle from him, which had been delivered to him by the accused. I have the bottle here. I analysed its contents, and found it contained a preparation of opium. I had asked Coats to get laudanum, and the bottle contained laudanum.

And laudanum is a preparation of opium?—Yes.

The Sheriff: No doubt of it.

Examination continued: I took the bottle to Mr. Falconer King, and got him to analyse it. I saw Mr. Baillie, the accused, with the bottle in his hands putting the cork in it, and the laudanum was in it then. I then saw Mr. Baillie hand it to my assistant.

Cross-examined by Mr. Young: It is rather a dangerous thing to dispense laudanum, but it is not difficult for anyone who knows anything about it. I have not a shop of my own. I was brought up in Edinburgh, in the shop of Mr. MacDonald, West Newington. Speaking from memory, I think Mr. MacDonald had four *employés*, two of whom were qualified assistants. The other two were not assistants. One of them may have served in the shop sometimes, but he never sold poisons. One of them was in the habit of serving in the shop.

Do not you know it is the custom in the trade for lads who are not qualified assistants to sell from behind the counter, the business of course being under the supervision of a qualified man?—Yes.

The Sheriff: Do you mean to dispense poisons?—Not as a rule; it is not allowed.

Cross-examination continued: The question is—Is it the custom of the trade for unqualified assistants to dispense poisons under the supervision of one who is a qualified assistant?—Yes, under the supervision of a qualified person.

And it is quite a common thing, I suppose, for such unqualified *employés* to sell 2*d.* worth of laudanum?—Under the supervision of a qualified person.

What do you mean by under the supervision?—In his presence.

Would it ever be done out of his presence?—It would be an offence under the Act if it was so done.

Mr. Young: I am not asking your opinion.

Mr. Morison: I do not think that is relevant. Suppose he proves that fifty people commit the same offence, what then?

Mr. Young: I shall have occasion to refer to a passage in Lord Selborne's judgment again, which I think clearly meets the present case, and I want to show that there exists a practice just like that which his lordship described, a practice namely——

The Sheriff: This may have a bearing on the case. I am not disposed to exclude it; it may go to show the necessity of putting a stop to it.

Mr. Morison: And that is what I am here to do.

Mr. Young: On behalf of the very body of men who commit the offence.

Mr. Morison: Quite so.

The Sheriff: Pray, gentlemen, do not argue: just go on.

Cross-examination continued: The bottle containing the laudanum was duly labelled when I got it, labelled "Poison" just as it is now, the name of Center and Co., chemists, being also upon the label.

Mr. Young: I am going to prove that a company carried on business in this shop.

The Sheriff: With laudanum?

Mr. Young: Yes, one of the most familiar domestic remedies.

Cross-examination continued: What is Coats?—I believe he is now an apprentice, but at the time he made this purchase he was my assistant.

You say you sent him to make the purchase?—Yes.

Then how comes it that you went along with him?—I went simply to see the sale made.

The Sheriff: You went as a witness?—Yes.

Cross-examination continued: Did you select any particular time for going to the shop?—Yes.

What hour of the day was it?—About half-past three in the afternoon.

Why did you select that hour?—I understood the shop was in charge of an unqualified person at that hour.

How did you come to understand that?—From Mr. Center.

When did you understand it from him?—Some time previously when he called upon me in connection with another matter.

You precognosced him then?—Yes.

What took place?—He called for me one day between three and four o'clock, and did not find me, and he came back again the same night, and I apologized for not having met him in the afternoon, and said, "I suppose that is your dinner hour; you are usually out at that hour," and he said, "yes."

Had you called at his shop?—No.

How did it come that you asked him about his being out in the afternoon?—I knew he was in the shop well enough.

What did you want to do with the information?—I wished to see if the shop was really in charge of a qualified man at all times, or if it was some times in charge of an unqualified person.

Did you select the hour that Mr. Center told you was his dinner hour for going to the shop?—Two hours, I think he said.

But did you select the hour when you expected him to be away according to his statement?—Yes. Mr. Center is a qualified person, and his name appears in the registers I have produced,—in both of them.

By the Sheriff: When I went in the respondent was the only person in charge of the shop.

Alexander Coats, sworn and examined by Mr. Morison: I am 17 years of age, and am a druggist in my brother's employment. Up to the end of December last I was Mr. Hill's assistant. I recollect being told by him in December to go to the shop, 53, Nicolson Street, Edinburgh, and purchase laudanum, and I did so. When I entered

the shop, Mr. Baillie was in it and an old lady. There was no one else present. I asked Mr. Baillie for twopennyworth of laudanum, and he took my bottle and filled something into it out of a bottle which he took off a shelf. I gave the bottle to Mr. Hill immediately after leaving the shop. Mr. Hill came into the shop just when I was being served. I am perfectly certain there was no one else in the shop besides those whom I have mentioned. What Mr. Baillie did was to take my bottle and fill it with what I supposed to be laudanum and give it to me.

Cross-examined by Mr. Young: How long have you been connected with the trade?—I have never been connected with the trade specially; I have been with my brother.

Are you not an apprentice now?—Yes.

How long have you been an apprentice?—Not any specified time.

How long have you been an apprentice?—I cannot say.

Or won't say?—I cannot say.

Have you been long enough to be able to sell laudanum?—Yes.

Would you know laudanum if you saw it?—Yes.

It is pretty commonly sold, is it not?—Yes.

And you knew it when you got it?—Yes.

Was it taken from a bottle labelled laudanum?—I did not see. I think there is a back room in the respondent's shop. I was not in it.

Then, when you say there was no one else in the shop, you mean that no one else was in the front shop except you and Mr. Baillie and the old lady?—Yes. When Mr. Baillie was finishing giving me the laudanum Mr. Hill came in.

By the Sheriff: There was part of a label upon the phial when I gave it to Mr. Baillie. It was Mr. Baillie that put on the one that is there now.

Cross-examination continued: That is the usual label, is it not?—Yes. I was in the shop three or four minutes altogether, just long enough to get what I wanted. I did not put off any time. I am in my brother's employment at present. He is a chemist and druggist in Leith. He has two others under him besides me.

Are they qualified men—registered assistants?—No.

Has your brother a breakfast and dinner hour? I suppose he does not live in the shop?—That has nothing to do with this case.

Does he live in the shop?—No, he does not.

How far off is his house?—About a quarter of an hour.

And he goes home to dinner?—No.

Does he stay straight on in the shop from eight o'clock in the morning till what hour at night?—He goes to his dinner when he can get it.

When he goes to his dinner, whom does he leave in charge of the shop?—The assistants.

You three?—No, the assistants and I,—whosoever is in the shop.

By the Sheriff: He leaves one of you in charge?—Yes, he never leaves me in charge.

Cross-examination continued: No, I should think not. Is that quite a common arrangement in the trade so far as you know?—Yes.

By the Sheriff: Has the assistant power to sell laudanum when your brother is away?—Yes.

Mr. Morison: My only other witness is Mr. Falconer King, to prove that the bottle contained laudanum.

Mr. Young: I admit that it was laudanum, and a preparation of opium.

Mr. Morison: Then that is my case.

Evidence for Respondent.

Joseph Allan Center, sworn and examined by Mr. Young: I live in Grove Street, Edinburgh. I carry on business as partner of the firm of Center and Co., chemists, 53, Nicolson Street, Edinburgh.

By the Sheriff: Are you sole partner?—No.

Examination continued: I was 24 years of age on the 31st of January. I served an apprenticeship of four years to Mr. Billing, Chemist, Lauriston, and latterly in Queen Street. I passed the Preliminary examination required by the Pharmacy Act before I entered on my apprenticeship. I joined the Pharmaceutical Society as a registered apprentice or student about 1879. After my apprenticeship was out I went to be assistant to Mr. Rae, South Queensferry, and I was with him for about eighteen months in that capacity. It was while I was there that I became a qualified assistant. From Queensferry I went to Messrs. McIntyre, West Port, Edinburgh, and I was seven months with them, and at the end of that time I went into partnership with Mr. Baillie in connection with the chemist's business in Nicolson Street. I obtained my certificate in October, 1884. I produce my certificate. When Mr. Baillie and I started business we issued a circular to the public intimating that Center and Co. had succeeded to the business of the man who had been in the shop before. I produce a copy of the circular. Mr. Baillie was not a qualified person in the sense of the Act. I believe he served an apprenticeship as a wholesale druggist, with Messrs. Mackay and Co., Edinburgh. He was employed for about five years in their laboratory, and I believe had full charge for three years.

Mr. Morison: I was not aware——

Mr. Young: I want to show that nothing unreasonable was done.

The Sheriff: Is Mr. Center speaking of his own knowledge, because we do not want anything except what he knows himself?

Examination continued: You made inquiries, I think, when you entered into partnership with Mr. Baillie, and learned what you have just told us?—Yes.

Mr. Young: I am not to suggest that Mr. Baillie has passed his examination.

Mr. Morison: I would have brought evidence that he had gone up for examination.

Mr. Young: There is evidence that he has had considerable experience in the sale of drugs.

Mr. Morison: No, there is no proof that he has any experience of that. He has only been with a wholesale chemist.

Mr. Young: It does not give experience in selling twopennyworth of laudanum, but it gives experience in dealing with drugs.

Examination continued: You produce your contract of copartnership with Mr. Baillie?—Yes. It provides that the name of the firm should be Center and Co., and stipulates for my share of the profits. There is a bank account in the name of the firm. The first entry in it is dated September 9. All goods ordered by the firm since the commencement of the business have been ordered in the firm's name, and the sales have been made in the firm's name also. The firm's name is also over the door of the shop—Center and Co. There is also an insurance in connection with the business, and it is in the firm's name too. My name is on the Register of the Pharmaceutical Society.

Supposing one were to call at your shop at half-past three o'clock in the afternoon, would you be found on the premises?—As a rule I would.

If not in the front shop at least behind?—Yes.

A good deal of your compounding of drugs I suppose is done in your back premises?—Yes, they are all made up in the back.

So that when you are busy at that, the party at the counter would be Mr. Baillie?—Yes.

Has he directions from you as to the dispensing of such medicines as laudanum?—Yes, he can sell it.

And if he has any doubt about the matter, what are his directions?—He must consult me. The contract of copartnership provides for my taking charge of the dispensing part of the business particularly. That was arranged specially, looking to my qualification, and the arrangement has been carried out. Mr. Baillie takes a general oversight of the business and looks after the books principally.

With the exception of the prescription book ?—Yes.

Which you write up ?—Yes.

Cross-examined by Mr. Morison : I cannot sign the firm name.

By the Sheriff : Who does that ?—Mr. Baillie.

Cross-examination continued : I have no capital in the business.

The whole concern belongs to Mr. Baillie ?—No.

To whom does the capital belong ?—The capital belongs to Mr. Baillie.

What is in the business besides the capital ?—My experience.

Ths Sheriff : He contributes his skill.

Cross-examination continued : You get one-third of the profits ?—Yes.

Provided they amount to £72 a year ?—Or over.

And if they do not amount to that, Mr. Baillie makes up the difference ?—The difference is made up from the profits.

If a third of the profits do not amount to £72, Mr. Baillie makes up the difference, does he not ?—It comes out of the other share.

That is Mr. Baillie making it up. Can Mr. Baillie terminate the contract on three months' notice to you ?—Yes.

Is it the fact that in your duties you are to be subject to Mr. Baillie ?—Yes, except as to dispensing.

Where is the provision excepting dispensing ?—"The said Joseph Allan Center shall take the more active charge of the dispensing department, including the transcription of the prescriptions into the prescription book, but he shall be subject in his duties to the direction of the said William Baillie"—is not that so ?—Yes.

Who has power to engage and dismiss *employés* ?—Mr. Baillie.

Then practically are you anything else there than a person with £72 a year or more of salary, and who may be dismissed on three months' notice ?

Mr. Young : Before the witness answers this question I may point out that he is being asked his opinion on a point of law. I shall be happy when the occasion arises to contest that point with my learned friend. Meantime, to ask the witness his opinion as to the effect of the contract, is to ask him a question of law.

The Sheriff : He may be asked a question of fact.

Mr. Young : The question really went to the effect of the contract.

The Sheriff : It may go to that, but it is a fact.

Mr. Young : It is a matter of opinion.

The Sheriff : Mr. Morison is asking him as a matter of fact.

Cross-examination continued : Is it not the fact that you may be put away on three months' notice, and the whole thing remain with Mr. Baillie ?—(No answer.)

Re-examined by Mr. Young : You were asked about the dismissal of *employés* ; have you any *employés* ?—No there are none.

By the Sheriff : It is you and Mr. Baillie who carry on the business ?—Yes.

You have no assistants ?—No.

Re-examination continued : I think you know something about the trade of people belonging to the Pharmaceutical Society, will you tell me whether it is quite a common thing in the trade to have a business carried on by a qualified person, whose assistants under him are not qualified ?—Quite a common thing.

I think you said you would be in the shop between three and four o'clock in the afternoon ?—Generally.

By the Sheriff : I do not remember December 17 last. I cannot say whether I was in the back shop on the afternoon of that day or not.

By Mr. Young : You come back from your dinner about three o'clock ?—Yes, generally about three o'clock.

Thomas Baillie, sworn and examined by Mr. Young : I am the father of William Baillie against whom this charge is made. He was indentured to Messrs. Mackay and Co., wholesale chemists, Edinburgh, for, I think, five years. He served his time there, and he remained with them for some time afterwards. His duties lay in the laboratory. After leaving Mackay and Co., he was not very well and he came into my warehouse for a change. My firm are drysalters and provision merchants in Edinburgh. While my son was with me he got the offer of a situation from Messrs. Mackay and Co. as laboratory assistant. I produce the offer.

The witness was not cross-examined.

Mr. Morison : The case is now before your lordship, and I would submit that the offence here charged has been made out. In the first place I would ask your lordship's attention to the 15th section of the Act, which is the section founded on. It says that from and after the 31st day of December, 1868, any person who shall sell poisons, not being a duly registered chemist, is guilty of an offence and liable in a penalty. The object of the Act, as your lordship will find stated in the preamble, is to protect the public. My friend tried to make out a case of this kind, that provided a person is a qualified chemist he may open half a dozen shops in Edinburgh, put in Tom, Dick and Harry, and allow them to dispense poisons—and because he himself, the owner of the business, or some one in the business, is qualified, therefore the offence cannot be committed. Now my lord, I say that is not the interpretation of the Act, and that is not the meaning of the Act. The case of the Pharmaceutical Society *v.* The London and Provincial Supply Association I think determines that point. The case was a little different from this. It was a case brought for keeping open shop.

The Sheriff : An incorporation.

Mr. Morison : An incorporation : but in that case the person who actually dispensed and sold the poison was duly qualified ; and in deciding that case the judges made certain observations which I think are very pertinent to this case.

The Sheriff : It was held in that case the word "person" did not apply to an incorporation, and that consequently an incorporation could not be convicted of an offence under the 15th section. But then they held that "person" applied to an individual, and that it applied to an individual employed by an incorporation, and that he might be prosecuted for a penalty, although the incorporation could not, if he was not a duly registered chemist.

Mr. Morison : Lord Selborne says on p. 865, English Appeal Cases—"The penalty also imposed by that section is, not like the 15th section, a civil debt to be recovered."

The Sheriff : He there speaks of the 17th section.

Mr, Morison : Yes, and he speaks of it as throwing light upon the construction of the 15th.

The Sheriff : Yes.

Mr. Morison : I do not think I need say very much upon that point. I think a person even in the employment of a duly qualified chemist may commit an offence under the 15th section if he sells a poison at his own hand. Now what have we evidence of here ?

The Sheriff : Not being a duly qualified chemist.

Mr. Morison : Yes, now the evidence here is this. Two gentlemen went into this shop, and what takes place is seen. There is no attempt to go and get a qualified person at all, but an unqualified man takes the bottle and sells a poison. Now, my lord, I think that is certainly an offence. But I think if your lordship will look at the contract of copartnership which has been produced your lordship must arrive at the conclusion that the whole thing is just an attempt to evade the statute. That is apparent in every clause of the contract.

The Sheriff : In what way to evade the statute ?

Mr. Morison : By enabling an unqualified man to carry on business and keep open shop under the colour of a registered man.

The Sheriff: But was not that practically what the House of Lords held might be done in the Pharmaceutical Society's case, for it was held that an incorporation might keep open shop, although themselves not qualified.

Mr. Morison: But I contend that it is unlawful for a person to do what an incorporation may under the statute lawfully do. An incorporation is not under the Act, because it cannot undergo an examination, and cannot be registered. But a person may be registered—may undergo examination, and may become qualified, and therefore a person is under the Act. Now, my lord, if this person simply is doing by an evasion what he ought to do in a legal manner, he is evading the Act. The reasoning in the case of the London Supply Association was this: the judges held that an incorporation could not be examined, and could not be put upon the Register, therefore the Act did not apply. But a person may be examined and may be put upon the Register, and therefore, although the Act does not apply to an incorporation it applies to an individual. This respondent is just attempting to evade the provisions of the Act. In that view the provisions of the contract of copartnership are of consequence, and I shall ask your lordship's attention to them. The first clause provides for the duration of the partnership for three years, and for the dissolution of it thus: "The partnership may be dissolved by the death of either party, or by the wish of the said William Baillie, who shall be bound to give three months' written notice to the said Joseph Allan Center in the event of his wish to terminate this agreement." Now what is to happen at the dissolution? That is provided for in the second clause in the contract, which is: "As the whole capital of this business, including cash in bank, goodwill, stock-in-trade, utensils, fittings, prescription books and others belonging to the said William Baillie, on the dissolution of the firm through any cause the same shall still belong to him or his legal representatives, and the said Joseph Allan Center or his legal representatives shall only be entitled to his portion of the share profits from the date of the last division of the profits to the date of the dissolution." That is just simply a salary by way of profit, nothing else. Then the third clause provides:—"The parties shall be interested in the profits of the business to the following extent, William Baillie to the extent of two thirds, and the said Joseph Allan Center to the extent of one third; but it is hereby expressly agreed that in the event of the share of the profits falling to the said Joseph Allan Center in any one year not reaching the sum of £72 per annum, the said William Baillie will be bound to make up the deficiency to the sum named so long as the partnership exists." Then if your lordship will look at the fourth clause of the agreement, towards the end, it is said: "It is agreed that all liability connected with the financial department of the business rests solely upon the said William Baillie, who relieves the said Joseph Allan Center of all responsibility whatever regarding debts due by the firm." Then the fifth clause provides that documents shall be signed by Baillie alone, and that he shall have sole power to engage and dismiss *employés*.

The Sheriff: I do not want to stop you, but the charge about keeping shop has been deleted.

Mr. Morison: Quite so.

The Sheriff: Is it not enough for you to make out the first charge, that there was a sale by a person not duly registered as a chemist? What have we to do with the agreement?

Mr. Morison: I agree with your lordship, but it was the other side who introduced this contract. The respondent is founding on it.

The Sheriff: That may be, but I do not see what we have to do with it. If we were dealing with the second count, which has been struck out of the complaint, there would have been a good deal of force in going into the agreement, because it might be said this was keeping open shop by a person who was not a duly qualified pharmaceutist.

Mr. Morison: Well, I submit I have made out my case upon the first point.

Mr. Young: The proposal that I maintain to your lordship is just directly the opposite. I should submit to your lordship, that the facts do not come up to a contravention of the statute. Observe, my lord, that what has been proved is certainly a sale by or for a company. No doubt the hand that dispensed the drug sold was the hand of one who could not be said to be a qualified assistant in terms of the Act, but he was a servant, and at the time acting as agent of the company whose sale it was. There is nothing in the Act, as your lordship will observe, to prevent persons forming a firm or company or association for the purpose of dispensing the articles which are dealt with by the Act, and what is necessary, I take it, is that the business should be under the charge of a competent man—a man with sufficient practical knowledge. It is quite true, as my friend has said, that this is not a statute which has been introduced for the sake of chemists, although, curiously enough, the procedure here is at the instance of the chemists. It is a statute introduced for the protection of the public. But the question then would be whether the safeguards which are intended by the statute to prevent mischief have been observed here or not, or whether we have what is tantamount to the very safeguard for which the statute provides. Now, my lord, I think we have. Just observe what really took place. We are not dealing with a case where parties are trying to evade the statute and putting themselves in a position that could only be held by men qualified according to the conditions of the statute, but the firm has as one of its partners a man who certainly was entitled to deal with the drugs which are mentioned in the Act, and we have it borne out in evidence that he takes the supreme charge of the dispensing part of the business. Now, how is such a charge to be exercised in connection with such a trade? Your lordship will observe this, that the superintendent of a shop like that may very well discharge his duty if he set aside certain medicine and say to his assistant who was in the shop with him, "That is so and so, if you are asked for so and so give that." If he gave directions of that sort, they would be just as reasonable and just as likely to serve for the protection of the public as if the directions had been given by word of mouth at the time of dispensing, or as if the medicine or drug was dispensed under his very eye. Of course in all these cases one must just, I think, put to oneself the question whether ordinary and reasonable precautions have been taken in the circumstances. Now, as your lordship will recollect, Mr. Center told us, and I thought he referred to a very sensible arrangement, that it was his rule, known to Mr. Baillie, that where Mr. Baillie had any difficulty in regard to things to be dispensed, he was at once to refer to him. Of course, I suppose that must have reference to those occasions when possibly Mr. Center for necessary purposes was absent from the shop, or it might be when Mr. Center was in the back room where it is said the usual work of compounding drugs goes on. Now for aught I know, and for aught the proof shows, Mr. Center was in the back shop when Coats and his master entered, and the purchase of twopennyworth of laudanum was made. For aught we know, Mr. Center, who tells us he took charge of the dispensing part of the business, was present, and when any difficulty in dispensing the drugs referred to in the Act was found by Mr. Baillie the arrangement was that he was to refer to Mr. Center, and usually between three and four o'clock in the afternoon Mr. Center was there, his habit being to return from dinner at three o'clock. Now, I take it, so far as the evidence goes, a reasonable assumption is, that although Mr. Center may not have been present in the front shop he was on the premises, so that if Mr. Baillie, who had had a very considerable experience in connection with these matters, had any difficulty at all, what he would

have done would have been to walk to the back room and consult his superintendent, for in the matter of dispensing the superintendent was really the party with whom he was bound to consult. Let me refer to a passage in Lord Selborne's judgment in the case to which reference has been made, the case of the Pharmaceutical Society against the Supply Association. The words are put in such a way as, I think, just to cover the case we are dealing with. On page 868 he says "It is true that the Legislature has in the Acts"—he is dealing with a case under section 16 of the statute—"required for the benefit of the public this safeguard that there should be an assistant duly qualified; but the Legislature says that, having that case in view, is was not thought necessarily inconsistent with the object and policy of the Act that the members or proprietors of the business, the persons deriving profit from it, or to whom those actually selling the drugs would be responsible, might be unqualified persons provided there was in the business a duly qualified assistant. It by no means follows"—and this is a sentence which I think applies with remarkable patness—"that all the drugs would necessarily be sold by that duly qualified assistant, or that he might not be, as in this case, under the general superintendence of a manager not himself duly qualified. All that is left open." Now when the Lord Chancellor uses words like these, which, I think, apply in direct terms to the case with which we have to deal—when he says it is left open—what does he mean? I think he means this—it is left open to the Court to consider whether after all, looking to the arrangements in connection with the particular business in question, reasonable precautions are taken for the safeguarding of the public. Now my lord, I maintain that that is the condition of things in connection with this business. I am not much concerned about the observations that were passed upon the nature of the copartnership that exists between the two individuals, because, I think, this commentary may be made upon it, that it is just conceived in those very terms which we would expect to meet where an arrangement of this sort is made between capital on the one hand and skill on the other.

The Sheriff: Yes.

Mr. Young: And in connection with the superintendence which Mr. Center says he does take of this business, let me remind your lordship that he might reasonably put considerable confidence in Mr. Baillie, because Mr. Baillie is not a mere raw hand like a lad of seventeen who says that boys about Leith are left to take charge of the shop in the absence of the chemist who keeps it. My lord, this is a pretty wide question which the chemists are now raising. If the evidence that your lordship has heard to-day is true, there is scarcely one of the chemists who have persons in their employment—it may be serving their apprenticeship—I have no doubt they are, and right it is they should serve their apprenticeship—who is not in the habit of selling all sorts of drugs by the hand of these unqualified persons when not under the eye of a qualified assistant, whose duty it is to take the direct superintendence of the business.

The Sheriff: Mr. Morison says that is the very thing he wants to prevent.

Mr. Young: Exactly, and curiously enough the Pharmaceutical Society, whose members have a practice of that sort, are the complainers here. It seems to me rather ridiculous, and it indicates to my mind that there is something more behind this than a mere desire to subserve the interests of the public, because if it is a common practice, why should this particular instance be selected, and why should the Secretary of the Society with the aid of this lad of seventeen act the part of detective in the matter?—I should submit to your lordship that after all they really have not shown that there has been any disregard in connection with this business of the very steps which ought to be taken for the protection of the public in the purchase of such drugs. It is a business which is carried on under the direct charge of a qualified assistant. I think it would be a straining of the Act to say that where a qualified assistant is so attached to a business he is bound to be there, and even for the gravest necessity must not leave the shop. If he, in the course of his superintendence, gives the directions whch Mr. Center tells us he does give for the purpose of keeping the public safe, and if in the case of any doubt being present to the mind of the assistant, he is bound to resort to him, surely the very best measures are taken that nothing harmful shall happen. Now, my lord, if that be so, I should submit that that is not the kind of case which really is intended to be struck at by the Act. It is just the kind of case which the Lord Chancellor referred to as an open one when he said "it by no means follows that all the drugs would necessarily be sold by a duly qualified assistant." Accordingly, reminding your lordship of the wide question that is raised, if it is to be maintained that everybody who sells must be a qualified assistant——

Mr. Morison: Poisonous drugs.

Mr. Young: Poisonous drugs; that the hand which sells must be that of a qualified man, reminding your lordship of the question that is raised by that, I should submit that there were here fairly reasonable precautions taken by those who were in charge of the business, the business being superintended by a duly qualified person, and that in these circumstances a conviction of an offence under the statute would be harsh and uncalled for.

The Sheriff: There were originally two counts in this complaint, founded upon the Pharmacy Act of 1868. The second of these was for a penalty as for an offence committed under the Act of keeping open shop in contravention of the 15th section, the party not being a duly qualified person within the meaning of the Act. But that count in the complaint has now been deleted on the motion of the prosecutor's agent, and that renders it quite unnecessary for me to consider the terms of the contract of copartnery between the respondent, Mr. Baillie, and his partner, Mr. Center. It was suggested that the contract was merely an attempt to evade the provisions of the statute to enable a person who was not a duly qualified person to keep an open shop for the sale of drugs and poisons, and so on; but all that I need say in the meantime is that it is certainly not an illegal contract apart from anything that is contained in this statute for one member or partner of a company to contribute his skill or labour while another contributes the capital. Whether this contract really in its terms and provisions tended or was an attempt to evade the provisions of the 15th section of the Pharmacy Act, I do not think it is necessary for me to determine at all, because the second count of the complaint has been withdrawn, and the only charge that is now insisted on is that founded on the same section of the statute—the 15th section—which renders it an offence for any person to sell poison who is not a duly registered chemist. Now the preamble of the Act obviously shows that the purpose of the Act, and of every clause in the statute which imposes restrictions on the sale of poisons, was for the protection of the public generally. It was just to prevent persons who had no knowledge of these matters, who might perhaps confound epsom salts and oxalic acid, from being allowed to dispense them to the public. The facts certainly here are that the respondent is not a duly registered chemist, although he is in partnership with one, and under the firm of Center and Co. On December 17, at half-past three in the afternoon, the witness, Alexander Coats, who was then assistant to Mr. Hill, the Secretary of the Pharmaceutical Society, called at their shop in Nicolson Street, the only persons then in the shop being Mr. Baillie, the respondent in this complaint, who was attending to the shop, Coats himself, an old lady who does not seem to have been found, and shortly after Mr. Hill himself, who followed up his assistant. Coats asked

for two pennyworth of laudanum, and produced the phial, which has been exhibited to the witnesses, to get it filled, and the respondent went and filled it with laudanum—there is no doubt it was laudanum—from a bottle, and gave it him back with the label upon it, which it now has. It was properly labelled laudanum, with the name of Center and Co. as the sellers. Now it seems to me there is no doubt that that was a sale of a poison by a person not a duly registered chemist, and certainly within the very letter of the provisions of the 15th section of the statute. It is said that Mr. Center, who took upon himself, as being the qualified partner in the concern, the particular duty of mixing up prescriptions, and dispensing medicine and drugs, might have been in his back shop on the occasion in question; but that is not proved, and I think it is quite certain, from the view entertained by the House of Lords in the case cited in the course of the discussion, that if an unqualified person carries on a business of this kind he must see that poison and articles of that kind are dispensed by a person who is duly qualified. A passage was read, which my friend, Mr. Young, seemed to think tended in the opposite direction, in the opinion of Lord Selborne, on p. 868 of the report. Lord Selborne, although he says in that passage that it is at least not thought indispensable that persons carrying on such a business as that should without exception be duly qualified, goes on to say, "If, my lords, there had not been adequate safeguards against the sale of poisonous drugs in a manner contrary to the provisions of the Act by the persons actually carrying on the business for the incorporation; then I think the argument would have been extremely strong against incorporations being permitted to carry on the business"—and when he says incorporations that applies to all unqualified persons—"but where you find such safeguards and that every one whom they employ will be penally answerable, if he sells or compounds poisons or other medicines without having the qualification required by, or without complying with the provisions of the Act, I am unable to conclude that the purposes and objects of the Act require a larger construction to be placed upon the word person in the 1st and 15th sections, than that placed upon it by the Court of Appeal." And accordingly I think it is not doubtful that in the opinion of Lord Selborne and the other judges who decided that case in the Court of last resort, a person who sells drugs or poisons must himself be a duly qualified person, although he may be employed by a corporation or a person who has not a qualification. Now it is said that there has been a practice in this city and elsewhere, for parties who had the qualification leaving unqualified assistants to look after the business in their absence, and giving them more or less minute instructions as to the sale of poisons or other dangerous drugs. If that practice exists to any extent at all, I am convinced it is an exceedingly dangerous one, and Mr. Morison says it is to put an end to that that this complaint is brought. Nothing can be more dangerous than for a druggist to go to dinner and leave a boy in charge of the shop, who does not know epsom salts from oxalic acid. The same observation does not apply with equal force to all poisons. Laudanum is a thing well known, and is often sold in small quantities, and perhaps there is less danger from these; but it is not with reference to any particular poison or drug that we are now considering the matter, but with reference to the sale of poisons generally. I am quite satisfied that any such practice, if it exist, is a wrong practice, and should be put an end to. I am of opinion, therefore, on the facts, that this complaint has been proved. At the same time there are some extenuating circumstances here. The practice has been referred to—I do not think that this is an extenuating circumstance—but it appears here that in point of fact the prescriptions were made up by this firm by a duly qualified person in general, and that all that the respondent, Mr. Baillie, did, was to sell a small quantity of laudanum, a very well-known thing about which there was not much danger of mistake being made, on one occasion to a customer. I fine the accused in the nominal penalty of 2*s.* 6*d.*, with £3 9*s.* 6*d.* of expenses.

Mr. Young: Will your lordship give us a case for appeal.

The Sheriff: Yes, if you desire it.

Prosecution for Selling Defective Tincture of Quinine.

At the Wolverhampton Police Court, on Friday, February 25, before the Stipendiary, Mr. N. C. A. Neville, Mr. John Tunley, chemist, High Street, West Bromwich, was charged with selling tincture of quinine not up to the proper standard. The assistant-inspector purchased 1*s.* worth of tincture of quinine, and defendant told him it was ready mixed and just as he had purchased it. The analysis showed that was not up to the standard of the Pharmacopœia.

Mr. Glaisyer, for the defence, stated that the small quantity which was short was accounted for by crystallization, consequent upon having been kept in stock for some time. Defendant had been in business for fifty years, and was a most respectable chemist.

The Stipendiary said if it was not for the importance of drugs being pure he should not say that was a very material case. The analysis showed there were 6½ grains of quinine instead of 8. It was important drugs should be as pure as possible. Fined 40*s.* and costs—total, £4 2*s.*—*Midland Counties Express.*

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

The Future of Pharmacy.

Sir,—From the effect which my previous note, on some aspects of pharmaceutical politics in Sheffield, has produced, it would appear as though there had been good reason for its publication, and that its purpose has been, in a degree, served. I should like now, however, to point out how my opponents have fallen into error, partly through misunderstanding my arguments and by crediting me with opinions which were neither expressed nor implied. Since, too, my assumption of the pseudonym of "A Sheffield Student" is regarded as an unworthy disguise, I will, with your permission, cast aside the mask, and so remove any obstacle, fancied or real, to free and fair discussion.

I would first thank Mr. Cubley for the compliment with which he prefaces his attack, and, next, proceed to show where he has gone astray in considering my remarks. I should have thought that his own experience in life generally, together with the information he must have acquired concerning human nature, would have furnished him with facts enough from which he might reason that the public is best fitted to care for its own safety. Exercising its choice as to what it will purchase, and where it will obtain the same, it is surely but reasonable to assume that the tendency will ever be to avoid inferior articles and makers of such, and to turn to conscientious dealers in more satisfactory wares. What can be clearer? Then, to say that the public elects a Parliament which cares for the general safety, is but asserting that the public looks after itself. For what is Parliament, in its widest sense, but the public? And, though this public delegates certain powers to the Pharmaceutical Society, we have no right to assume that it deputes also the care of its own safety to that body. It merely binds the whole body of pharmacists and druggists, as represented by the Society, to perform their duties under certain restrictions in order that its safety may not be endangered. And, as compensation for this infringement on their liberty as individuals, it gives them the right to insist that no one shall deal in certain articles, to wit, some poisons, save and except they, through their representatives, shall have pro-

nounced them duly qualified to deal in the same. The care for the public safety is evinced in the public's enforcement, by its law, of the labelling and registration of those poisons; the power deputed to the Society merely gives it the right to say who are fit and proper persons to perform this labelling and registration. Here we see plainly enough the necessity for the existence of the Pharmaceutical Society, and of the education of pharmacists, from the provisions of the public's own Act, quite apart from the desire of all true pharmacists to elevate themselves and their calling. If my acquaintance with the data of pharmaceutical history does not mislead me, this desire it was which called the Society into being before any Pharmacy Act was known. Such Act but gave the body a legal standing and, in the opinion of some few, crippled its influence for good by compelling it to recognize all who complied with certain tests as equally worthy of public support, so preventing merit, in individuals, from achieving its full reward. In the passing of the "Food and Drugs Act" again, we find that it is the public which protects itself. I most certainly do not admit the contrary when I say that "the poorer classes suffer most by the fraud," for, though proximately they do suffer, it will be found that ultimately they profit by the experience so gained, and seek more trustworthy sources for their future supplies.

Sufficient objections to the legalization of the Pharmacopœia as the sole standard for all medicinal preparations are given at length in the "leader" of January 22. These are worthy of a more critical examination than they appear as yet to have received from many, and need no further exposition by me. I would but reiterate that multiplication of each pharmacist's efforts to inspire public confidence in his integrity is the best safeguard against unprofessional competition, whether from within or without, and that, compared with this, any legislation must prove futile.

Mr. Ward's diffidence in supplying the information I desiderate is perhaps excusable in one occupying his position as compared with that of a humble student like myself, yet I think it will be generally conceded that his apprentice, Mr. Hollely, does worthy service in his master's place. And, since the epistle of the latter has a decidedly Wardian tone, I presume we may take it that the pupil's opinions and remarks are but echoes of those of his respected principal. The youthful inexperience of the writer is doubtless the cause of his many rash statements and startling conclusions, hence I will try to deal with them as gently as is consistent with the necessity for correcting them.

That my contribution "might be termed a personal attack on two gentlemen of this town" is surely "unhistorical," for I was most careful to avoid touching upon any point save those dealt with in the letters of those gentlemen, and a very careful survey of my words fails to reveal anything of a personal nature. If I have unwittingly touched any sore places, I apologise, and my excuse must be my great desire for strict justice.

Mr. Hollely next repudiates my authority to speak for "true students," and would accept the baas of the black sheep mentioned by Mr. Cubley as most rational expressions of opinion formed after mature deliberation, instancing as evidence the direction taken by the "younger members" in voting at the recent indignation meeting. Now I will first venture to assert that only some of the "younger members" were then present, and secondly, that most of the "younger members" who were present were unfitted to consider the questions under discussion. Again, since I gather from the official report that all the resolutions were carried unanimously, and it is well known how unlikely "younger members" attending such meetings are to balance the arguments for and against the propositions (besides which I believe that in this case the arguments were mostly on one side), it seems plain to me that "follow my leader" was the rule acted upon. So much for the value of such evidence. With wider experience I doubt not that Mr. Hollely's conception of true studentship will undergo considerable modification.

In the next paragraph the "care of the public safety" comes to the fore again. How proud all engaged in the art of pharmacy should be, and withal, how conscientious in the discharge of their duties, were it really the fact that such care does devolve upon them. But does it? I would suggest that this bubble has been pricked, so that it is no longer possible to float it. A little confusion in my antagonists' ideas and words is apparent at this stage. I am asked, "What is Parliament but the crystallized opinion of the public or State?" Speaking generally, I reply, "Nothing!" and therefore it is plain the State and not our Society has the "care of the public safety" at heart. Again, "Therefore who can deny 'the care of the public safety' was not entrusted to the Pharmaceutical Society by the public and for the public?"

Well, I cannot! But, lest my opponent rejoice too soon at my capitulation, I would remind him that in the English language two negatives in a sentence make that sentence an affirmative one, and that my apparent yielding at discretion is due to his incorrect composition. I do deny that "the care of the public safety" was entrusted to the Pharmaceutical Society "by the public and for the public!"

Then I fail to see how the sale of "poisons" can be left to the working of "natural causes," or in what words I implied the possibility of any such process. A "sale," as I understand it, is a very artificial transaction; but vigorous definition and careful analysis seem quite beneath my critic's ideas and not worthy of consideration.

Anon, I am accused of ignorance of the existence of "Pharmacy Acts" and "amendments." How, where, or when I used any form of words that could be twisted to give grounds for such a supposition I am puzzled to think; of course I would not pretend to compete with a local secretary or his pupils in legal knowledge or close acquaintance with the "Calendar." That might be highly presumptuous and blameworthy on my part.

Concerning my "vague reasoning (?) against legislation," I would refer him to the articles on this subject in recent Journals, and to the earlier part of this letter. It might be advisable to sweep away a few intellectual cobwebs first, however.

My reference to local secretaries merely implied that such, being presumably leading lights in our profession, might be assumed to be educated to the highest possible pitch, and most imbued with regard for professional character, and, therefore, better fitted to survive any unfair opposition.

If Mr. Hollely should ever commence business as a pharmacist, let him try the effect of supplying sweet nitre diluted with its own bulk of water to "ordinary members of the discerning public," and he will soon know that they can distinguish the false from the true. In any case I would strongly advise him to avoid the practice if he values reputation and profit.

Regarding "paregoric *minus* opium," I have it on the word of one of our local lecturers, that he actually was asked for this preparation by a customer on Friday, 18th ult.

To conclude my survey of this remarkable letter I would venture to oppose to the writer's opinion my own that it is not the uneducated, but the presumably well-educated members of the trade who play most mischief. If the leaders go astray the rank and file cannot be blamed for following their example. With this opinion I join "an earnest desire that the law be made a terror to evil-doers," that such people may be no longer allowed "to palm on the innocent 'discerning public' their half-and-half preparations with impunity."

No alteration in the law is needed to effect this result, and if pharmacists will be true to themselves and to their fellow-men no law will be needed at all.

Sheffield. JOHN HUMPHREY.

Errata.—Benevolent Fund List of Subscriptions:—Page 707, Allan (Bury St. Edmunds) should read Allen; page 715, Vawser (March) should read 5*s.*, not 2*s.* 6*d.*; page 716, in the Oldham list the name of F. Goodall, 10*s.* 6*d.*, should have appeared.

Erratum.—On p. 698, col. i., line 45, for "the seeds of a new species, *Strophanthus hispidus acera*," read "the seeds of *Strophanthus hispidus* from Accra."

Army.—Strictly speaking there is no such post; the work is done by persons who have previously enlisted.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Proctor, Blunt, Christy and Co., Griffith, Church, Elborne, Hill, S. H., S.

NOTE ON LINIMENTUM TEREBINTHINÆ AND SAPO MOLLIS.*

BY EMERITUS-PROFESSOR REDWOOD.

It is evident from the correspondence that has taken place, and much of which has been published, respecting the turpentine liniment of the last British Pharmacopœia, that difficulty has been experienced by many pharmacists in producing this preparation in a uniform and satisfactory condition. It might be inferred from the number of communications which have appeared in the journals on this subject, and the anxiety that has been expressed to obtain information with regard to the characters which the liniment was intended to present, and the best mode of ensuring its production in full possession of those characters, that it is a preparation frequently prescribed, and to which considerable value is attached. It is therefore the more desirable that all that is practicable should be done to remove the difficulties hitherto experienced in manipulating according to the official formula, and if necessary to point out means by which at a future time the formula may be amended.

I have found it necessary in dealing with the subject to make special reference to the liniment, and also to the soap used in making it, and I purpose treating of both separately.

Linimentum Terebinthinæ.—Previous to the publication of the British Pharmacopœia in 1864, there were three different formulæ for the liniment in the three official Pharmacopœias of London, Edinburgh and Dublin. The London formula differed only from that of the present Pharmacopœia in the omission of the water, while the Dublin formula prescribed turpentine and resin ointment, and the Edinburgh ordered those ingredients together with camphor. During the compilation of the first British Pharmacopœia, the Dublin formula was admitted in preference to the others, the Irish committee in this instance, as in others, having prevailed over their associates, so that the Pharmacopœia when produced in 1864 was found to be better suited for the use of Irish than of English or Scotch physicians. In England especially the resinous liniment was objected to, and therefore in the edition of 1867 the London formula without change was substituted for the other. The liniment thus prepared, however, was not yet quite satisfactory. It had some of the elements of an emulsion, but it lacked one of them, namely water. Still it was preferred to its predecessor, there sinous character of which was decidedly objectionable.

In preparing, with others, the present edition of the Pharmacopœia I undertook some experiments with the view of improving the character of turpentine liniment. The object was to improve its pharmaceutical character with the least possible alteration of its therapeutical properties. It was found that by mixing the soft soap with an equal quantity of water, and then adding the turpentine and camphor in the way, in which a pharmacist would naturally proceed for the production of an emulsion, but which need not be described here, a good and satisfactory result could be obtained. Just one small point of manipulation, however, I may perhaps be allowed to notice, because the want of sufficient attention to it has caused my failing once or twice in experiments I am about to describe. There are emulsions the successful production of which not only require the use of a pestle and mortar, but also the judicious selection of such, and especially of a proper pestle. The case in question affords a striking illustration of this, for unless a broad, rather flat-faced pestle that fits the curvature of the bottom of the mortar, be used, the difficulty of making turpentine liniment will be greatly augmented.

Availing myself of such efficient means, I satisfied myself and my editorial colleagues that the formula with the alteration indicated yielded a satisfactory result in the form of a thick creamy emulsion. It was, therefore, with others, submitted to the Pharmacopœia Committee of the Medical Council, and approved by them.

I should here state that the soap used in my experiments had been made in my laboratory, and had been there for several years. I have every reason for believing that it was a genuine olive oil soap of good quality, but I do not know, nor have I now the means of ascertaining, what its exact condition was in regard to alkalinity, or in other respects, for all that remained of it has since been used up. As the liniment produced with it was not unduly thick or pasty, I conclude that the soap was not excessively alkaline.

Such then is the history of what was done in reference to this liniment during and previous to the preparation of the present Pharmacopœia.

Turning now to the statements which have been published in the journals during the last twelve months, I find that whilst some operators have either failed to get, or have experienced difficulty in getting, satisfactory results in operating according to the official formula, others have succeeded to their entire satisfaction. The prevailing opinion seems to have been, especially as expressed in the latter part of the discussion, that although it is certainly possible to get a permanently emulsive product by the official process, this may be either thin or thick, liquid or pasty, according to the nature of the manipulation adopted, or other unexplained cause. Under these circumstances an appeal has been made by dispensers and journalists for some authoritative statement as to what the condition of this liniment is intended to be.

Now I have no authority to do more than to explain, as I have just done, the part which I and others have taken with reference to the official formula, and to offer any suggestions that may have been prompted by the results of experiments which I have recently made.

I observe that several of those who have described the results of their operations in preparing this liniment state that they have used sapo mollis, B.P., but I have not found any representation of the grounds upon which that statement is made. It seems desirable therefore that reference should be made to this part of the subject.

Sapo mollis.—The definition of soft soap as given in the Pharmacopœia is not so complete and explicit as that of either of the other official varieties of soap. I think it must be admitted also that in one respect it is not quite correct. It has been usually assumed that soft soap necessarily contains uncombined alkali, either caustic or carbonated, resulting from the fact that there is no recognized method by which the soap can be separated from

* Read before the Pharmaceutical Society of Great Britain at an Evening Meeting in London, Wednesday, March 9.

the excess of alkaline liquor used in producing it, such as is adopted in the manufacture of soda soaps. Consistently with this view the Pharmacopœia makes no allusion to the alkalinity of soft soap, and if in its production all excess of alkali is retained, it might be expected that this would be a variable quantity. On reading the published account of the uncertain results obtained by different operators who have endeavoured to follow the official instructions for the production of turpentine liniment, it has always appeared to me probable that a variable extent of alkalinity in the samples of soap used might account for much at least of the discrepant results. My experience, however, has not for some time past extended to the characters and properties of the soft soaps of commerce, until this inquiry caused me to renew my acquaintance in that direction.

Having procured several samples from different sources, wholesale, retail, and manufacturing, of *Sapo mollis*, *B.P.*, the first thing that struck me was the marked green colour which they all, but not all equally, presented. Their appearance in this respect differed entirely from that of any sample that I have ever made or seen produced according to the Pharmacopœia description. Yet the first character indicated in the Pharmacopœia for soft soap is "yellowish-green." In the face of this therefore, I could hardly take exception to the colour, although I might be inclined to think that it had arisen from a complacent acquiescence with the dictum of authority, unless indeed the dictum arose from a too complacent reliance on the observation of a pre-existing practice. In the former case the character, as given in the Pharmacopœia, must have been an overlooked misprint, since 1867, for "yellowish-white," which was the character given in the edition of 1864, and also in the London Pharmacopœia. In any case there appears to be an error, to the commission of which I suppose I must plead guilty, although I have no recollection of the facts as they occurred in 1867. But why have the critics never noticed this, for I presume they have had commercial soft soap before them, which I have not until now? The error might be of some importance, because hemp seed oil is said to be used in making soft soap, and to yield a green soap,* while we know that olive oil soap is white or yellowish-white. As the case stands there may be a possible doubt by manufacturers between the correctness of the specified character and that of the prescribed oil. Some further investigation may with advantage be directed to this point.

Another character given in the Pharmacopœia is that the soap is "soluble in rectified spirit." This is important, because although it is reconcilable with the presence of uncombined caustic alkali it completely excludes the carbonate. In pursuing the examination of the various samples of commercial soft soap, represented as official, I have found none of them to be perfectly soluble in rectified spirit. They all contain a little carbonate of potassium, the quantity varying from 1·4 to 2·8 per cent. of K_2CO_3. What has very much surprised me has been that all the samples I have examined have been free from uncombined caustic alkali, as indicated by the addition of a drop of phenol-phthalein to a cold filtered alcoholic solution of the soap. It may perhaps be considered that the presence of carbonate, which the official character excludes, is less objectionable than that of caustic alkali, which the same character may admit, and this no doubt would be so with reference to some possible applications of the soap, perhaps even to all.

There is one obvious advantage resulting from the absence of free caustic alkali in commercial soft soaps, which is that it is easy to prepare from them a neutral soap, by dissolving in rectified spirit and then distilling off the spirit. I commend this method to pharmacists, and the use of such soap for pharmaceutical purposes where a neutral soft soap is required. I have proceeded in that way with the view of getting a soap of definite composition, that would yield turpentine liniment in a more uniform condition than it is possible to get it in by the use of soft soap in its ordinary commercial state.

It must be borne in mind, however, that the oil used in the soap may be in fault, that some oil, other than olive, such for instance as colza oil, may have been used, and as colza oil yields by saponification brassic acid, which has a different composition from oleic acid, it is possible that this may form a soap having an emulsifying power different from that of olive oil soap.

In the experiments I have made by using various samples of soft soap for the production of turpentine liniment, I have found that those samples which have contained the largest proportions of carbonate of potassium, as well as samples of my own preparation which have contained much free caustic alkali, have yielded the liniment in a thicker, more pasty, condition than it has been in when a neutral or nearly neutral soap, has been used. The result, however, largely depends on manipulation. If carefully and well prepared with neutral or nearly neutral soap, the product will be too thick to admit of its being easily put into a bottle with a narrow neck; it should be put into an open-mouthed bottle, because after standing for some days it usually becomes more liquid, and too much so to admit of its being conveniently kept in a covered pot.

Samples of both neutral and alkaline soaps, an of the liniment made with them, are on the table. Among them is a sample of soft soap which I only received yesterday, after my paper had been prepared, from a manufacturer to whom I had not previously applied. This sample differs from all the other commercial samples I have obtained in being free from the green colour on which I have commented. It does not therefore accord with one of the characters specified in the Pharmacopœia, but it nearly, if not entirely, agrees with what I think that character ought to be. In common with the other commercial samples it is free from caustic alkali but contains a little carbonate. As some of our members who are interested in the subject of this paper may desire to obtain a soft soap that possesses these characters I may mention that this is from the well-known firm of Knight and Son, of Silvertown Soap Works.

Returning now to the special purpose of this inquiry I may state, as the conclusion I have arrived at, that the official formula for *Linimentum terebinthinæ* yields a thick permanent emulsion, well suited for its intended use, if prepared with a soap that is neutral or nearly free from alkalinity; but that the definition of *Sapo mollis*, as given in the Pharmacopœia, requires correction and otherwise admits of improvement.

[*The discussion on this paper is printed at p.* 753.]

* Allen's 'Commercial Analysis.'

A CONTRIBUTION TO THE PHARMACOGNOSY OF STROPHANTHUS.*

BY WILLIAM ELBORNE,

Assistant Lecturer in Materia Medica and Pharmacy in The Owens College, Manchester.

Strophanthus, a drug which latterly has come into extensive use as a remedy in affections of the heart, was introduced by Professor Fraser, his researches having reference to the seeds of a particular species known as *Strophanthus Kombé*, the Kombé arrow poison. From these seeds Fraser isolated a crystalline bitter principle, a glucoside, which he named strophanthin. From *Strophanthus hispidus*, DC., Hardy and Gallois subsequently isolated a crystalline bitter principle, neither of a glucosidal nor alkaloidal nature, but possessing all the toxic properties of Fraser's glucoside, which they termed strophantine.

With reference to the fruits and seeds, not only of the species already mentioned, but of the whole genus, the botany of the subject is by no means at present sufficiently clear to enable pharmacists to distinguish with precision the one from the other, and it appears to be questionable whether poisonous seeds, possessing undoubtedly the physiological activity described by Fraser, may be and are not collected from species other than the two already experimented upon by the above gentlemen. Professor Oliver has stated that the fruits entirely correspond in the two species; it is, however, generally accepted that the follicles yielding seeds with greenish-brown hairs belong to the Kombé plant, whereas those yielding seeds with brown hairs are yielded by *S. hispidus*.

In the absence therefore of more exact botanical information, the author does not presume to say from what species the seed used in the experiments which follow may have been yielded, beyond that it was collected in East Africa and is the drug which has latterly been used in this country with marked success.

I. Introduction.

Strophanthus† is the name of a genus of tropical shrubs belonging to the natural order Apocynaceæ, natives of Africa and Asia, of which there are several species. The seeds of some species are used by the native tribes of various districts in the preparation of an arrow poison, which has been met with in Africa at Kombé, in the Manganja country, near the Zambesi in the south east, in the Shiré Valley, in the Gaboon district, in Guinea, and in Senegambia. In the Gaboon district it is called "inée," "onaye," or "onage."

Botany of the Genus.—Flowers in terminal heads; corolla funnel shaped, its throat partially closed by ten scales, its limb divided into five long tail-like segments; the style thread-like, dilated at the top with a cylindrical stigma; the fruit a double follicle.‡ "Folliculi oblongi vel elongati, duri, divergentes vel divaricati. Semina compresso-fusiformia, apice in aristam longe plumosam producta, inferne coma decidua appendiculata (rarius ecomosa?). Arbusculæ v. frutices sæpe scandentes, glabri pubescentes v. villosi. Folia opposita, pennivenia. Cymæ terminales, nunc dense pauciforæ, nunc corymbosæ multifloræque. Flores speciosi varius parvi, albi flavicantes aurantiaci rubri v. purpurei."* The various species (some eighteen) of this genus have not as yet been described by botanists with precision, the plant yielding the Kombé arrow poison being referred by Professor Oliver, of Kew, to *Strophanthus hispidus*; but after a more minute examination to a distinct species which he has named *Strophanthus Kombé*.

Description of Strophanthus Kombé.—Dr. Kirk, H.M. Consul at Zanzibar, has described the plant as follows† :—"The plant is a woody climber, growing in the forest both of the valley and the hills, and found at various places between the coast and the centre of the continent above the Victoria Falls and the Zambesi. The stem is several inches in diameter and rough outside. The plant climbs up the highest trees and hangs from one tree to another like a bush-vine. The flowers are of a pale yellow, and last for but a short time during the months preceding the first rains of the season (October and November)."

Professor Oliver's description is as follows‡ :—"Climbing shrubs with dense rough branches (in the young state hairy), leaves shortly petiolate, broadly elliptical with obtuse apices (in the young state rough and hairy on the upper surface, tomentose below), inflorescence in hairy cymes with few flowers, with linear lanceolate caducous bracts, the linear acuminate lobes of the calyx being shorter than the tube of the corolla. Habitat South Tropical Africa, Zambesi land. [Our flowering specimens, although not all that could be wished, I think justify the separation of this plant from *S. hispidus*, DC., of West Tropical Africa, one of the poisons of the Nigritania. *S. Kombé* differs in the few-flowered inflorescence and the narrower (linear, not lanceolate) and shorter calyx lobes, which do not reach to the narrow sinuses of the throat of the corolla of *S. hispidus*, the firmer texture of the calyx and bracts and the early fall of the latter appear minor distinctions. The follicles entirely correspond in the two species; follicles 9 to 12 inches long, or rather longer, glabrate, dark brown and longitudinally striate when dry, narrowed above into a short appendix terminating in a subpeltate disc $\frac{1}{3}$ of an inch in diameter]."

Fruits and seeds of strophanthus, kindly submitted to the author by several gentlemen for the purpose of facilitating this investigation, presented characteristic difference in the shape and ripeness of the seed, length and arrangement of the comose appendages, and in other characters. One sample was totally different in structure from the rest.§ In the descriptions of the some eighteen species already described by botanists no detailed description is obtainable concerning the nature and characters of the seeds, hence the difficulty experienced in discriminating them. Without authentic specimens of

* Read before the Pharmaceutical Society of Great Britain at an Evening Meeting in London, Wednesday, March 9.

† From the Greek στρέφω, to twist, and ἄνθος, a flower, in allusion to the manner in which the segments of the corolla are twisted together before expansion.

‡ 'Treasury of Botany.' Part II.

* 'Genera Plantarum,' Bentham and Hooker, vol. ii., Part II., 1876.

† *Journal of Anatomy and Physiology*, 1873, vol. vii., p. 140. Dr. Fraser.

‡ 'Icones Plantarum,' No. 4, 1870.

§ The author alludes to a sample of seeds forwarded to him as *Strophanthus*, which he is inclined to refer to a species of *Wrightia*, an allied genus of plants belonging to the same natural order (Apocynaceæ), possessing similar habits, fruit and seed.

pods, leaves, flowers and seeds of the *Kombé*, *hispidus* and other species of *Strophanthus*, it will therefore be impossible to assign the proper name and identify the numerous kinds of seed which in due course may probably be poured into commerce.

Collection of the Fruit.—The fruit is ripe in June, and is collected by the natives, who separate the rough dark outer coat (the epicarp and mesocarp, popularly termed "husk") before drying it, preserving the more leathery inner covering (the endocarp) containing the seeds; hence the tawny appearance of the strophanthus follicles, or pods, at present in commerce, due to the dark-coloured husk having been removed before drying, thus consisting only of endocarp and the comose seeds contained within. Owing to their poisonous nature, great difficulty, it appears, is experienced in inducing the natives to procure these fruits.

Mr. Thomas Christy, informs me that the fresh fruits are fleshy, and that in the separation of the husk by the natives previous to drying, a certain amount of watery juice (which afterwards assumes an oily appearance) is lost; also that from 3 to 4 cwt. of the fresh pods only yield 1 lb. of seeds, and that it is generally accepted that the fruits yielding seeds with comose appendages of a white colour are considered to be obtained from the Kombé plant, whereas those yielding seeds with brown-coloured appendages are from *S. hispidus*.

Preparation of the Arrow Poison.—The method adopted by the natives in poisoning their arrows, is as follows:—Before extracting the seed from the fruits, they dig a hole in the ground, so that they can bury the comose hair attached to the seed (for fear of its flying in their eyes),* they then coarsely grind the seeds, and mix it into a paste,† which latter constitutes the poison with which the arrows are smeared. In another description, furnished by an African agent and collector,‡ it is stated that the natives, having first cleared the seeds of their hairy appendages, then pound them in a mortar till reduced to a pulp, at which point they add a little water; in applying the latter they use the bark of a species of *Tilliaceæ*, the sap of which being pressed out along with the water tends to make the Kombé more adhesive, so that it does not peel off from the arrow in event of its meeting a bone when sent into the animal. The poison thus prepared is spread upon the shaft to the extent of about six inches. Game wounded by an arrow thus poisoned dies at once, seldom being able to move a hundred yards. The flesh is eaten without any evil effect accruing. The only precaution is to squeeze the sap out of a branch of the baobab tree into the wound made by the arrow, which is said to mitigate any evil effect that might result from the poison being more plentiful in the vicinity of the wound.

Chemistry.—According to the researches of E. Hardy and N. Gallois,§ the seeds of *S. hispidus* contain a crystalline principle (neither of an alkaloidal nor glucosidal nature), which they named "strophantine," soluble in water and in alcohol, but insoluble in ether, chloroform, benzol and petroleum spirit. Professor T. Fraser states that he has isolated a crystalline active principle from the seeds of *S. Kombé*, representing 8 to 10 per cent. of the seeds, which he has named "strophanthin." It is not precipitated by the ordinary reagents for alkaloids, does not contain nitrogen, and when heated with dilute sulphuric acid it yields glucose, and a body insoluble in water, but very soluble in rectified spirit, and having a strong bitter taste; this latter he terms strophanthidin.* The process adopted for the isolation of strophantine by Hardy and Gallois was as follows:—

The seeds deprived of their hairs were powdered and macerated in alcohol slightly acidulated by hydrochloric acid, the alcoholic tincture filtered and evaporated to the consistence of an extract on a water-bath, and then treated with cold distilled water. The solution left to evaporate spontaneously, yielded white shining crystals which were purified by a second crystallization.

The hairs of the seeds submitted to the same treatment by Hardy and Gallois, yielded also a crystalline alkaloid, which they termed ineine—not possessing the same physiological action as strophantine.

Pharmacological Action† (Fraser).—The pharmacological action of strophanthus appears to be an extremely simple one; it is a muscle-poison. However introduced into the body, it increases the contractile power of all striped muscles, and renders their contractions more complete and prolonged. In lethal doses, it besides destroys the capacity of the muscle to assume the normal state of partial flaccidity, and causes the rigidity of contraction to become permanent, and to pass into the rigour of death. As a result of the action on muscle, the heart is early and powerfully affected. It receives a larger quantity in a given time than any of the other muscles in the body, and, therefore, probably it is that strophanthin affects its action more distinctly and powerfully than the action of the other striped muscles. Indeed, by regulating the dose, a very distinct pharmacological influence may be produced upon the heart, while the other muscles remain apparently quite unaffected.

(1) Strophanthus acts primarily upon the heart, and produces, as the final result of this action, paralysis of that organ with permanence of the ventricular systole; (2) Pulmonary respiration continues in cold-blooded animals for several minutes after the heart is paralysed; (3) The striped muscles of the body are acted upon; twitches occur in them; their tonicity is exaggerated; and, finally, their functional activity is destroyed, the muscles being then hard, and, soon afterwards, acid in reaction; (4) The reflex function of the spinal-cord is suspended soon after the heart is paralysed; but the motor conductivity of the spinal-cord and of the nerve-trunks continues after the striped muscles of the body are paralysed; (5) The lymph-heart of the frog continues to contract for many minutes after the blood-heart has been paralysed.‡

II. Preliminary Experiments.

The fruits and seeds operated upon were presented to the Owens College Materia Medica Museum by Mr. T.

* *British and Colonial Druggist*, October 16, 1886, p. 413 (Christy).

† 'Christy's Commercial Plants,' No. 9, p. 54.

‡ *Chemist and Druggist*, January 15, 1887 (Burroughs Wellcome).

§ *Pharm. Journ.*, [3], vol. vii., p. 756.

* *British Medical Journal*, November 14, 1885.

† *British Medical Journal*, November 14, 1885. [The experiments being conducted with the rectified spirit extract of the *S. Kombé* seed.]

‡ *Pharm. Journ.*, [3], iii., p. 524.

Christy, who informs me that they were collected in East Africa. One of the seeds I forwarded to Mr. E. M. Holmes for his opinion concerning it, who, with his usual courtesy, replied as follows :—"The seed coated with hair which you have sent corresponds with those from Lake Nyanza, East Africa, which I refer doubtfully to *S. Kombé*. The seeds of *S. hispidus* are chestnut-brown." The accompanying figure is illustrative of the kind of

seed used: the hairs on the seed itself being *deciduous* they are apt to pass unobserved—unless the seed be withdrawn from the pod with great care. From Bentham and Hooker's description this character, however, is common to the genus (*inferne coma decidua appendiculata* (rarius *ecomosa* ?)). The comose appendages were of a white colour.

One of the dried husked fruits, 12 inches in length (containing well-developed ripe seeds of a greenish-brown colour), weighed 14·069 grams ; separated into seed, comose hair and endocarp, the following numbers were obtained :—

Weight of seeds (159)	=5·99	grams	=42 per cent.
Weight of comose hair	=3·119	grams	=22 per cent.
Weight of endocarp	=4·96	grams	=35 per cent.
	14·069		

The Seed.

The quantity of seed necessary for analysis was well powdered and exposed to a current of dry air for several hours.

I. *Petroleum Ether Extract.*—Eight grams of the powder were macerated with 80 c.c. of petroleum ether for forty-eight hours, frequently shaken, and allowed to subside. The clear liquid extract was poured off, the residue thrown upon a filter and washed with petroleum ether until the liquid extract was brought up by the filtrate to 80 c.c. The latter was of a bright yellow colour with a tinge of green, and 40 c.c. evaporated in a tared dish on a water-bath until free from petroleum ether yielded an oily residue weighing ·834 gram = 20·8 per cent.

This oily residue was of a bright yellow colour with a tinge of green, gave a permanent stain with bibulous paper, possessed a bland oily taste absolutely free from bitterness, remained perfectly clear and liquid, and possessed the characters of a fixed oil. A small portion treated with H_2SO_4 on a white porcelain tile gave a brown coloration, with H_2SO_4 and $K_2Cr_2O_7$ a green coloration. The oil after standing a few days deposited some bright colourless pyramidal crystals, free from bitterness. The crystals, heated upon a piece of platinum foil, fuse, char and burn with a blue flame like sulphur, leaving no ash or residue.

II. *Absolute Ether Extract.*—The residue of No. I., after being well washed with petroleum ether and dried in a current of warm air, was macerated with 80 c.c. of absolute ether (·720) for forty-eight hours, frequently shaken, the clear extract drawn off, the residue thrown upon a filter and washed with ether until, by the addition of the filtrate, the extract measured 80 c.c. The latter was of a green colour, and 40 c.c. evaporated on a water-bath until free from the solvent yielded a soft fatty residue of a dark green colour (which consisted chiefly of chlorophyll) weighing ·037 gram = ·9 per cent. The fatty residue was boiled with a small quantity of distilled water and filtered, the filtrate was free from bitterness, and gave negative results with Meyer's solution and (after having been boiled with a few drops of dilute sulphuric acid) with Fehling's solution. [From my earlier experiments I found that unless the ether was perfectly free from alcohol and water, a considerable quantity of the bitter principle was likewise removed in this extraction ; also that the ether supplied to me commercially as absolute (·720) required considerable rectification (shaking with water, and redistillation over chloride of calcium and quicklime, and final digestion with sodium) before being fit to use for this purpose.]

III. *Absolute Alcohol Extract.*—The residue of No. II. was well washed with ether, carefully dried, and macerated in absolute alcohol (·800) for forty-eight hours, with frequent shaking, the clear liquid extract poured off and the residue thrown upon a filter and washed with absolute alcohol until, by the addition of the filtrate, the extract measured 115 c.c. The latter was of a light straw colour, and the alcohol having been distilled off the dried residue weighed 0·13 gram = 1·6 per cent., which, upon removal, readily powdered, was of an intensely bitter taste, and soluble in water, one milligram dissolved in a fluid ounce of distilled water, imparting a decided bitterness. A small portion dissolved in water gave no indication of the presence of an alkaloid on the application of the usual reagents for detecting alkaloids; no precipitate with ammonia; neither was anything removed by the agitation of the ammoniacal liquid with ether, chloroform or benzol; neither did these solvents remove anything from the aqueous solution of the alcoholic residue previously rendered acid. It was not precipitated by acetate of lead. A portion was dissolved in water and boiled with Fehling's solution with no

perceptible reduction of the latter; another portion dissolved in water and boiled with a little dilute sulphuric acid amply reduced Fehling's solution however, thus indicating the presence of a glucoside. Attempts to crystallize the glucoside from both aqueous and alcoholic solutions by spontaneous evaporation were, however, futile, it being left, in each case, in an amorphous state. With the view of further purification the yellowish-white powder was dissolved in a small quantity of distilled water, digested with recently ignited purified wood charcoal, evaporated to dryness and abstracted with absolute alcohol; the filtered extract evaporated on a water-bath left a residue, which, upon being scraped out of the dish, possessed the form of transparent scales, which, unless examined with a lens, might readily be mistaken for crystals. [In consequence of this result the author, with the view of obtaining the glucoside in the crystalline state, submitted 1·6 gram of the powdered seed to the process adopted by Hardy and Gallois (see Introduction), and found that it was impossible to evaporate, at the temperature of a water-bath, the acid alcoholic extract obtained (10 c.c. absolute alcohol +3 minims of hydrochloric acid used in extraction) without destroying (charring) the extracted matter (the oil excepted, this appeared to be unaffected). Another gram of the seed extracted in the same manner, but submitted to spontaneous evaporation, extracted with a small quantity of distilled water and allowed to evaporate, yielded an amorphous residue of intensely bitter taste, which, on purification by treatment with ether, appeared to be identical with that already obtained in the ordinary course of experiment III.]

These yellowish transparent scales, intensely bitter, unattainable in the crystalline state by these methods (due possibly to the presence of a minute quantity of impurity), were soluble in alcohol and in water, insoluble in benzol, ether and chloroform. As yet I have not been able to devise any good colour reaction or ready chemical test for this extremely bitter glucoside.

Another interesting feature in reference to the rectified spirit extracts of the seeds has been communicated to me by my friend Leopold Larmuth, Esq., M.B. (Lond.), who is working at the subject in the pharmacological laboratory of the Owens College. He finds that when the residues of the spirituous solutions are dissolved in water (the alcohol being evaporated off, as is customary, at a low temperature) and set aside for a few days, the resulting product undergoes some decomposition and becomes far more toxic than when first prepared. The explanation of this decomposition will of course require extended investigation. The fact however will justify my referring readers to the manner in which the natives poison their arrows (see Introduction); some analogous toxic decomposition probably occurring in the preparation. [The ultimate explanation and clearing up of this important topic foreshadows in the author's mind many important questions in reference to the proper method of preparing the tincture of the seed for use in pharmacy, such as whether or not an economy could be made in its preparation by previously exposing the seeds to the air in the form of a paste with water until this change has been effected?]

Several experiments have been made in this direction, the powdered seed being made into a paste with water and exposed for several days; the product when dried is of a browner colour than the original powder; it is still under investigation and will be the subject of a separate communication.

IV. *The Aqueous Extract.*—The seed residue from III. was exhausted with cold distilled water, and the liquid extract corresponding to 2 grams of the seed evaporated to dryness over a water-bath yielded a residue of a light brown colour weighing ·45 gram =22·5 per cent. When removed from the dish the residue readily powdered, and was intensely bitter to the taste: digested with absolute alcohol, filtered, and the filtrate evaporated to dryness, only a trace of bitter principle was removed. The original residue (·45 gram) was then dissolved in a drachm of distilled water and poured into a mixture of 2 ounces of absolute alcohol and 2 ounces of ether, set aside for a few hours, filtered from the precipitated albuminous matters, the alcohol and ether from the filtrate distilled off, and the residue dried upon a water-bath. The residue upon being scraped out of the dish consisted of yellowish scales identical in appearance with the glucosidal residue of III., possessing the same intensely bitter taste; it was insoluble in ether, chloroform and benzol, and tested with the usual reagents proved to be a glucoside. My friend, Mr. R. B. Wild, M.B., B.Sc., informs me that its physiological action on muscle is similar to that of the glucoside isolated in III. It weighed 0·058 gram=2·9 per cent. The albumen by difference, therefore, equals 0·392 gram=19·6 per cent.

V. Corroborative results were obtained by another method as follows. Some seed was powdered and macerated with 10 per cent alcohol for four hours, the extract strained through muslin and the residue exhausted by further maceration in similar menstruum until free from bitterness. The strained liquids were then treated with lead acetate to precipitate albuminous matters, heated to the boiling point, filtered, excess of lead removed from the filtrate with sulphuretted hydrogen, again filtered, and the filtrate evaporated to dryness over a water-bath in a capacious flat dish. [Strophanthus preparations are very prone to char and develop a saccharine odour on the application of heat, hence a temperature a little under 100° should be employed in their evaporation.]

The dried residue was extracted first with ether and then with absolute alcohol, until the latter ceased to dissolve anything. The alcoholic extract was intensely bitter, and left on evaporation a residue corresponding in bitterness and in its glucosidal nature to that obtained in III. The residue insoluble in alcohol was soluble in water and intensely bitter. It gave the reaction of a glucoside and corresponded to that obtained in IV. (after solution in water and purification by the alcohol and ether method).

Résumé.

		Per cent.
I. Petroleum ether extracted fixed oil.		20·8
II. Ether extracted chlorophyll and fat		·9
III. Absolute alcohol extracted bitter glucoside*	1·5	4·4
IV. Water extracted bitter glucoside*	2·9	
Albuminous matters		19·6
Insoluble residue		54 3
		100·0

* 1 in 380,000 of water imparts a decided bitterness.

Remarks.

Strophanthus seeds contain an extremely bitter glucosidal active principle intimately combined with an excessively large quantity of albumen —which latter is of such a nature that from aqueous solution basic acetate of lead, tannin, mercuric chloride, or the addition of two volumes of absolute alcohol, only partially precipitate it. Amylic alcohol is capable of removing the glucoside from aqueous extracts by agitation, but owing to the emulsion it forms with the albumen, the process of separation is very tedious. In reference to the rectified spirit tincture, that by Fraser's revised process of 1 in 20 is a great improvement upon the original 1 in 8 strength, which latter left the marc in a very unexhausted state.*

From experiments made upon the tincture by the revised process, I find that the rectified spirit exhausts the seed of about 7·0 per cent. of extractive of an albuminous nature, leaving about 1·5 per cent. of the bitter principle in the marc, and further that the loss of the latter would not be remedied by increasing the quantity of the menstruum, due in the author's mind to the coagulating effect the spirit exerts upon a certain portion of the albumen with which that portion of the bitter principle is associated. By lowering the alcoholic strength of the menstruum it could readily be effected, yet not without the extraction of a corresponding large quantity of abuminous matter—which would prove highly objectionable, however, since the latter by over-dilution with water is, on escape of the alcohol, very prone to decompose and develop a very fœtid odour.

By previous writers it has been observed that when the 1 in 20 tincture is mixed with an equal volume of ether opalescence occurs. This appearance would probably be due to the partial separation of albuminoid material.

Comose Hair.

I. *Alcohol Extract.*—Eight grams cut into small pieces and pounded in a mortar (the latter operation producing little visible effect upon it) were exhausted with 80 c.c. of alcohol (·800) acidulated with three drops of hydrochloric acid by maceration for forty-eight hours, filtering and washing the residue with alcohol. The filtrate and washings evaporated on a water-bath left a brown resinous residue, weighing ·055 gram = 0·68 per cent. This residue treated with a small quantity of distilled water was practically insoluble, the solution, however, filtered off and submitted to spontaneous evaporation, left a slight brown coloured residue, very slightly bitter. On re-dissolving in water negative results were obtained with alkaloidal reagents; it appeared to contain only a very minute quantity of bitter glucoside.

The resinous residue in the filter paper after being dried was treated with ether, in which it was found to be insoluble. Upon re-dissolving it in absolute alcohol a few drops of the solution mixed with half a test-tubeful of water gave a beautiful blue fluorescence, accompanied with opalescence; it had a bitter taste.

II. *Aqueous Extract.*—The residue from I. was extracted with water and found to be free from bitterness.

* From results ascertained abroad, half a fluid drachm of the aqueous extract of a 1 in 8 seed marc (corresponding to 40 grains) killed a cat in twenty minutes.

Endocarp.

Alcoholic Extract.—Four grams of the powdered endocarp were macerated in 40 c.c. of absolute alcohol for forty-eight hours. Ten c.c. evaporated to dryness on a water-bath yielded a residue of ·013 gram = 1·3 per cent, which, treated with a little distilled water, dissolved, yielding a solution with only a slight bitter taste, free from tannin, and gave no reaction with Meyer's solution.

Root.

The root, freed from the cortical portion, was powdered (the operation excited sneezing) and 3 grams exhausted with absolute ether, the residue, on evaporation of the extract, weighed ·021 gram = 0·7 per cent. of a substance resembling caoutchouc, soluble in chloroform, insoluble in absolute alcohol. The residue of root, exhausted with absolute alcohol and evaporated to dryness, yielded 0·033 gram = 1·1 per cent. of an intensely bitter substance of a brownish colour, giving negative results with alkaloidal reagents; it gave the reaction for a glucoside. The root residue from the alcoholic extract, exhausted with water, filtered and evaporated to dryness, left a residue, weighing ·23 gram, intensely bitter. The aqueous extract of the residue has not yet been examined.

Husk.

The author contemplates the publication of the examination of the husk in the form of a separate paper at some future date. It possesses a physiological activity somewhat similar to that of the seed, but in less degree.

In conclusion, I beg to thank Messrs. Burroughs and Wellcome for the courtesy with which they submitted for my inspection one of the poisoned arrows, and for their kindness in furnishing me with various supplies of seed.

[*The discussion on this paper is printed at p.* 754.]

SOME NOTES ON STROPHANTHUS.*

BY H. HELBING,

Apotheker to the German Hospital, Dalston.

The interest that strophanthus and its preparations have lately awakened has induced me to turn my attention to the pharmaceutical study of this drug. It is often the case that when a new medicament is introduced it appears in commerce in several different qualities, and there is frequently a wide difference in the manner in which the article is prepared by pharmacists. This is the case with strophanthus. I need only remind you that Professor Fraser at first recommended the preparation of the tincture of strophanthus in the proportion of 1 in 8 (*Brit. Medic. Journ.*, Nov 14, 1885), whereas Mr. Martindale advised making the tincture in the proportion of 1 in 20 (*Pharm. Journ.*, [3], xvii., 411). For my part, at that time I considered it advisable to prepare the tincture with proof spirit in the proportion of 1 in 20 (*Pharm. Zeit.*, Berlin, Jan. 15, 1887). Another firm sent out a tincture made from the whole pods, including the hairs and pod-lining. Finally, Professor Fraser advocates, now, a method of preparing the tincture of 1 in 20 made with recti-

* Read before the Pharmaceutical Society of Great Britain at an Evening Meeting in London, Wednesday, March 9.

fied spirit, removing, previously, the fatty oil from the seeds by means of ether (*Brit. Med. Journ.*, Jan. 22, 1887). This diversity in the methods of preparation was, perhaps, of less consequence at that time, as strophanthus was more or less difficult to be obtained, and consequently less widely used than at present, and the material itself was probably not quite uniform throughout. It is now quite different, for strophanthus is at present to be had good and of uniform quality, and in such quantities as will probably suffice for years. I therefore think that it is necessary for all preparations to be uniform as far as possible, lest from the beginning physicians lose all confidence in a preparation of which they do not know the composition, nor exactly the amount of active principle therein contained.

The strophanthus which is now offered in the trade occurs in two different forms, either in pods or as clean seeds. The pods appear quite similar to one another, and, externally, are not in any respect different to those which have been used formerly. The quality of these pods is, however, not always the same, as will be seen from the following examination of them. Taking five similar pods from a large stock, I examined them carefully with the following results:—

Pod.	Weight of single pod.	Weight of pod-lining.	Weight of hairs.	Weight of seeds.	Per-centage of seeds in single pods.	Num-ber of seeds.
I.....	216	89	77	50	23·15	303
II.....	334	142	86	106	31·76	294
III.....	188	65	44	79	42·04	201
IV.....	132	49	25	58	43·93	126
V.....	289	91	58	140	48·44	203
Sum total	1159	436	290	433		1127

All the weights are given in grains.

As sum total, the pods contain:—

Seeds	37·36 per cent.
Pod-lining	37·61 „
Hairs	25·02 „

The total percentage corresponds pretty accurately with that of the pods of last year which I examined in the same way. The results published in the (*Pharmaceutische Zeit.*, Berlin, Jan. 15, 1887) were as follows:—

Seeds	37·4 per cent.
Pod-lining.	35·6 „
Hairs	26·9 „

I here show the seeds and hairs of these five pods; they exhibit some peculiarities to which I consider myself justified in calling your attention, as a characteristic criterion of the quality of strophanthus pods. In spite of the great number of seeds contained in the pod labelled No. I., the weight of the sum of these seeds is the smallest, and it appears that they are all more or less spoiled and not adapted for the preparation of the tincture. It is a noteworthy fact that the colour of the hairs of the pappus coincides with the state of the seeds, the least heavy of the seeds having a dusky, dirty colour and the kernel having lost its pure white colour, while the hairs of the pappus are of a dirty yellow colour. In point of quality the pod labelled No. II. ranks better than No. I, but here also a similar proportion between the number of seeds and their weight is apparent; furthermore, the hairs are also of the same dirty colour. In the three other samples the number of the seeds was less, but their weight was greater, being between 40 and 50 per cent of that of the whole pods; these seeds were decidedly excellent. The quality of the pods and seeds may therefore in most cases be estimated by examining the colour of the hairs of the pappus, which is very characteristic; if these are white and bright the seed too is in good condition. If therefore the pods are sorted before being offered for sale, as is indeed the case, great care being taken by the firms to be sure of the good quality of their article, the number of inferior pods, which is always very small, is reduced to a minimum; yet for my part I prefer the clean seeds, which are also to be bought by themselves. The pods as met with in commerce would appear to be better adapted for the extraction of strophanthin and inein. Of the clean seeds, furthermore, there exist two kinds, both brought over by the East African Lakes Company from the Shiri Highlands. The usual kind, which may be denominated Kombé seed, is alone to be obtained in the market. The seeds are 1½ to 2½ centimetres long and 4 to 5 millimetres broad. They are more or less rounded off at the base, without, however, losing the distinctly pointed shape; towards the upper end they become suddenly very much narrower and end in the stalk of the pappus. They are flattened at the sides, and have a much more prominent keel-shaped ridge on one side than on the other; the seed is twisted slightly in the form of a spiral from the base to the apex. The colour of the seeds varies from a greyish green to brown, being more or less covered with numerous appressed silvery hairs of silky appearance.

The second kind of seeds, which I will call white strophanthus seed, is similar in form to the Kombé strophanthus, only the seeds are more densely covered with looser, longer, silky hairs, like a fur, so that the real shape of the seeds is not quite so apparent as is the case with Kombé seeds. The colour of the hairs of the seeds is much paler than that of the Kombé, and is almost white. I will pass by other kinds of strophanthus seeds, as, for instance, *S. hispidus*, of which the seeds are quite brown, with very short, slightly bristly hairs, and I will only mention as a curiosity that Mr. Thomas Christy once received some seeds professedly of *Strophanthus*, but which, by Mr. E. M. Holmes, to whom I submitted them, are considered to be probably those of *Holarrhena africana*, from which an alkaloid, conessine, has been prepared; the same that is mentioned in E. Merck's latest report as having been obtained by him from *Holarrhena antidysenterica*. I should like to present to you now a small sketch of the average proportions of the different seeds and their weight.

One hundred seeds from the pods now in the market weigh 35·75 grains.

One hundred seeds from the Kombé pods now in the market weigh 62·00 grains.

One hundred seeds from the white strophanthus now in the market weigh 57·00 grains.

These figures show that the clean seeds have evidently been carefully separated from the bad ones, and also that it is evidently safest to use selected clean seeds.

Turning now from the drug itself to the question of the best preparation of it for pharmaceutical pur-

poses, several points arise for consideration. First and foremost comes the question as to the durability of the preparation, and secondly, though almost equally important, that of the uniformity of the quantity of the various active principles contained in it. Then also the question arises how both demands are to find a practical solution. When I remind you of the various methods of preparing the tincture of strophanthus described in the beginning of this paper it will be at once apparent that various attempts have been made, but without, at least in my opinion, giving a satisfactory answer in the difficulty. If we adhere to Professor Fraser's last prescription, or indeed as regards any one formula for the preparation of the tincture of strophanthus, we find the following desiderata have been accepted universally without sufficient justification. I may therefore name them without further comment. They are :—

I. That the tincture be prepared with rectified spirit.

II. That the fatty oil be previously removed by ether.

III. That the proportion of the seeds to the tincture be as 1 : 20.

If the Kombé strophanthus seed is dried in the manner recommended by Professor Fraser at a temperature of 120° Fahrenheit a loss of weight takes place, of upwards of 5 per cent. The seeds thus dried and, after being powdered, treated with ether to extract the fatty oil, give from 1 oz. of seeds 142 grains or 32·45 per cent. of fatty dark green oil, which, at the usual temperature is a thick fluid, and of the specific gravity of 0·925 at 60° F. It is easily soluble in ether, less easily in alcohol, not at all in water, or much diluted alcohol. The residuum after exhaustion with ether produces on being dried at 100° F., from 1 oz. of seeds 294 grs., equal to 67·20 per cent. This dried mass I exhibit here ; it is a greyish white, rather fine and very mobile powder. I have treated it with rectified spirit of the specific gravity 0·838 at 60° F. in the proportion of its original weight (1 oz.), according to the recipe given by Professor Fraser, and I obtained the tincture as here shown ; in larger quantities it is slightly yellow, in smaller ones, as with this sample, colourless and exhibits all the properties described by Professor Fraser. I have labelled it a little further on in this paper as G-tincture. It struck me as very remarkable during the preparation of this tincture that the process of completely exhausting the seeds by means of spiritus rectificatus offered great difficulty, but that it was much easier to achieve this by employing diluted spirit. This, however, would utterly injure the tincture in point of durability. As I have myself observed, and also had corroborated by others, the residuum had always a bitter taste, and indeed it gave by continued treatment with alcohol also some more soluble substance, in spite of most careful working and with all the different methods of percolation and maceration that are usually followed. This circumstance induced me to compare my tincture with those offered in the market, and I was not a little surprised at the result of this comparison, which I beg to submit to your notice.

It is only of a relative importance to note the specific gravity of the tinctures in this table, as it allows of no conclusions as to the active principles extracted, the specific gravity being due to the concentration of the alcohol employed, and the larger quantity of extract in the first four samples is attributable to weaker alcohol having been employed. The last four tinctures have been probably prepared with the rectified spirit of commerce, still the difference in the extracted contents is doubly apparent. To my mind these results appear to indicate that the preparations either did not receive the necessary care, or that different qualities of seeds were used. In colour the tincture varies from being almost colourless to a green or yellow, which is very objectionable, for what would a physician think of a prepartion which bears a signature as being prepared in a certain clearly defined manner supposed to be uniform in all tinctures of the kind, but which appears in various different colours, so that at first sight, even without a closer examination, it is clear that there must be some diversity in the preparation ?

Sample.	Specific gravity at 60° F.	Residuum after evaporation.	Colour and fatty oils.
A . .	0·900	239	Little oil, greenish-yellow colour.
B . .	0·890	200	Some oil, yellow colour, like hock.
C . .	0·875	242	Little oil, yellow colour.
D . .	0·870	170	Very little oil, light yellow colour.
E . .	0·844	124	Little oil, greenish-yellow colour.
F . .	0·840	180	Colourless, only trace of oil.
G . .	0·840	120	Colourless, only trace of oil.
H . .	0·840	88	Colourless, only trace of oil.

All the weights are given in milligrammes.

Oil was always present more or less in the tinctures examined, but always so little that it could hardly be taken into consideration, varying from 5 : 15 mg. in the oz. For the detection of small quantities of oil in the tincture, it is necessary to know that it is often invisible in the process of evaporation. The reason is that it is too evenly dispersed throughout the tincture and extract, but if a little water be added during evaporation, the oil collects in one spot. If the dry extract is treated with water, which is simply poured over it, in the porcelain dish and carefully shaken around, and the fluid is poured off, the process repeated, then after the dish has become dry the pure oil is found to remain. The diversity in the percentage of extract obtained from the tincture of commerce seems to necessitate an attempt at uniformity and the fixing of a standard for the tincture. I believe, that, even with the greatest accuracy it is impossible to exhaust completely the seeds in the process of preparing the tincture. I had an opportunity of convincing myself of this, in a case of preparation of the tincture in a factory, where enormous quantities of seeds were employed, continued percolation always producing the same bitter taste.

Returning now to the white strophanthus seeds, I will mention that if treated in the same manner as the Kombé seed they show a loss during drying of 5 per cent. ; the percentage of oil is somewhat less, being 28·33 per cent. ; the oil is also of a green colour,

but a little paler. I take the liberty to call your attention to a peculiarity of the two oils. If they are heated on a water-bath, they lose their emerald-green colour, and change it for an opalescent brownish-red, as is shown by the two samples.

The tincture derived from these seeds is of the same nature and colour as that from Kombé seeds, and I could not obtain a stronger extract from the former than the latter.

Hoping that the results I have obtained may be conducive to a better knowledge of strophanthus, it would give me great satisfaction if they ultimately tend, in however small a degree, to help towards the fixing of a definite and more satisfactory formula for the preparation of the tincture, whereby a greater degree of uniformity may be obtained than is at present the case.

I cannot conclude my paper without returning my cordial thanks to all who have assisted me in my work, especially the officers of the Pharmaceutical Society, from whom I have met, although a stranger, with such a kind reception and great courtesy; to Messrs. Burroughs and Wellcome, who most kindly placed considerable quantities of the seeds and pods at my disposal to enable me to carry out my investigations.

In offering this paper to the Pharmaceutical Society, I do it in the hope that inasmuch as British enterprise has introduced this valuable remedy to the nations of both continents, so English pharmacy may be the first to devise the best possible method of preparing the tincture, and in respect to strophanthus also retain the advanced position which it is generally recognized to hold.

If my specimens should be considered to be of any interest, I would feel most happy to offer them for the Museum of the Pharmaceutical Society.

[*The discussion on this paper is printed at p.* 754.]

ELECTROLYSIS OF COPPER AND ZINC.

BY ALEXANDER SHAND.

The separation of copper from zinc or any other metal is much more easily and quickly conducted by electrolytic deposition than by the ordinary wet process. As the result of some experiments recently conducted, I have found that the electrolytic method is also much more accurate. In order to determine the accuracy of the process ·5033 gram of pure copper and ·5031 gram of pure zinc were dissolved in a little dilute sulphuric acid, and the solution made up to 1000·5 grams with distilled water at 15° C.

Of this solution, 100 grams, calculated to contain ·050304 gram of copper, and ·05028 gram of zinc, were weighed into a tared platinum basin, and the current from one Bunsen cell passed through the solution, the positive electrode being a platinum disc. The Bunsen cell exposed 140 sq. in. of zinc to dilute sulphuric acid specific gravity 1·12 at 15° C. The current was allowed to continue all night, the total time being about eighteen hours.

The solution in the basin was now poured into a beaker, and the deposited copper washed three times with distilled water, then three times with alcohol, and finally three times with ether. It was then dried in an air-bath at 80° C., allowed to cool in a desiccator and weighed.

Results of two estimations.

1st.	·0504	Theory requires	·0503.
2nd	·0503	,, ,,	·0503.

A large number of experiments showed that the most accurate results, in zinc estimations, are obtained by the following process. The zinc, being in the form of sulphate is nearly neutralized, if necessary, with potassic hydrate, free from aluminium; then add ammonium oxalate in excess. Maintain the solution at a temperature of 80° C. or 90° C. by heating with a steam- or water-bath, and pass the current from two Bunsen cells similar to the one used for the copper estimation. In a few hours the whole of the zinc is deposited as a pale bluish-white coating on the basin; which is washed with water, alcohol and ether, as in the case of copper, and then dried and weighed.

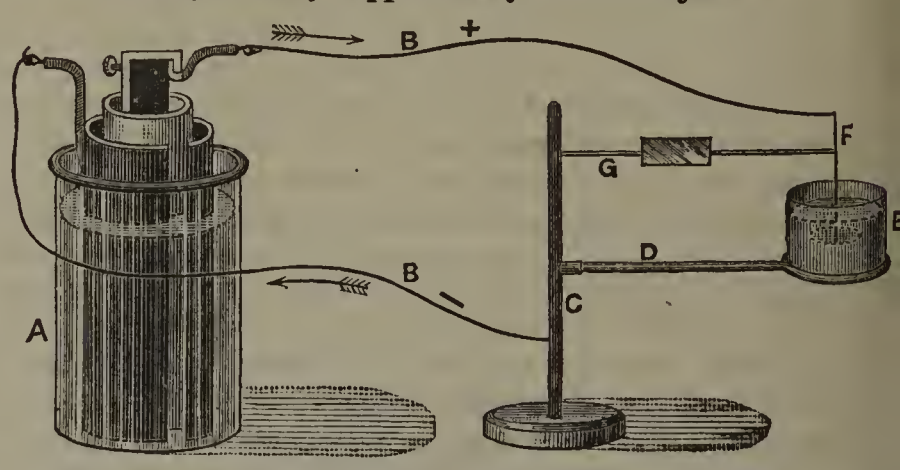
Results of two estimations.

1st	22·19 per cent.
2nd.	22·09 ,,

There are a number of practical details and precautions, most of which will occur to any who may be disposed to investigate this process. It is absolutely necessary that the analysis be carried out exactly as described above, and that the platinum basin be chemically clean. If the basin is heated directly with a flame during the process the zinc is deposited in a black powdery condition, and gives too high results. Should the acid in the battery be too dilute the zinc comes down in a crystalline state. In this condition it is very difficult to wash without loss, as some of the crystals become detached and are easily washed away. From ·4 to ·9 gram of the metal is the most convenient quantity to work with, as too large a quantity takes much longer to deposit. 1·5 gram of copper, for instance, takes thirty hours to completely deposit with the current from a single Bunsen cell.

The accompanying wood-cut will show a suitable arrangement of the apparatus for conducting the process.

Arrangement of Apparatus for Electrolysis.



A is a Bunsen cell with zinc-carbon couple. BB are the conducting wires, and the direction of the current is indicated by the arrows. C is a metallic rod fixed in a circular base; an ordinary retort stand does very well. D is a copper rod having a ring at the end on which the platinum basin, E, is supported. F is a platinum wire supported by the rod, G, and insulated by a piece of glass in the centre of the rod. At the lower end of the platinum wire, F, is a small platinum disc which dips under the surface of the solution in E containing the metal to be deposited. The other end of F is attached to the positive conducting wire, and the arrangement is complete.

The Pharmaceutical Journal.

SATURDAY, MARCH 12, 1887.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

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MODERN PHARMACOLOGY.

THE address delivered at the opening of the Session of the Ulster Medical Society by the newly-elected President, Dr. WHITLA, dealt with a subject to which pharmacy is closely related, and in many parts with matters of considerable interest to pharmacists. The subject of the address was the present position and prospects of the domain of therapeutics. Regarding that branch of medical science as the one possessing most interest to the majority of the medical profession, Dr. WHITLA first referred to the opinions constantly expressed as to its want of progress and to the habit apparently fashionable in some quarters to lament that, whilst pathology, physiology, bacteriology, and every other "ology" are progressing with rapid strides, the treatment of disease remains pretty much in the same position that it was a quarter of a century ago. He therefore proposed to examine how far this view might be justified, in order that if true it might be ascertained to what extent there was a possibility of providing a remedy, and if untrue to expose the fallacy. For the purpose of such an inquiry, it was pointed out that much difficulty would be at once removed, if in place of the vague and somewhat shadowy conception of the meaning of the term therapeutics, it were recognized as including at least two distinct sciences. In addition to the "treatment of disease," there is the science of pharmacology, or of the action of remedies altogether apart from disease, and though the study of the effects produced by remedial agents upon healthy or normal physiological conditions may be regarded as a branch of investigation in its infancy, it has, since being called into existence by the creative genius of MAGENDIE, developed under difficulties sufficient to strangle the growth and progress of any other branch of science, and is now making enormous strides. Among the difficulties that this study has had to contend with, one of the most serious is the opposition raised to its prosecution in our own country by what Dr. WHITLA characterized as the morbid sentimentality and wicked ignorance of hysterical agitators. But notwithstanding the obstructive restrictions of a short-sighted legislature, pharmacological study has continued to enrich therapeutics, and to provide means of alleviating human suffering so as to constitute a lasting memorial to the truly scientific spirit of practical medicine.

As illustrations of the fact that in this way the solid foundation of a scientific treatment of disease is being permanently and surely laid, Dr. WHITLA selected from among a multitude of other evidence the researches of LAUDER BRUNTON upon the action of the nitrites; of FRAZER and CRUM BROWN upon strychnine; of continental investigators who have studied the actions of the chinoline series and of the mydratic alkaloids; of MATTHEW HAY, who has demonstrated the action of the saline group of cathartics, and other results obtained where the anti-vivisection mania has not retarded the progress of scientific research. And while it must be admitted that these results are not immediately revolutionizing the treatment of disease, it is equally certain that ground is being gained in that direction in two ways; first, by the introduction of new remedies of great power and value; secondly, by the possibility acquired of using the older remedial agents with far greater precision and effect, and precision is just the quality in which therapeutics has hitherto been deficient. To the advance in this direction chemistry is contributing results that are almost startling, as, for instance, the recently recognized relationship between physiological action and chemical constitution, in reference to which LAUDER BRUNTON has remarked that therapeutics having passed through the flint, the stone and bronze ages, is now entering upon the iron age. It is certainly a sign of progress to find the physiologist can now predict with almost unerring certainty that when once the chemist has succeeded in producing certain readjustments of the molecules of various carbon compounds, he will be able with the resulting compounds to produce certain definite physiological or therapeutical effects.

In addition to the aid thus rendered to pharmacology by chemical science pharmacy has also been of much help, especially by the advantages which the practical physician experiences in using the active principles of drugs, instead of the crude vegetable decoctions of former years. This alone would be evidence of progress, for the alkaloids isolated during the last few years have furnished a series of precise weapons which the scientific therapeutist can wield with a uniformity of result and certainty of action undreamt of in past times. The synthetical production of various rare and expensive principles by the pharmaceutical chemist also marks an era which is deserving of record, not only in regard to what has been done in this direction, but also by reason of its promise of future development. While acknowledging that in these respects the physician is deeply indebted to the practical pharmacist, Dr. WHITLA pointed out a development of modern pharmacy that he regarded as being not only far from an advance,

but calculated to retard the progress of the healing art, viz., the practice of large American and English drug-houses, who are flooding this country with ready-made remedies, and cut and dry formulæ for every ache and symptom to which flesh is heir. This practice he designated as one that threatens either to exterminate the scientific pharmacist, or to convert him into a mere bottle-filling machine.

SIR JOHN LUBBOCK'S BILL.

We have received a letter from Mr. J. Hart, of Manchester, the publication of which, with that of others, is unavoidably postponed, in which he takes exception to the idea conveyed by Mr. Woolley in the remarks he made on the subject of Sir John Lubbock's Bill at the late meeting of Council. As a Manchester pharmacist, he desires to combat the notion that the pharmacists of that city are in favour of the Bill. That Mr. Woolley correctly represented the sense of the meeting he referred to is not questioned at all, but Mr. Hart points out that the meeting was constituted, if not entirely by what he terms the "aristocratic" section of the trade, at least to the extent of ninety-nine per cent of those who already close their establishments at seven or eight p.m. Amongst what he terms the "working class" on the contrary there is a very strong and bitter feeling against the Bill, as being one that would operate very disastrously upon the lower order of the trade. Hitherto the opponents of the Bill have taken no action, because, in the first place, they scarcely think it possible such a drastic measure could become law, and, secondly, because there would, in such case, be a possibility of obtaining exemption from its provisions under the clause intended for that purpose. Mr. Hart is of opinion that if the Council would decide to oppose the Bill, so far as regards its application to the drug trade, it would receive the thanks of thousands of hard-worked chemists, who are compelled to labour on until the "witching hour" is well-nigh come.

The *Standard* of Thursday has a leading article upon this subject, in which objections are raised to the Bill from a more general point of view. While giving full credit to the benevolent motives which have led Sir John Lubbock to introduce the Bill, admitting, also, that there is a large number of shopkeepers who would be glad to close earlier than they do, and that there are many young persons engaged in shops who feel the long hours of work to be a heavy strain upon their physical strength, it is held that the inconvenience occasioned by early closing would be a still greater evil to a disproportionately larger class. It is also urged that the principle of the Bill is thoroughly bad, as involving an interference with individual liberty of action. If this principle of State interference with the management of a man's private affairs is to be admitted, and the State is to decide when a man may sell a pound of candles, or when a customer may buy them, there will be no limit to State intervention of this kind. The application of such a principle might before long be extended to the regulation of the price of commodities, or, to take an illustration from pharmacy, we might have the German system of a fixed tariff for each ingredient of a prescription. Apart from criminals and public offences, compulsory legislation is generally distasteful, but when it comes to prescribing to a small coal dealer or tallow chandler in Whitechapel at what hour he shall leave off business the *Standard* considers that the rare distinction of being at once ridiculous and odious would be achieved. On the whole, therefore, the *Standard* thinks that it would be best to drop the Bill altogether, and to leave the arrangement of reduced hours of labour to be settled between employers and employed according to circumstances.

The second reading of the Pharmacy Acts Amendment Bill in the House of Lords is fixed for Friday, the 11th inst.

* * *

On Wednesday evening next an Evening Meeting of the Pharmaceutical Society will be held at 36, York Place, Edinburgh, when the following papers will be read :—"Note on a Theory of Emulsification;" "Practical Remarks on Pearl Coating of Pills," by Mr. W. Gilmour; "Note on Lime Water," by Mr. J. S. Fraser; "Note on the Corrosion of a Zinc Refrigerator by Ammonium Chloride and Potassium Nitrate," by Mr. J. H. Fisher; "Note on Syrup of Tolu," by Mr. F. Stephenson; and "Presence of Manganese in Chlorinated Lime," by Mr. A. Shand. The chair will be taken at half-past eight o'clock precisely.

* * *

The new Pharmaceutical Register for the colony of Victoria, a copy of which has just been received, contains 684 names, showing an increase of 53 names since our last note on the subject two years ago. In addition it contains a list of five persons, widows and executrices of pharmaceutical chemists, to whom permission has been granted by the Pharmacy Board to carry on business under the management of a registered pharmaceutical chemist for a period of twelve months; and another list of thirty-five persons to whom certificates have been issued authorizing them to sell poisons at places four miles distant from the shop of a pharmaceutical chemist.

* * *

At the next meeting of the Chemical Society on March 17 there will be a ballot for the election of Fellows, and the following papers will be read :—"The Action of Heat on Nitrogen Peroxide," by Dr. A. Richardson; "The Formation of Naphthalenesulphonic Acids by means of Sulphuric Anhydride," by Dr. Armstrong and W. P. Wynne, B.Sc.

* * *

The next meeting of the School of Pharmacy Students' Association will be held on Thursday, March 17, when the Hon. Secretary, Mr. F. W. Short, will offer some remarks on the commoner difficulties met with by beginners in chemistry, and Mr. F. J. Yeatman will make a Report on Physics.

Transactions of the Pharmaceutical Society.

EVENING MEETING IN LONDON.

Wednesday, March 9, 1887.

MR. MICHAEL CARTEIGHE (PRESIDENT) IN THE CHAIR.

An Evening Meeting of the Pharmaceutical Society was held at 17, Bloomsbury Square, on Wednesday last. The chair was taken at eight o'clock by the President, when the first paper read was a—

NOTE ON LINIMENTUM TEREBINTHINÆ AND SAPO MOLLIS.

BY EMERITUS-PROFESSOR REDWOOD.

The paper is printed at p. 741, and gave rise to the following discussion :—

Mr. MARTINDALE said sapo mollis, as he had met with it, was greenish and nearly neutral. The first sample of the official turpentine liniment that had been made upon his premises was a fairly satisfactory preparation. But the second was not so ; it made a bad emulsion, separating after keeping, and a clear layer settled at the bottom of the bottle. Another sample, made with another sample of soap, was almost as limpid as possibly could be, although he had used his best powers to make it a good emulsion. The only deviation from the Pharmacopœia directions was that he used warm water to make the soap readily soluble. In the *Pharmaceutical Journal* a suggestion had been made for a modification of the Pharmacopœia formula by substituting rectified spirit for an equal weight of water. The preparation so made was translucent and homogeneous.

Mr. TRAFF pointed out that under the heading "Sapo Mollis," it was stated in the Pharmacopœia that it was present in turpentine liniment in the proportion of 2 ounces of soap in 17½ ounces. Referring to the Pharmacopœia quantities for that preparation, he found the proportion was 2 ounces to nearer 19½ ounces. That seemed to afford some justification to those pharmacists who had imagined that there was some error, since it seemed to allow for the two ounces of water, which, as some suggested, should be added. This made a good emulsion. Moreover, in the formula for the liniment, it was directed to rub the "fluids" together, but the term fluid was not applicable to the mixture of the soap with only 2 ounces of water.

Mr. BURNETT said that the reader of a paper at a recent meeting of the Chemists' Assistants' Association mentioned that many of the green soaps turned yellow upon being kept for a short time. He had himself noticed the same fact in the commercial preparations. The ordinary sapo mollis, B.P., became yellow upon being kept for six months. The reader of the paper stated that this change was a sign of bad manufacture. As to turpentine liniment he had some of the preparation made for him about twelve months ago in the form of a jelly of about the consistency of a table jelly. This preparation was still in the same state as when it was put into the bottle.

Mr. MACEWAN stated that the essayist referred to attributed the change of colour to oxidation, and not to bad manufacture.

Mr. SEWARD said that previously to eight or nine years ago, the best soft soaps were of a somewhat amber colour. The character of green soaps, however, was that they were exceedingly pure, and many persons had come to look upon a green soap as synonymous with a pure soap. As there was now a certain amount of confidence in green soaps, he thought that it would be a pity to disturb it. Professor Redwood's paper had stated that green soaps were very pure. Many of the yellow soaps were otherwise.

Mr. MACDERMOTT said that very few persons made turpentine liniment strictly according to the Pharmacopœia, for unless heat was used the preparation could not be made fluid. He found that in mixing the soap with cold water and then adding turpentine gradually he obtained a beautiful opalescent paste. With regard to the keeping of the liniment he had found that if it were put in a covered pot it became quite liquid at the top after twenty-four hours, but this would again mix with the other portion and form a perfect paste. If it was kept air-tight it would remain as a paste for some weeks, if not months. He had also noticed that as successive quantities of turpentine were added the emulsion seemed to get thicker. It was rather a tedious process which was given in the present Pharmacopœia, for the turpentine required a great deal of rubbing in. He should like to know whether in future a description of what the liniment ought to be like would be appended to the formula in the B.P., so that it might be known whether the preparation should be sent out as a liquid or as a paste. The practice of different houses varied in this respect.

Professor ATTFIELD said that the criticism as to the mixing of the "fluids," which had just been spoken of, was somewhat old. The word was omitted in the last reprint of the Pharmacopœia at the suggestion of Professor Redwood himself, and the omission was recorded in the list of corrections.

Mr. BLAND said that in the old Pharmacopœia the only official hard soap was an olive oil soap. In the present Pharmacopœia there were two hard soaps, an olive oil soap and an animal soap. It was well known that the manufacture of animal soap might vary considerably, according to the different manufacturers. One important point in connection with this subject was the state of hydration in which the different soaps came into the hands of pharmacists. In the hard olive oil soap it was impossible for the manufacturer to get in more than a comparatively small percentage of water, but it was very different with the hard soap which was made from animal fat, especially if cocoanut oil fat were present. Into such a soap water might be introduced in enormous quantities. The difference in weight between a piece of such soap when fresh and when dry was astonishing. The soaps of commerce deserved more attention in this respect than they had received. The fact which he had pointed out might account for some of the difficulties which had been noticed in making turpentine liniment.

Dr. REDWOOD, in reply, said that of course they all knew that Mr. Martindale was an expert pharmacist, but notwithstanding that he (Dr. Redwood) ventured to doubt whether Mr. Martindale had prepared the sample which he had exhibited in the way in which a pharmacist would make an emulsion. He (Dr. Redwood) could certainly produce such an emulsion as that by using a narrow pestle, such as he had on the table, but he repudiated that mode of operating. When a small-headed pestle of that sort was used the soap was broken up into little flakes which would swim about in the water, but would not dissolve previous to the addition of the turpentine, and no satisfactory result could be obtained. He had two or three times obtained such a result, but he had put it aside. He should be ashamed to show it. He would venture to appeal to Mr. Martindale to bring his soap to his (Dr. Redwood's) laboratory and let him manipulate with a broad-headed pestle, carefully selected, one which fitted the contour of the bottom of the mortar. When such a pestle was used the soap became triturated. With the small-headed pestle he could break the soap up, but he could not triturate it, and trituration, especially when the turpentine was added, as well as before, was necessary for a proper result. He had never met a case in which trituration, properly conducted, had failed. As he had stated, the thickness of the emulsion would depend in a great measure upon the more or less alkaline condition of the soap. Mr. Martindale had stated that his soap was nearly neutral, but he had not

indicated how he determined that fact. He had never met with a sample of commercial soft soap which did not leave a residue upon being dissolved in rectified spirit. Once or twice he had been deceived upon dissolving the soap in rectified spirit and pouring off the clear part and adding the phenol-phthalein to it. In that way he at once got a deep reddening; but he had never met with any sample in commerce which, if carefully filtered, after being dissolved gave any indication with the phenol-phthalein test. It was neutral in regard to caustic alkali, but it always contained K_2CO_3 in variable quantities from 1·4 per cent. to nearly 3 per cent., and this made a difference in the results. If the soap was alkaline it would hang about, and it would require an open-mouthed bottle. When it had been enclosed it would become more liquid in the course of a few days, although it might be closely corked. In one of the bottles which he had before him was contained a product which he had made by using soap prepared by himself, and which had rather a large excess of caustic alkali left in it. It had been made a week, and was still quite firm. But when he came to operate with exactly the same soap, after he had converted the alkali into a carbonate and taken away the carbonate by dissolving in spirit, it formed an emulsion which was in a more or less liquid condition. He would engage to say that no sample which was carefully manipulated with the precautions he had indicated would fail to give such results as he had referred to. One of the speakers had remarked that he (Dr. Redwood) had found the green soaps to be pure. That statement did not correctly convey what he intended to say. He did not consider that any of the green soaps were pure. They were either made with oil other than olive oil, or, as he thought more likely, contained some added colouring matter. In all probability they had been coloured to make them correspond with the character which was indicated in the Pharmacopœia. He intended to make inquiries with a view of finding out, with reference to soft soaps prior to 1867, when they were required to be yellowish-white and not yellowish-green. One of the bottles contained a sample of soap of his own manufacture, made with pure olive oil, and rendered neutral by converting the excess of alkali first into carbonate, and then removing it by dissolving in spirit. This he should look upon as showing the proper character of olive oil soft soap. He trusted that in the future that character would be introduced into the Pharmacopœia.

The PRESIDENT said that it was delightful to find the veteran Professor coming out as he had done in answer to some adverse criticism of certain of his special preparations in the Pharmacopœia. He had shown how well he was able to defend every pharmaceutical process in which he had had a hand.

The PRESIDENT then said there were two papers to be read upon the subject of Strophanthus, the discussion on which could be taken together. The first was—

A CONTRIBUTION TO THE PHARMACOGNOSY OF STROPHANTHUS.

BY WILLIAM ELBORNE.

This will be found at p. 743. The next paper was entitled—

SOME NOTES ON STROPHANTHUS.

BY H. HELBING.

The paper will be found on p. 747.

Previous to the discussion of these papers, Professor DUNSTAN, at the request of the PRESIDENT, gave a brief *résumé* of "Some Notes on the Pharmacology of Strophanthus," by H. D. Rolleston, B.A., which will be published in the next number of this Journal.

Mr. MARTINDALE said that it was interesting to learn that the ethereal extract obtained in the preliminary treatment of the seeds for the removal of oil, by the process recommended by Professor Fraser, was active to some extent. He was inclined to think that the removal of the oil might be useful in rendering the strophanthin which remained in the seed still more accessible to the rectified spirit, though Mr. Elborne had shown that proof spirit took out more of the glucoside than rectified spirit did. The percolation of the seeds, either by ether or spirit, was a very tedious operation. He had had some tincture in manufacture for nearly a fortnight, and in both the alcoholic and the ethereal percolation the albuminous matter in the seeds seemed to check the process. He had dried the bruised seeds, and endeavoured to get the ether to pass through them with fair rapidity. He thought that the treatment with ether might be serviceable in allowing the alcohol to make a more perfect exhaustion than would be possible if the oil was still present. He believed that one in twenty did not exhaust the seeds. The marc remained intensely bitter, even after the percolation had been continued for a long time.

Mr. CHRISTY said that he had brought some specimens to show what an immense number of varieties of strophanthus there were. In speaking about the continent of Africa one was apt to forget the enormous extent of that country. One of the specimens belonged to a variety which came from the south-east of Africa. It was sent over at the time of the two shipments of the seed which had been collected there. Professor Oliver and Professor Baker, of Kew, both said that it was a different variety of *Strophanthus hispidus* from that which was got from the African Lakes Mission, and very different from that which Mr. Buchanan sent from farther up the river. Another of the specimens was one from the African Lakes Mission. Another was a specimen of whitish strophanthus, which they had heard of that evening, which was labelled as false strophanthus. This variety had been sent over to Europe for several years past from the west coast. It contained very little bitter principle. The supply of seeds recently received represented no doubt several varieties. Some of the pods were very short, and had only five or six seed cells in them.

Mr. LASCELLES-SCOTT, who was very indistinctly heard, exhibited some specimens of different species of strophanthus. He said that in experimenting with two of these physiologically he had found that the seeds of what he designated a rufous variety were more powerful than the others in the proportion of $1\frac{3}{4}$ to 1. The remarks of the readers of the papers coincided with his own experiments. There was, however, one remark with which he did not agree, and that was that the oil present in the seeds seemed to have the property of rendering the strophanthin more soluble in ether and certain other menstrua than it would be if the oil were not there; certainly that did not seem to be the case with regard to petroleum ether, therefore if the oil were extracted carefully with petroleum ether, and then the strophanthin was taken out with spirit, a stronger tincture would be obtained than could be got by using ordinary ether first and spirit afterwards. The statement about the albumen had interested him greatly, because the albumen seemed to be the "rock a-head" which prevented a satisfactory preparation from being made with the seeds. He had found that if he neutralized or precipitated the albumen by means of mercurial salts, first of all, he could obtain a far more powerful tincture from the residue than he could obtain in the same time if the albumen were left present and not rendered insoluble. He did not think that a definite tincture could be hoped for by simply using a given proportion of the seeds, as the seeds varied in strength from time to time. He would suggest that, until a definite method of deciding the strength of the tincture could be arrived at, something based upon the active energy of the tincture might be adopted as a standard. For instance, if a definite quantity of the tincture were applied to a certain animal, its strength could be measured by ascertaining the reduction in the number of heart-beats per minute which it produced. The effect of the tincture upon the heart was a peculiar one. The preparation might be called a heart-

regulator. It reduced the beats of a feverish heart, but quickened the pulsations of a very languid one.

Mr. ELBORNE said that in the communication from Mr. Rolleston, which had been laid before the meeting by Professor Dunstan, there were one or two points which were inconsistent with his own experience. Could Professor Dunstan say what variety of seed Mr. Rolleston had used. Mr. Rolleston stated that the ethereal extracts always contained a certain amount of the bitter principle with the fixed oil. In his (Mr. Elborne's) paper he had alluded to the necessity of having a thoroughly absolute ether; and this had to be specially prepared. In the last filtration everything depended upon the temperature of the room and the amount of moisture present. Upon the evaporation of the ether in a very moist atmosphere there was a very large amount of condensation, and ice would be found to fringe the filter; this quickly disappeared, and tended to saturate the paper; and then, of course, if any more ether were used it would cease to be anhydrous. The extraction of the seed with proof spirit had been spoken of as likely to yield a larger quantity of the active principle. This would perhaps more thoroughly exhaust the seed, but he was sure that it would not be advisable to lower the alcoholic strength, for the seed contained a large quantity of albumen which was peculiarly liable to undergo decomposition. Mr. Lascelles-Scott had recommended petroleum ether in place of ordinary ether for the previous extraction. But if that were used the colour of the extract would be green, because chlorophyll would be left which would be taken out in the subsequent extraction by spirit. He did not understand whether Mr. Lascelles-Scott associated the use of mercuric salt for the precipitation of the albumen with the preparation of the tincture.

Mr. LASCELLES-SCOTT: No, simply as an experiment.

Mr. ELBORNE: As to the physiological test which Mr. Lascelles-Scott suggested, he did not think it practicable.

Professor DUNSTAN said that he believed that the strophanthus used by Mr. Rolleston was *Strophanthus hispidus*. As to the ether, in every case absolute ether was used. Four different persons made the extract for Mr. Rolleston. He (Professor Dunstan) could vouch for one particular case in which the ether was perfectly free from alcohol and water. He believed that closed percolators were used. Up to the present every specimen of oil which Mr. Rolleston had examined contained strophanthin. It was desirable that the oil prepared by Mr. Elborne should be physiologically examined.

Mr. HOLMES said that the Society was much indebted to Mr. Christy for the loan of the excellent specimens of strophanthus which had been placed on the table; such complete specimens were rarely to be found in herbaria. He quite agreed with Mr. Christy that there are many species both in East and West Africa of which at present very little is known. The greenish-brown seeds now in commerce, and which alone are at present used for making the tincture, are obtained from a plant with hairy leaves which differ decidedly in shape from those of *S. hispidus*; the seeds also are different in colour and size, and in the character of the hairs, which in *S. hispidus* are dark brown and short. The strophanthus leaves on the table were presented to the Society's Herbarium some months ago by Mr. Lindsay, the Curator of the Edinburgh Botanical Garden. They had been grown from some of the seed used by Professor Fraser, apparently the greenish-brown kind. These leaves differed considerably from those of the type specimen of *S. Kombé* in the Kew Herbarium, so that it appeared they were derived from a hairy leaved species resembling *S. hispidus*, but not identical with it. Possibly the "white" seeds might be the produce of *S. Kombé*, Oliv., but there was no evidence to that effect. The pods containing them were shorter, more marked with white spots, and the seeds were easily distinguished by the fact that the hairs do not become shorter at the apex of the seed, so that the tapering outline of the apex is hidden by them. The seeds shown by Mr. Lascelles-Scott from Delagoa Bay belonged to another section of the genus, in which the leaves were smooth and more coriaceous. It was important to note that the experiments that had been made by the two gentlemen who read the papers that evening had been made, not with the brown seeds of *S. hispidus*, nor with the white seed of *S. Kombé*, but with the greenish-brown. one which passes in commerce under the name of *S. Kombé*, The Society was also indebted to Messrs. Burroughs and Wellcome for the loan of an arrow poisoned with strophanthus, and of an original plait of strophanthus pods, showing the way they were packed for exportation. On the table there were some interesting specimens forwarded from Hong Kong by Mr. W. E. Crow, a former student and first prize man (1883) of the Society. One of these was the root and stem of *Gelsemium elegans*, which was used for criminal poisoning in China, and in which Mr. Crow had discovered an alkaloid resembling gelsemine. On a former occasion Mr. Crow had sent flowers and fruit of the plant for the Herbarium, so that the plant was now fully represented in the Museum of the Society. Another of the interesting specimens sent by Mr. Crow, and probably seen for the first time in this country, were the leaves, stem and root of *Strychnos Ignatii*. Some abnormally developed lemons had been sent by Mr. H. Ballchin. The peculiarity consisted in the carpels being partially separated above, giving a fingered appearance to the lemon. This was attributed to the bite of an insect, in an early stage of growth of the fruit, preventing the union of the carpels, which were, he believed, in the young state nearly free. The Curator also called attention to a specimen of recrystallized proteacin and phloroglucin, obtained from the kino of *Pterocarpus marsupium*. These had been presented to the Museum by Dr. Schuchardt of Goerlitz. The proteacin was used as a remedy for malarious fevers by Dr. J. W. Beek of Rondebosch, Cape Colony. The specimen of anhydrous lanolin presented by Messrs. Burroughs and Wellcome was of a brown colour, but when mixed with water assumed the pale yellowish colour of ordinary lanoline. It was said to be capable of absorbing 200 per cent. of water.

Mr. CHRISTY said that having resided in China he could state one curious fact about the lemons and citrons. Those which were divided were called in China the Buddha's claw. They had been lately grown in Algeria, but they could not produce them in Algeria until the priest sent for the insect. It was said that the curious points were caused by the insect piercing the fruit.

The meeting then adjourned.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly meeting of the Council was held at the Society's rooms, No. 11 Harcourt Street, Dublin, on Wednesday, 2nd instant, at 3 p.m.

The President, Mr. William N. Allen, in the chair.

The other members of the Council present were the Vice-President, Mr. Draper; Mr. Brunker, Professor Tichborne, Dr. Collins, Dr. Montgomery, Mr. Wells, Mr. Doran, Mr. Beggs, Mr. Hayes, Mr. Grindley and Mr. Simpson.

The Registrar, Mr. Arthur T. Ferrall, read the minutes of the last meeting, which were confirmed.

Mr. Brunker said his attention had been called to the fact, that one of the three days appointed for the examination for the licence would fall on Good Friday. It was desirable to alter that.

After some discussion it was ordered that the days of examination should be April 5, 6, and 7.

A letter was read from Mr. Charles Threadgale, St.

Hubert's Lodge, Great Harwood, Lancashire, stating that he was twenty-seven years of age and a Canadian by birth. Eleven years ago he was apprenticed to an apothecary in London [England] and served five years. In April, 1882, he presented himself at the Preliminary examination of the Apothecaries' Hall, and passed in all the subjects except mathematics. Owing to the death of his father in August, 1882, he was obliged to return fo Canada. Last year he came back to England. Under these circumstances he asked to be allowed to present himself at the Licence examination, after having passed a medical preliminary examination, and attended a three months' course in Practical Chemistry, Botany, Materia Medica and Pharmacy at a recognized school, without waiting until two years should have elapsed from the time of passing the Preliminary examination.

The Vice-President: What does he mean by the statement that he "passed except in mathematics?"

Dr. Collins said it might mean that he passed the examination as the course stood when he went in; but that he had not passed in "mathematics," which had since been added to it.

On the motion of Mr. Hayes, seconded by Professor Tichborne, it was ordered that Mr. Threadgale should be asked to state what Preliminary examination he had passed, and where, and to produce the certificate of his having passed the same; otherwise that he should have to comply with the regulations of the Society.

A letter from Mr. Patrick J. Lyons, 59, Arthur Road, Belfast, stating that he had been unable to attend the last Licence examination beyond that for theoretical chemistry, and asking to be informed when he might again present himself, and whether a fee would be required.

Professor Tichborne said he had received a letter calling attention to a mistake about this gentleman in the report which appeared of the proceedings of the last meeting of the Council. It was inaccurately stated that he had passed.

On the motion of Mr. Brunker, seconded by Dr. Collins, it was ordered that Mr. Lyons should be permitted to appear at the next examination for the licence on paying a fee of 10*s.* 6*d.*

The Vice-President remarked that with a view to future action on this point it would be well to ascertain what was the practice of other bodies in the case of students attending part of an examination and then leaving.

Mr. Wells thought it would not be judicious to allow gentlemen to attend part of an examination, and then, if they did not do well, to stop away, and come up at the next examination.

The Vice-President: They could also take away the papers and use them for their guidance.

Mr. Brunker said that would not much matter, because after the examination the papers could be bought for a shilling.

The President said the members of the Council had in their hands copies of a letter which he had received from the Editor of the *Chemist and Druggist.* He had taken the course of sending copies to them because he thought the letter should have been addressed to the Council and not to him. He had grave doubts as to the propriety of the course which Mr. Wootton had adopted of taking a consensus of opinion of the members of the Society with respect to the question raised by his letter. That document concluded with a statement that the wishes of the majority of the members of the Society had been unmistakably revealed to be in the writer's favour. He (President) thought the letter rather tended to show the opposite. It showed that of seventy-one members only twenty-four were favourable to Mr. Wootton. The remaining forty-seven were either neutral, or replied to the contrary, or said they did not wish to give an opinion, or did not reply at all. According to his own way of arguing, the forty-seven should be deemed to be against him. There were two gentlemen who approved of his journal, but said that they never read the *Pharmaceutical Journal* at all; so that their opinions were not worth much.

Dr. Montgomery: I do not think there is any use in wasting time on the subject. I think the members of the Society have given their opinion in favour of the *Pharmaceutical Journal.*

Dr. Doran: If members want the *Chemist and Druggist*, they can subscribe for it.

Mr. Brunker said there was no doubt that the *Chemist and Druggist* was worked with a great deal of energy and enterprise. But in so far as the letter conveyed the opinions of anonymous writers, it was unworthy of being dealt with by the Council. Some of the persons who had replied to Mr. Wootton might be persons whose opinions were not worth much; while others might be persons whose opinions the Council would value very highly. So that there was really no basis on which to deal with the letter. But if the Council were to turn their backs on the English Society which had treated them with such liberality, they would be doing a very unworthy act. They got the *Pharmaceutical Journal* for over fifty members of the Society for about £5 a year; and the total cost in connection with it was not more than £12 or £13 a year. Anyone who wanted the *Chemist and Druggist* could pay 10*s.* for it, and it was very good value for that money.

Dr. Doran: I doubt very much if many of the objections which have been made to the *Pharmaceutical Journal* came from members of the Society at all.

The Vice-President said it was not necessary to laud the *Pharmaceutical Journal* at the expense of the *Chemist and Druggist*, which was a clever and well-conducted trade journal as far as it went, although perhaps it had not very high scientific pretensions. He did not, however, approve of the course which it had taken of carrying out a sort of plebiscite for the purpose of introducing the *Chemist and Druggist* into the place occupied by a rival journal.

Mr. Brunker: This letter says—"We think your Society ought to have the means of issuing its own announcements and reports sufficiently." That we have at present.

President: We may allow the letter to be marked "read." The receipt of it has already been formally acknowledged.

Mr. Hayes moved the following resolution:—

"That this subject having been frequently discussed by the Council, and decided in favour of the *Pharmaceutical Journal* as the official organ of the Society, the Council sees no reason to alter its decision."

Dr. Montgomery seconded the above, which was passed unanimously.

Donations were received from the American Pharmaceutical Association of their 'Proceedings for 1886;' from the British Pharmaceutical Conference of the 'Year-Book for 1886;' and from the Pharmaceutical Society of Great Britain of their 'Calendar for 1887.'

A report of the Preliminary Examinations Commitee submitted a letter from Dr. Tweedy, the Society's Examiner, stating that in the main his conclusions as to the Preliminary examinations coincided with those expressed in the President's letter of October 6 to Sir William Kaye, but that in his opinion that examination would be rendered more efficient in its character if the following proposals were brought into operation:—(1) That 50 per cent. in English and arithmetic and 40 per cent. on the entire course be the minimum on which candidates be allowed to pass the Preliminary examination. (2) That English grammar form a definite portion of the examination. (3) That a knowledge of structural botany only be required of candidates. (4) That the examination in chemistry being on this occasion of an entirely theoretical character the first seventeen chapters of Roscoe's 'Elementary Chemistry' be substituted for the

manual at present in use, which, although a work of the highest excellence, is obviously intended for the use of students working in a laboratory. (5) That means be adopted to ensure the better isolation of candidates (such as the providing of separate desks or tables). That each candidate be supplied with proper writing materials, and that to save time all such preparations for the examination be completed previous to the arrival of the candidates, so as to allow the examination to commence punctually at the appointed hour.

Mr. Ferrall : I do not think that Dr. Tweedy had any cause for putting in that last recommendation.

The President said the Committee recommended that all Dr. Tweedy's proposals should be adopted except No. 4, relating to the 'Chemistry Manual.'

The Vice-President said Roscoe's 'Elementary Chemistry' was a book of the highest possible excellence, but, notwithstanding its title, it was only suited for advanced students, and would be useless to boys who had just left school. All that candidates for the Preliminary examination wanted was the most elementary knowledge of chemistry. Unless they decided upon leaving it open to students to get their information from whatever book they liked, he did not see why Roscoe's 'Primer' should not be reverted to.

Mr. Brunker thought that in chemistry, for the purpose of the examination in question, the amount of chemical knowledge that was required should be defined.

The Vice-President said the Preliminary Examination Committee should frame a syllabus for the Preliminary examination. He moved that that Committee be continued with a view to their defining the limits of the Preliminary examination in chemistry.

Mr. Brunker seconded the motion, which was agreed to.

A report of the Examination Improvement Committee having reference to the refitting of the examination room was adopted.

The Council then adjourned.

The Late Examinations.

The following is the official announcement of the results of the January examinations :—Passed Preliminary candidates : Henry L. Wilson, Monaghan; Edward Whelan, Limerick; James T. Watterson, Longford; Maurice O'Sullivan, Youghal; Thomas Adam Moody, Banbridge; Thomas W. McMurray, Clonmel.

Passed candidates for the Licence: Joseph Thomas Ponsonby Brabazon, Belfast; George Ambrose Henry, Belfast; Thomas White, Dublin; Frederick William Hatton, Dublin; William Smith Duggan, Rathmines; John Patrick Thomas Timmon, Navan.

Provincial Transactions.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The seventh meeting of the ninth session was held in the Pharmaceutical Society's House, 36, York Place, on the evening of Wednesday, February 9th, at 9.15. Mr. William Duncan, President, in the chair.

The minutes of last meeting having been read and approved, the evening was devoted to a series of notes and queries arranged by Mr. J. Rutherford Hill, who opened the proceedings by reading a note on—

A Solution of Hyoscyamine.

BY J. RUTHERFORD HILL.

The following note deals with a circumstance recently brought under my notice by Mr. Robbie. He had frequent occasion to dispense the following prescription.

℞. Hyoscyamin. amorph.	grs. ii.
Aquæ	℥ xx.

The hyoscyamine used was Merck's amorphous alkaloid. It is insoluble in water, and to overcome this difficulty it had been first dissolved in rectified spirit and then added to the water. The result was a somewhat muddy mixture, which on standing deposited a flocculent precipitate, and in bottles returned to be refilled it was found that the sides were coated with a brown deposit. By filtering the mixture a more elegant result was obtained. The mixture did not deposit so much on standing, but it very properly occurred to Mr. Robbie that the deposit might consist of active principle, and that the greater elegance was attained at the expense of therapeutic value.

I separated a quantity of the precipitate from the mixture, washed it with water, and found it to be alkaline to test paper. It was freely soluble in dilute H_2SO_4 and gave an abundant precipitate with Thresh's potassio-bismuthic iodide test for alkaloids.

Undoubtedly Mr. Robbie was correct in thinking that it was an error to filter such a mixture. The prescription in fact is incomplete. To secure a good stable solution, it is only necessary to add a sufficiency of dilute sulphuric acid to form sulphate of hyoscyamine which is freely soluble in water. It does not secure the object in view simply to attach a "shake the bottle" label, as the amorphous alkaloid adheres to the sides of the bottle and cannot be detached by shaking.

It may be interesting to note that the amorphous alkaloid used in this case has a strong disagreeable smell. This, I think, is almost entirely due to the solvent used in the process of extraction. From the odour of the solution I should say it had been extracted either by benzol or benzolated amylic alcohol. I have separated the alkaloid from a portion of the washed precipitate dissolved in H_2SO_4, by treating with excess of Na_2CO_3 and shaking out with chloroform, and you observe that it has no odour,

You will also notice that the alkaloidal solution is distinctly fluorescent. I think it is very likely that this fluorescence is due to the presence in the amorphous alkaloid of a fluorescent substance, similar to that found in belladonna by Kunz (*Pharm. Journ.*, [3], xvi, p. 365) and in *Scopolia japonica* by Professor Eykman. (*Pharm. Journ.*, [3], xv., p. 81). This substance was called chrysatropic acid by Kunz, and scopoletin by Eykman. Kunz's discovery has been confirmed by Paschkis (*Pharm. Journ.*, [3], xvi., 838) and this substance is very probably present in other solanaceous plants. It is a glucoside having the formula $C_{12}H_{10}O_5$, and seems to closely resemble æsculin.

The Chairman said he had observed in the 'Year-Book of Pharmacy' for 1886, that Paschkis gave the formula $C_{10}H_8O_4$ to this fluorescent substance. This brought it much nearer tropic acid, which was known to be a decomposition product of atropine and similar alkaloids. He, therefore, thought it probable that this substance did not occur in the plant, but was produced during the process of extraction.

The Chairman then read the following—

Note on the Reaction Between $AgNO_3$ and Sp. Ætheris Nitrosi.

BY WILLIAM DUNCAN.

The following is a prescription at the present time very frequently met with in Edinburgh :—

Nitrate of silver	gr. 20
Spirits of nitre	℥j.

and is used as a paint for ringworm and eczema ; a modification of the same is found in the London Throat Hospital Pharmacopœia.

Two years ago when I was first called to dispense it, it struck me that it was an incompatible mixture, but the whole affair passed from my memory until a fortnight ago, when it was being made up at the dispensary. A double quantity was made and the half was set aside to see what would take place. The silver nitrate is only

slowly soluble in the menstruum, and on adding it in fine powder a white milky-like mixture is the result. In the course of an hour a black precipitate falls, leaving the supernatant liquor perfectly clear. In twenty-four the bottle is partially covered with metallic silver.

Thinking the reduction of the salt was due to the aldehyde which is always present in samples of sp. ætheris nitrosi, I first proved the presence of that compound by the liquor potassæ test, and again make an ounce of the lotion. The mixture was allowed to stand for a week, when I presumed the reduction of the silver would be complete. One drachm of the clear solution was taken and evaporated, and the residue (silver nitrate) weighed 1·8 grain. A second drachm was taken, and the whole of the silver in solution thrown out by excess of liquor potassæ filtered, and the filtrate afterwards boiled; it gave no indication of aldehyde, proving that it had been all oxidized into acetic acid. The explanation, therefore, which I have to offer regarding the decomposition is that any aldehyde present reduces the silver nitrate to the oxide, and even to the metallic state: the excess of the salt going into solution as silver nitrate. Of course it is possible that the other constituents of this complex compound, sp. ætheris nitrosi, may have a reducing action as well, but I have not thought it necessary to go further into the question.

Mr. Mackenzie said he had found the white precipitate, at first formed, soluble in water. Water was present in the Throat Hospital formula, and he thought a mistake had been made in omitting it in the cases brought forward by the President.

Mr. W. S. Turnbull then read the following :—

Note on Some Preparations of Iodoform.

BY W. S. TURNBULL.

Iodoform has lately come into frequent use with medical practitioners, so that it may be said to have gained a place amongst the more important medicaments of the time.

It is to be regretted, I think, that in our Pharmacopœia the solubility of the drug is not more clearly defined, and that the question of solubility in many cases has received so little attention from the compilers of our National Compendium.

There are two pharmacopœial preparations of iodoform, the suppository and the ointment; these seem to be faultless if carefully prepared.

Perhaps in nothing does the dispenser encounter greater difficulties than in the making of suppositories. The best basis for most suppositories, no doubt, is oil of theobroma; though many seem to have a special liking for soap as a basis, but recent observation has convinced me that soap is unsuitable as a basis for iodoform suppositories, especially if they require to be kept for any length of time.

A number of suppositories containing iodoform, opium and soap were prepared according to a prescription about six months ago, at the same time a number were prepared according to the Pharmacopœia. On examining them, lately, I found that in the case of those made with the soap basis the iodoform had volatilized to such an extent that the layer of cotton-wool in the box had become completely saturated with crystals of iodoform, while those made with oil of theobroma as a basis remained perfectly in the same state as when first made. This seems sufficient proof that in the case of iodoform suppositories soap is objectionable as a basis.

Although, as I have said, the pharmacopœial ointment of iodoform, if carefully prepared, seems to be without fault, still it is not unusual to have an ointment prepared with iodoform and vaseline. I made a small quantity of this ointment of pharmacopœial strength, and after exposing it for about twenty-four hours to the light it presented anything but a uniform appearance, the ointment on the surface becoming much darker than that below. I failed, however, to find free iodine, but Mr. Hill informs me free iodine can be detected in an ointment composed of iodoform and vaseline if exposed to the sun for some time. Perhaps my being unable to find iodine without the application of heat may be due to the want of sunshine, but the subject of the incompatibility of iodoform with the hydrocarbons is doubtless one worthy of further investigation.

Odin and Seymarie, while experimenting with iodoform in 1873, found, in making solutions in ether and other solvents, that if iodoform in the crystalline state be simply agitated in a white glass flask with ether, and so dissolved, it will keep without change for a considerable time; but if powdered iodoform be used the solution develops a dark brown colour, which development of colour is prevented by using a red glass flask, and they attribute the coloration to the liberation of free iodine. Light in this case appears to be instrumental in bringing about the change.

Mr. Helbing has observed that an ethereal solution of iodoform, when exposed to light, acquires a brown tint, gradually becoming darker, due to the liberation of iodine.

In the *Pharmaceutical Journal*, vol. xvi., and *Medical Gazette*, May 29, p. 259, he says the action of sunlight may be retarded by the addition of a small quantity of alcohol, but to prevent the alteration in ethereal solutions it is necessary to preserve them in black or brown bottles. The dissociating action of sunlight is also exercised upon the superficial layers of ointment containing iodoform if exposed. The change of colour varies with the excipient, being blackish brown with vaseline, violet red with paraffin, and red with benzoated lard. You will also notice on the table two solutions: one of iodoform in petroleum ether giving a purplish colour; the other iodoform in benzol giving a red colour. In both of these I have found free iodine. Very probably iodoform may come into use as a purity test for petroleum products of the vaseline type; at least I think some member of this Association might with advantage take up the subject. I have also had prepared several iodoform bougies with the glycerine and gelatine basis, and also some according to Professor Chiene's formula with oil of theobroma. We must bear in mind that iodoform is almost insoluble in glycerine (1 per cent.), therefore neither will it be held in a state of solution, nor will its absorption be facilitated, for on high medical authority it is stated that fat facilitates the absorption of iodoform, therefore it is reasonable to suppose that iodoform from suppositories and bougies when prepared with oil of theobroma will be more readily absorbed than when made with a basis which not only does not aid, but must have a tendency to retard absorption.

In regard to iodoform pills, which are coming much into use in hospital practice, doctors as a rule do not mention any excipient for their preparation; it is therefore left to the dispenser to use the one most suitable. Glycerine of tragacanth is recommended by Martindale, and either this, or ext. gentianæ, may be used with advantage. The latter I prefer, and the small quantity required does away with the objection so often raised against the use of gentian, viz., that of its being a medicinal agent of itself, for the maximum dose of iodoform is considerably below the minimum pharmacopœial dose of ext. gentian. If at any time there exists a necessity for coating pills it certainly does exist in the case of iodoform pills.

Attempts have been made to deodorize iodoform when used as a dusting powder for sores, and the most efficient substance in disguising the odour is coumarin, as will be seen from the sample I exhibit.

The Chairman stated that coumarin was open to the objection that it very soon volatilized and left the iodoform. He had found ground coffee a most effectual mask for the odour of iodoform.

Mr. A. R. Robbie then read the following :—

Note on Confection of Sulphur.

BY A. R. ROBBIE.

At an evening meeting of the North British Branch on February 8, 1882, Mr. Boa read a paper on "Confection of Sulphur," making a suggestion which greatly improved that preparation, and showed that a happy idea and a very simple expedient may produce a result of considerable practical value.

The improvement was deservedly adopted in the British Pharmacopœia of 1885. Even this improved confection, however, is open to the objection that when it is kept for some time, especially under circumstances favourable to evaporation, it becomes dry and hard.

Having recently had my attention specially drawn to the matter I made a few experiments to ascertain if any simple means could be adopted to obviate this defect. I found that this could be accomplished by the addition of a small proportion of glycerine.

The following formula gives a product which appears to leave nothing to be desired :—

Sulphur. sublimat.	℥iv.
P. G. tragacanth.	gr. xviii.
Tinct. aurantii	℥ss.
Ac. tart. potass.	℥i.
Glycerini	℥vi.
Syr. simpl.	℥ii. ℥vi.

Misce.

I have here a sample made by the above process, about three months old, which has been kept in a pot loosely covered with a piece of parchment paper laid on, but not tied down, and occasionally removed. You will see that it is still in perfect condition.

It has been said by a great writer that "There is nothing new under the sun," and I find on looking over the *Pharmaceutical Journal* that the addition of glycerine to confection of sulphur was suggested by Mr. Kermath on March 11, 1882. This had escaped my notice until after the note was written, and it seems also to have escaped the notice of the editors of the Pharmacopœia. My experiments may have value, however, in proving that the suggested modification stands a pretty severe test satisfactorily, and would have been a useful addition to the official formula.

After an interval of ten minutes to allow members to examine the specimens exhibited, a note was read entitled—

Note on Suspension of Terebene and Tolu in the Same Mixture.

BY JAMES BISSET.

The following note contains the results of a few experiments as to the best method of dispensing the following mixture :—

℞ Terebene		℥i.
Sp. chloroform.		℥ii.
Tinct. tolu		℥ii.
Syr. tolu.		℥vi.
Aq. menth. pip.	ad	℥vi.

The notable feature in the above mixture is the circumstance that the best manipulation to secure suspension of the terebene differs from the best manipulation to secure suspension of the tolu. Terebene is best suspended by rubbing it up in a mortar with a pretty thick mucilage of tragacanth ; but tolu cannot be satisfactorily dealt with in the same way, and is best emulsified by shaking up with diluted acacia mucilage in a bottle. I proceeded as follows :—Put 4 grains powdered tragacanth in a dry mortar, add sufficient sp. chloroformi to moisten thoroughly, and then water to make a fairly thick mucilage. To this add the terebene gradually, and, with diligent rubbing. Dilute 1 oz. mucilage of acacia with 2 ozs. peppermint water ; put it in a six-ounce bottle, shaking it so as to coat all the inner surface with a thin layer of mucilage ; add the tincture of tolu, and shake up immediately. Add the terebene emulsion ; shake well, and then add the other ingredients. This mixture, after standing for a time, separates into a creamy and a milky layer which mix easily by shaking.

A Note on a Precipitate of Glycyrrhizin in a Mixture.

BY GEORGE COULL.

The following prescription was handed to me with a query as to the nature and cause of the precipitate produced, and the correct method to be adopted in dispensing :—

℞ Sodii sulph.		℥i.
Quininæ sulph.		grs. xx.
Acid. sulp. dil.		℥ii.
Ext. glycyrrhizæ liq.		℥vi.
Aquam	ad	℥viii.

The first thing that strikes one is the excess of acid ordered, if the only object of its being there is to dissolve the quinine.

Proceeding to make up the mixture in all conceivable ways, I found that the precipitate was unavoidable. I first made up the prescription as written, with the result that a thick flaky precipitate was produced, which, when allowed to stand for a day, became so tenacious that it could hardly be diffused by shaking. I then made the mixture, omitting the acid, in which case the precipitate was very fine and easily diffused through the liquid. I again made the mixture with just sufficient acid to dissolve the quinine, and the result was very similar to the second. Lastly, I made the mixture, omitting both the acid and the quinine, and got only a slight precipitate, the colour of the supernatant liquid remaining dark. In the three former cases the liquid was of a light brown colour.

Now, taking the queries in their order, we arrive at the following conclusions. The precipitate is sweet to the taste, and as glycyrrhizin is the only sweet substance in the mixture, therefore, it is glycyrrhizin. This was further proved by its dissolving in an alkaline solution, with emission of a peculiar odour, as stated by Flückiger and Hanbury. The cause of the precipitate is everything in the mixture except the water.

Hager states that alkaloidal salts generally are incompatible with liquorice. The quinine sulphate, therefore, conspires to throw down this precipitate. Strong solutions of all the commoner salts also precipitate glycyrrhizin slightly ; therefore the Na_2SO_4 assists in the precipitation. The chief cause, however, is the acid, which at once throws down the dirty white flakes which refuse to break and diffuse. As to the correct method to be adopted in dispensing, there may be room for difference of opinion. The excess of acid appears to serve no useful purpose. Seeing that both the precipitate without the acid and the precipitate with a minimum of acid have pretty much the same appearance, if the dispenser wishes to make it up as faithfully and accurately as possible, I think he should take the latter plan, *i.e.*, use a minimum of acid. I have to thank our esteemed President for permitting me to conduct these experiments in his laboratory.

Mr. J. Rutherford Hill concluded with some remarks on strophanthus and a—

Note on Two Instances of Incompatibility.

BY J. RUTHERFORD HILL.

The first of these occurs in a gargle containing alum, chlorate of potassium and bicarbonate of potassium. The aluminic sulphate in the alum reacts with the potassium bicarbonate thus :—

$$Al_2 3SO_4 + 6\,KHCO_3 = 3\,K_2SO_4 + Al_2 6\,HO + 6\,CO_2.$$

In this way the astringent action of the alum is lost. It is therefore a case of both chemical and therapeutic

incompatibility. The only way out of the difficulty is to suggest the omission of the potassium bicarbonate.

The second occurs in the following mixture :—

℞	Quininæ sulphatis	grs. xxiv.
	Acid. nitric. dil.	q.s.
	Potassii iodidi	℈ ii.
	Aquam	ad ℥vi.

In this case the nitric acid liberates iodine from the potassium iodide as follows :—

$$4HNO_3 + 2KI = 2KNO_3 + 2H_2O + 2NO_2 + I_2.$$

The liberated iodine combines with the sulphate of quinine to form the insoluble iodosulphate of quinine or herapathite, which is gradually deposited as a greenish-brown sediment. The best thing to do in such a case is to substitute sulphuric for nitric acid.

On the motion of the Chairman a cordial vote of thanks was awarded to those who had contributed to the evening's proceedings. There was a microscopic exhibition of botanical and zoological sections. Some new remedies were also exhibited, including strophanthus seeds sent by Mr. MacEwan.

Mr. Bisset was unanimously elected Treasurer in room of Mr. James MacInroy.

The Chairman having intimated the date of next meeting, the meeting was closed.

Proceedings of Societies in London.

CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting of the above Association was held at the rooms, Great Russell Street, on Wednesday, March 2, when a paper was read on "Sanitation and Sanitary Legislation," by Mr. W. G. Blackham, in which the subject was dealt with by the author under three heads: (1) Water; (2) Antiseptics and Disinfectants; (3) The Disposal of the Dead. In some preliminary remarks he pointed out that although sanitation has only recently begun to assume the dignity of a science, homage was paid in ancient times to the goddess Hygeia, and the public health was treated of in the writings of Hippocrates, the Plinys and Aristotle. Homer was acquainted with the disinfectant properties of burning sulphur, since in the Odyssey he describes it as being used after the massacre of the suitors of Penelope; Pliny the elder also refers to the antiputrefactive and parasiticide properties of creasote. Nevertheless, as recently as a half a century ago the state of sanitation in this country was deplorable in the extreme, but in 1848 an Act was passed, which was the forerunner of legislation that has produced most salutary results, the most important Act being the Public Health Act, 1875. Under the first heading, "Water," the author referred to the munificent provision of this necessity, made by the Romans, contrasting it favourably in respect to quantity with the present London supply. The quality of the water was also referred to and the evils resulting from defective methods of filtering and storing, as well as the part water may play as a carrier of contagion. The author then proceeded to speak of "Antiseptics and Disinfectants," pointing out the confusion which frequently obtains in the application of these terms. Criticizing a statement made by Dr. Elliston that a 1 in 15,000 solution of perchloride of mercury is fatal to organisms the author said that from some rough experiments of his own he had arrived at the conclusion that such a solution delays the appearance of putrefactive bacteria only a few hours, whilst a 1 in 1000 solution delays putrefaction only a few days. The author said that in discussing the merits of an antiseptic two great points for consideration had been insisted upon by Dr. Klein: "(1) the condition may be unfavourable to the growth of the organism in question, and (2) the condition may be fatal to the life and existence of it;" although the second proposition involves *à fortiori*, the first, the *à priori* reasoning would be fallacious. In other words, although a substance may be unfavourable to, and even inhibit the growth of organisms, it is not necessarily a germicide. Dr. Klein found that although sowings of various species of putrefactive micrococci, bacteria, and bacilli and pathogenic bacilli, refused to grow in phenylpropionic acid, phenylacetic acid, carbolic acid, and perchloride of mercury solutions, yet on a portion being transferred to a suitable nourishing medium they grew and multiplied as if nothing had been done to them; and, in the case of pathogenic organisms, on being introduced with a portion of the antiseptic into suitable animals the characteristic disease was invariably produced. These results were of the greatest importance, but not conclusive, for the question remained whether, a germicide being necessarily a disinfectant, it is absolutely necessary for a disinfectant to be a germicide. Carbolic acid, for instance, seemed to act to some extent as a disinfectant, although vaccine lymph submitted to its vapour for some time afterwards regained its activity. The conclusion arrived at was that the only true and perfect germicide at present known is heat, especially moist heat, and the author suggested a practical application of this knowledge in the direct treatment of excreta and sputa from patients suffering from contagious diseases. In the last part of the paper, treating of the disposal of the dead, the author gave his reasons for preferring cremation rather than the ordinary mode of burial.

In the discussion which followed Messrs. Bird, Burnett, Botham, Dymond, Ellwood, Stanton, Taylor, Tinley, Worsley, and the Chairman took part.

Obituary.

Notice has been received of the death of the following :—

On the 11th of February, Mr. Clement Pierson, Chemist and Druggist, Brunswick Place, Leeds. Aged 51 years. Mr. Pierson was an Associate of the Pharmaceutical Society.

On the 14th of February, Mr. David Davies, Chemist and Druggist, Coleford, Gloucestershire. Aged 33 years.

On the 16th of February, Mr. John Knowles, Chemist and Druggist, Seymour Street, Euston Square, N.W. Aged 54 years.

On the 21st of February, Mr. William Godfrey Spyer, Chemist and Druggist, Watlington, Oxon. Aged 83.

On the 25th February, Mr. Thomas Hogg, Pharmaceutical Chemist, Bideford. Aged 67 years. Mr. Hogg had been a Member of the Pharmaceutical Society since 1853.

On the 27th of February, Mr. Walter Jackson, Pharmaceutical Chemist, Foxberry Road, Brockley, S.E. Aged 24 years. Mr. Jackson was a Member of the Pharmaceutical Society.

ANSWERS TO CORRESPONDENTS.

L. A. White.—You will find communications on the subject in the numbers for March 13, 1886, p. 778; Dec. 18, 1886, p. 503; Jan. 29, p. 605, and other places. See also the present number.

A. Wright.—We did not see that there was any necessity for the announcement.

F. D. Heath.—The suggestion for the use of a larger quantity of water in preparing lin. terebinthinæ has already been made by Mr. Baxter, in a paper that appeared in the *Pharmaceutical Journal* for June 5, 1886, p. 1026. See, however, Professor Redwood's communication in the present number, p. 741.

Tomlinson and Hayward.—We do not remember the publication of such a formula.

J. B. L. Mackay.—Your letter has been handed to the Hon. Secretary to the Fund.

COMMUNICATIONS, LETTERS, etc., have been received from Dr. F. P. Smith, Messrs. Modlen, Butler, Bartle, Hart, Hollely, Hill, Graham, Grierson, Experientia, Pro Bono Professionis, J. G.

NOTE ON THE PHARMACOLOGY OF STROPHANTHUS.*

BY H. D. ROLLESTON, B.A.,

Assistant Demonstrator of Physiology in the University of Cambridge.

Thanks to the courtesy of Messrs. Brady and Martin, of Newcastle, I was enabled to examine the physiological properties of strophanthus, the arrow poison or "Kombé" of African tribes, which, since Professor Fraser's address to the section of Pharmacology and Therapeutics at the British Medical Association at Cardiff in 1885 has been gradually attracting notice and now bids fair to be an exceedingly popular drug.

I received alcohol tinctures (1 in 8) of the seeds, the hairs and the pericarps as well as corresponding ethereal extracts, six preparations in all.

There being a good deal of oil in *Strophanthus hispidus*, Fraser directs (*Brit. Med. Journ.*, Nov. 14, 1885) that a watery solution of the alcoholic extract should be repeatedly agitated with ether; by this means the oil and colouring matters are removed, and since the active principle strophanthin is said to be practically insoluble in ether, no loss is sustained in the process.

In trying physiological experiments with the various preparations of the drug it was, however, found that the ethereal extracts contained an active principle, resembling that found in the alcoholic tinctures.

In all experiments with the ethereal extracts the ether was got rid of, so as to avoid the fallacy and interference in results from the action of the solvent on the heart, for though acting in an opposite direction, viz., killing the heart in diastole, the presence of ether would render valueless, if not completely vitiate, any experiment. For it is evident, that the death of the heart might be due either to the ether or the strophanthin contained in it.

The ethereal extract of the seeds was mixed with (distilled) water and the mixture concentrated on a warm bath (temperature 30° C.); by this means the ether was got rid of and drops of oil coloured green with chlorophyll were precipitated. On filtering, the bitter taste characteristic of strophanthin (Fraser, *loc. cit.*) was present in the filtrate. The aqueous extract of the ethereal extract thus obtained when given in small doses to frogs' hearts produced a slowing of beat with increased force, followed by a condition of systolic contraction with beats at intervals, superimposed singly or in groups of two or three. In stronger doses the heart became tonically contracted, with beats at intervals, passing into a condition of systolic rigour, with the ventricles pale and contracted, the auricle being usually contracted, but in some cases distended.

Given to dogs it produced marked increase in the force of the heart's beat and of the pulse, then slowing of heart's rhythm with some evidence of increased arterial tension, then irregularity of the beat, a very constant form after a comparatively large dose being one large wave, followed directly by a small one, then a pause; in some cases groups of beats being seen. The heart eventually stopped in diastole, sometimes greatly dilated.

The ethereal extracts of the pericarps and hairs were also found to be active, though not to such an extent as the ethereal extract of the seeds; between the two former the pericarps were rather more active, *i.e.*, contained more of the active principle. It may be noted in passing that the alcoholic tinctures of the seeds, pericarps and hairs were found to be active.

Hardy and Gallois (*Pharm. Journ.*, [3], vii., 756) state that in the hairs there is an active principle which they call ineine, with different physiological properties from strophanthin. The tinctures of hairs and the aqueous solution of ethereal extract of hairs have only shown evidence of containing strophanthin in small amounts, but further investigation is perhaps desirable.

At Professor Dunstan's suggestion experiments were tried with an ethereal extract prepared from anhydrous seeds with anhydrous ether. Professor Dunstan most kindly placed at my disposal two extracts prepared in this way.* The same positive result was obtained as in the case of the ethereal extracts I had previously examined.

Specimens of the oils of white and green strophanthus, prepared by Mr. Helbing, of the German Hospital (see p. 747), were examined and also found to be active.

It therefore appears that strophanthin is soluble in ether, at any rate when the oil is present, and that the ethereal extract is therefore of value, although I refrain from expressing any opinion on the purely pharmaceutical question of whether or not ether should be used in preparing the tincture.

* Read before the Pharmaceutical Society of Great Britain at an Evening Meeting in London, Wednesday, March 9.

* One of these was prepared and sent to me by Mr. Martindale. Professor Ringer, of University College, is quoted (*Pharm. Journ.*, Nov. 20, 1886), as finding it not inert, though not very active. The other was prepared according to Fraser's directions (*Brit. Med. Journ.*, Jan. 22, 1887).—W. R. D.

RECENT DONATIONS TO THE MUSEUM.

BY E. M. HOLMES, F.L.S.,

Curator of the Museum of the Pharmaceutical Society.

BAHAMA SPONGES

In the Bahama Court of the late Colonial and Indian Exhibition a fine series of the different commercial varieties of West Indian sponges was exhibited, and since its close a typical specimen of each of them has been presented to the Museum of the Pharmaceutical Society. During the last few years sponges have formed an article of considerable import from the Bahamas to this country, and a description of the different kinds met with in commerce may therefore be found useful for reference. In order to make clear the features in which the several commercial varieties differ, it will be necessary to refer briefly to the structure of these animals in a living state.

By zoologists sponges are classed as an order of the sub-kingdom Protozoa, the leading feature of which is that the animals included in the order consist of a composite mass or colony of small amœboid particles of gelatinous matter, supported by a skeleton, which consists either of a network of horny fibres or of calcareous or silicious spicules.†

Consequently, in the fresh state sponges present an appearance exceedingly different to that with which

† Of the last-named, the pretty "Venus flower-basket" (*Euplectella Aspergillum*) and the glass rope sponge (*Hyalonema mirabile*) are instances.

we are familiar, forming dark, unsightly masses of jelly, and it is only when the sarcode or gelatinous matter is removed that the skeleton, known as the sponge of commerce, becomes visible. In the living animal the surface presents a large number of minute orifices or "pores," and a few much larger ones, known as "oscules," or excurrent apertures. Both of these can be closed at the will of the animal. A current of water carrying food to the animal enters through the smaller openings, and is subsequently ejected through the larger openings or oscules. This current is set up by means of specially ciliated sponge particles contained in cavities below the surface of the sponge, the cilia waving in one direction only, like those of the mucous membrane of the lungs in higher animals; the ordinary particles of the sponge flesh possessing no cilia, but having only an amœboid movement. The openings in the gelatinous surface correspond to the openings visible in the horny skeleton, and it is by the character and the arrangement of these, as well as by that of the fibres, that sponges are classified both commercially and scientifically.

Until the discovery of sponges in the Bahamas and in the vicinity of Florida, all the sponges of commerce were derived from the eastern half of the Mediterranean sea, which still supplies the finest qualities. A great number of varieties, both in form and relative degrees of softness or hardness, are recognized; one London sponge merchant even asserting that there are as many as four hundred Mediterranean kinds. These varieties, whether of European or American origin, are referred by zoologists to three principal types:—

1. *Spongia officinalis*, L., which is the source of the Turkey cup sponge.

2. *Spongia agaricina*, Schmidt, affording a cup sponge of harder and more unyielding texture than the Turkey cup and known as the Zimocca sponge.

3. *Spongia equina*, Schmidt, yielding the bath or honeycomb sponge.

The first, according to Mr. Saville Kent,* is distinguished by its usually cup-shaped contour, by the exceedingly fine elastic and densely interwoven fibres of which it is composed, and by the oscules being more crowded towards the centre of the cup.

The second, or Zimocca sponge, is recognized at sight from the Turkey cup sponge—which it closely resembles in shape, although the cups are flatter and more saucer-shaped as a rule—by the fact that the larger openings, instead of being crowded towards the centre of the cup, are uniformly scattered at nearly regular distances over its whole upper surface, and by being much harder and more unyielding to the touch. The fibres are closely interwoven, as in the Turkey kind, but are coarser and less elastic. It is only one-third the value of Turkey sponge.

The third, or honeycomb sponge, has a more spheroidal or rounded form, flattened above, and the larger or excurrent openings are irregularly scattered over the upper surface. In this kind the erect or primary fibres are not visible.

The Bahama sponges correspond closely with the typical forms above described in general characters, and by Mr. A. Hyatt,† the American spongologist, are considered to be varieties of these species. He expresses the opinion, however, that the coarser varieties of the European sponges are finer, firmer, and more elastic than the finest of the corresponding American sub-species, the inferiority of the latter being attributed to the larger amount of foreign matter included in their primary fibres, the looser mesh of the fibres, which are comparatively coarse, and the larger and more numerous canals.

The Bahama sponges are referable, according to Mr. Hyatt, to the following sub-species:—

Reef, or glove sponge, to *Spongia officinalis*, var. *tubulifera*.

Sheeps' wool sponge, to *Spongia equina*, var. *gossypina*.

Abaco velvet and cay velvet sponge, to *Spongia equina*, var. *meandriniformis*.

Grass sponge, to *Spongia equina*, var. *cerebriformis*, and *Spongia graminea*.

Hardhead sponge, to *Spongia agaricina*, var. *typica*.

Yellow sponge, to *Spongia agaricina*, vars. *corlosia*, *dura* and *punctata*.

Reef, or Glove Sponge.—Although resembling Turkey sponge in the closeness of its mesh it is quite different in shape, being broadest at the base and convex or dome-shaped above, and sometimes compressed laterally. The oscules are fewer in number, rather large, and are often situated in a row opening on the top of the sponge. The texture becomes very brittle with age and is never so elastic as the Turkey sponge; being very soft and much cheaper than the latter (only about one-tenth its value), it answers very well for surgical purposes where it is necessary to renew the sponge frequently.

The glove sponges, as a rule, are of comparatively small size. They grow gregariously on a hard bottom or on reefs, five or six feet below the surface of the water, and sometimes are irregular or dendritic in shape, and are then much less valuable. Those known as reef sponges are similar in shape to the glove sponge, but are rather harder, and have the oscules more regularly distributed over the surface. Old specimens become very brittle and are easily torn. A third kind, scarcely distinguishable from the glove sponge by the eye, but harder even than the reef sponge to the touch, is described as a "hardhead" sponge.

Sheeps' Wool.—This variety corresponds most nearly with the honeycomb sponge of the Mediterranean, and is, indeed, an American variety of that sponge. It derives its name from the fact that the fibres of the external surface are developed in the form of little pointed tufts, which give the sponge a peculiar fleecy appearance. In its sub-spheroidal shape it resembles the Mediterranean honeycomb sponge; the larger apertures are distributed with comparative regularity over the upper surface, the fleecy tufts sometimes projecting and converging over the openings; the inner substance is honeycombed with large tortuous channels. This sponge is soft to the touch and is suitable for bath and toilet use, but is only one-half the price of the Mediterranean honeycomb sponge. It is found at depths varying from three to sixteen feet or more, the finest in size and fibre being found at the greatest depth. A sponge very similar in appearance to the sheeps' wool, but much harder to the touch, is met with, which is classed as a "hardhead" sponge.

* "Report on the Sponges of the Bahama Islands," by W. Saville Kent, p. 407, in 'Fisheries Exhibition Literature,' vol. v., part ii.

† 'Revision of the North American Poriferæ,' Boston Soc. Nat. Hist., 1876.

Abaco Velvet or *Boat Sponge.*—This sponge bears a general resemblance to the sheeps' wool in shape and size, but the superficial tufts of fibres stand out more distinctly and are more obtuse and somewhat broader. The most marked feature consists in the oscules being crowded in the centre of the sponge and there uniting to form one, or more rarely two, large openings which much depreciate its value. If the opening is closed by passing a thread round it and then drawing the sides of the aperture together the sponge will last much longer. In texture it is as soft as the sheeps' wool; it is quite suitable for toilet use, where a cheap sponge is required, and is about 25 per cent. cheaper than the sheep's wool.

Cay Velvet.—This sponge is a harder variety of the Abaco velvet, being much more resistant to the touch. It presents in a still more marked manner than that sponge the peculiar appearance like brain coral (*Meandrina*) which characterizes the velvet sponges. It is chiefly used by painters and for stables and domestic cleaning purposes.

Grass Sponge.—This is a soft sponge, rounded or oblong in outline, with the oscules crowded together on the upper surface, each oscule being generally surmounted by a short thin projecting tube of sponge fibre, which has a longitudinally striated appearance, quite characteristic of this sponge. Occasionally there are a few large openings at the side. Another very noticeable feature in this variety is that the projecting tufts of fibre are very slender and appear to be arranged in a somewhat regular manner in perpendicular lines, which, extending to the upper surface, give it a singularly radiate appearance. Although very soft and elastic, the grass sponge is easily torn, owing to the looseness of its fibre. It is quite soft enough for toilet use, and is only about one-third the price of the sheep's wool sponge.

Another form of the grass sponge is described by Mr. Hyatt under the name of *Spongia graminea*, and included by him under the grass sponges; it has a coarser texture and the internal tissue is very open, owing to the large size and central position of the larger openings. It usually has the shape of a truncated cone, and is fluted on the side with deep furrows, the truncated apex being either flat or funnel-shaped and the oscules appearing on the truncated apex. It is a gregarious form, growing only three feet below the surface of the water.

Hardhead.—The sponges that pass under this name do not form a distinct kind, but the term is applied to hard varieties of the above sponges; thus there is a hardhead glove and a hardhead sheeps' wool. The former appears to bear the same relation to the glove or reef sponge that the Zimocca does to the Turkey cup sponge.

Yellow.—This sponge is the coarsest and hardest of all the Bahama sponges. It presents a dome-like shape and exhibits on the upper surface a few, often slightly projecting oscules, which are large enough to admit the little finger. The superficial tufts of fibre have a branched appearance with finely fringed ends. To the touch the sponge is quite tough and hard, yielding only to considerable pressure, and its texture is brittle. It is fit for stable use or where a coarse sponge only is required, and is only about one-tenth the price of honeycomb sponge.

(To be continued.)

A SIMPLE NITROMETER.

BY THOS. P. BLUNT.

A description of the following instrument, the efficiency of which has been proved, may be of use to some readers of the *Pharmaceutical Journal*; the well-known rapidity with which a sample of spirit of nitre deteriorates, especially in summer, and with a bottle only partially full, renders a simple and easy—and at the same time efficient—method of testing it of great importance.

The nitrometer described below may be constructed for a few pence and used in five minutes. Two glass syringe tubes, of ½ oz. and 1 oz. capacity respectively, have their points connected by a piece of black feeding tube, on which is placed a pinch such as is used for burettes; no doubt the "stops" sold for nursery use would do as well. This is the nitrometer. It is graduated by pouring into the shorter tube half a drachm of water, the upper surface of which is then marked with an india-rubber band, or better by a file mark; another drachm is then poured in and the surface similarly marked. The longer tube is now graduated in the same way by pouring in successive drachms of water, up to eleven drachms.

To use the instrument the longer tube is placed in a vessel of brine deep enough to reach the neck; the form of the vessel, beaker, measure or pot, is of little importance. The clip is relaxed and the lower tube completely filled by sucking the upper one, any drops drawn into the latter being turned out, after again clipping tight. The upper tube is now filled to the 1½ drachm mark with the spirit of nitre to be tested, the clip is released, and the whole lifted out of the vessel of brine until the spirit of nitre has reached the lower mark, which means that the lower tube now contains one drachm of it. The excess is poured away, the tube rinsed; and the solution of potassium iodide and the dilute sulphuric acid introduced in the same way, the half drachm being rejected in each case; the object of this being to ensure the absence of air. After moving the lower tube gently up and down once or twice it is raised until the level of the fluid within and without it is equal, and the volume of gas is read off.

THE LAWS OF NATURE IN RELATION TO HEALTH.*

BY PROFESSOR JOHN ATTFIELD, F.R.S., ETC.

A Natural History Society has few higher functions than that of disseminating knowledge of the laws of nature. And of all the relationships of natural law, whether as regards the universe, the world, or mankind, few can have more widespread interest for man than those which conduce to his own welfare. That welfare may be regarded from personal points of view, as the religious and the hygienic, or from the general standpoints of politics and of society. Last year your President had the honour of addressing you on the laws of nature generally—the laws themselves—and some of their relations to religion; he now ventures to treat of their relation to health. He ventures to consider, for an hour, the broad natural principles that govern health; and to consider principles only, for the details would occupy a very long course of addresses.

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* Presidential Address delivered at the Annual Meeting of the Hertfordshire Natural History Society at Watford, February 15, 1887.

Introduction.

Perfect health. Picture such health. The health of, say, full-grown youth under the most free and favourable conditions. Perfect physical health ; attended by perfect purity of mind and perfect strength of brain, associated with perfect development and cultivation of all the powers, and accompanied by freedom from all care and anxiety. Further, picture this health as commencing in the cradle, increasing in fulness towards manhood and womanhood, and extending to the age of a hundred or a hundred and four or five years, death then being only as the unawakening from sleep. That is perfect health.

Health more or less perfect, regulated by perfect natural laws. Endeavour for a moment to realize the general character of the more prominent of these laws. The comprehensive, far-reaching, all-pervading laws under which is supplied to us the light to which we wake in the morning and the warmth without which we should never wake ; the laws governing the poise and motion of the earth, the moon, the sun, and all the spheres of the universe, yet governing our position and our movements on the surface of one of the smaller planets at the bottom of a sea of air. Glance at the laws that influence our health through our comfort and our well-being, namely, laws which enable us to yoke the lightning to our wishes and so to transmit our messages in a moment to the uttermost parts of the world, or, again, laws which enable us so to harness the force of magnetism as to guide the mariner to his haven over the trackless ocean. Try to realize the broad character of the laws under which we obtain pure air, pure water, pure food, and all that charms the eye, the ear, and the other organs of sense ; and the laws that point to the character of the best clothing for the individual, the best dwelling for the family, and the best relationship of one dwelling to another in a community. These are some of the perfect, all powerful, irreversible laws of nature.

The manner in which and the extent to which health more or less perfect is governed by laws such as those just sketched is the subject of the present address. No one is so healthy but might be more healthy, and no one is so unhealthy but might be less unhealthy, by a proper apprehension and application of the all-sufficient laws of nature.

In the consideration of this subject, no doubt personal health must occupy the first place ; for the health of the aggregate in a house, a town, or a country, must chiefly depend on the personal health of each inhabitant. But a healthy individual, or a healthy family, or a healthy community, may be the cause, perhaps the innocent cause, of ill-health in another individual, or another family, or another community ; as, for example, when one person unwittingly gives fever to another, or when one or more persons draw pure water from a stream, but omit precautions that provide for the stream passing on pure to their neighbours. Therefore any comprehensive view of the laws of nature in relation to health must include the laws specially affecting the health of small and large communities, as well as the laws affecting the health of the individuals composing those communities. We must have healthy homes and healthy towns, as well as healthy individual inhabitants, for otherwise those inhabitants will soon cease to be healthy.

Ill-health will, in this address, only be considered incidentally ; that is to say, will only be alluded to as resulting from our ignorance of, or our nonconformity with, the laws regulating health. Ill-health once produced must be treated under a special set of laws applied by experts who have special knowledge respecting those laws. namely, by medical practitioners—a noble band of men, whose practice everywhere and always is to endeavour with the utmost practicable speed to reinstate in health those from whom that inestimable blessing has been temporarily withdrawn.

The maintenance of the physical health of the individual must, of course, largely be influenced, indirectly, by a healthily constituted, a well-stored and a contented mind, and by a pure and lofty standard of morals ; while the health of communities will largely be affected by the character of their æsthetical, social and political surroundings. Here, as everywhere, laws more or less obvious and more or less obscure are at work. These cannot, now, even be glanced at. Only the laws directly controlling physical health can be treated within the limits of the present address.

Our subject therefore shapes itself somewhat as follows. Personal health directly depends on the food we eat, the fluids we drink, the air we breathe, the clothing we wear. The health both of the individual and the family or household directly depends on the character of the dwellings we occupy. The health of the individual, the family and the community, directly depends on the relation of dwellings to one another in villages, towns and cities. Under this division of the subject, the laws of nature in relation to health will now be considered.

The Food we Eat.

Food is only a means to an end. Perhaps the best word to express that end is *work* ; but work done within us by, for instance, the heart, the lungs, or the matter of the brain, as well as externally by, for example, the hands, the feet, or the muscles of the back. Indeed, from the point of view of health, the work done by the various organs of the body in blood-circulating, breathing and thinking, is of far higher importance than the work done in sewing, walking or weight-carrying. The work of the heart or the lungs is, during life, regular, untiring, unceasing ; the works of the hands or the feet, irregular, intermittent, limited. Nay, the work of, say, the seamstress, the pedestrian or the coalheaver, only represents spare power at disposal over and above the power needed to carry on that work within the frame which life imperatively demands. An engine must first move itself : its spare power does the outside work. Be the work internal or external, however, food is the means by which the work is accomplished. "If any man will not work neither let him eat," said Paul. A far higher authority, the inflexible command of a law of nature, uttered without the agency of any human mouthpiece, decides that "if any man will not eat neither shall he work." Food and work are an equation, the one is the equivalent of the other ; here man's will is powerless, here he must bend to law.

Let us look into this matter of the correlation of food and work just a little farther. With the commencement of life we commence individual work ; for the work of the infant heart, lungs, and muscles generally, as, for instance, in crying and screaming, involves an equivalent and prior assimilation of animal food. Thenceforward the infant must take enough food to enable it to perform such outside work as crawling on all fours, walking, grasping, clasping. Not until much later must it carry weights. The less constructive inside work the child or youth has to do as it advances in age, the more power will it have at disposal for other inside work, as, for example, the work of the brain during education ; the more power, too, it will have at disposal for all outside work, whether at the workshop, the counter, or the tennis-lawn. Growth having ceased, a still larger proportion of brain and frame will be at the disposal of adults for work in the world outside themselves. In connection with the subject of the food we eat, nothing is more striking than this law of correlation as regards food and work.

The law of the dependency of growth on food is only less striking than that just mentioned, because more familiar to to us. So familiar, in fact, is this dependency of growth on the supply of food, from infancy to maturity, from birth to about twenty or twenty-one years of age, and so self-evident, that little need be urged in support of the law here, or of the inflexibility of the law. The child must absorb such mineral food as will provide

for the growth of bone, such nutritious food as will provide for the growth of flesh, and such fuel-like food as will enable it to maintain the warmth of its daily increasing bulk. Something, however, must be stated respecting the kind of food necessary for the purpose, and on the quantity; stated at once concerning bone-forming food, and afterwards as regards flesh-forming and warmth-giving foods. Bone must grow by additions of bone-material, both animal and mineral, and that material must be supplied in the food swallowed—must be, for this is no matter of opinion, it is a matter of law. But if not supplied; what then? If the mineral material is, say accidentally or ignorantly, withheld; what then? The child will have, one cannot say bones, but bone-shaped things made of the flexible animal material, a material resembling gelatine, but it will not have true bones. These bone-shaped things, looking like real bones, but lacking the firmness communicated by the mineral material, will give way under the weight of the body; the child will be ricketty. The child will have the "rickets;" a word equally expressive whether derived from the Greek or the Saxon; for if Greek it has reference to the result as a disease of the rhachis or spine, and if Saxon it has reference to the appearance of the child as resembling a heap or hump or rick, a small hayrick.

Here fond mothers will ask, "How can we avoid so dreadful a disease? how can we know which foods contain, or do not contain, this mineral material?" The full answer to that question would involve divergence into a lecture on certain chemical portions of physiology, which would be out of place. A short answer would be, "Avoid such mere starchy foods as arrowroot, and use such bone-forming flours as that of wheat"' But that is an insufficient answer. Better fall back on a principle, and reply, "First recognize and become familiar with the law; then trust to your love and your intelligence to find the right mode of applying the law." Let us all do what we can, by example and by precept, to aid the future parents of unborn generations to know more about themselves and more about the laws which govern the health of themselves and their descendants. If we read only good novels, and read only what is worth reading in newspapers, we shall have time not only to study but to become familiar with subjects more fascinating than those of fiction and infinitely more useful and elevating. If people spent less time in gossip about persons, they would have abundance of time for converse about things.

But, continuing the subject of the food we eat, we must pass from the relation of food and work, and the relation of food and growth, to the relation of supply and waste. And first as regards bone; respecting which, after what has been stated in connection with growth, very few additional words will be necessary. Growth having ceased when our first score of years has passed, only the daily waste of bone has to be made good. This is accomplished by daily eating a commensurately small quantity of bone material, contained so abundantly in many kinds of food that we need take no thought of the matter so far as regards preservation of health. The point now insisted on is that here, as always, man is the creature of law; to the extent of which bone is worn away by the daily work of life, to exactly that extent is the waste made good by fresh supplies of bone-material in the food.

All that has been stated respecting the correlation of waste and supply of bone-material is true of the waste and supply of muscle-material or flesh. The ceaseless alternation of contraction and expansion of heart or lungs, or any lifting with the arms or walking with the legs, or any work whatever, involves an exactly commensurate expenditure or waste of muscle-material, or of muscle-forming food, and this expenditure or waste must be made good by an income or supply of an equivalent amount of that material. How can we best live in accordance with this law of health? Here it is difficult to avoid being technical. Shortly we may say that muscle-material is found both in animal food and in vegetable food; mixed, however, with so many other substances that we cannot easily make its acquaintance in a separate or isolated form. But there is one familiar variety of it occurring in what is called the white of egg, or more exactly, albumen; and hence all the varieties of it are termed albumen-like or albuminoid constituents of food. Well, albuminoid substances are met with in most vegetable foods, and, generally in a more concentrated condition, in all animal foods. They are contained, for example, in a steak or chop, or in bread or potatoes. If, however, we have to perform a given amount of work, and must do it on a diet of beef or mutton on the one hand, or on a diet of bread or potatoes on the other, rest assured we shall have to eat more of the vegetable than of the animal food: the rules of arithmetic come in here as well as the direct laws of nature. But while there is no vast difference between vegetable food and animal food, science—which is a name for so much of nature's laws as is at present known—has nothing to say in favour either of an exclusively animal diet or of an exclusively vegetable diet. Men of science, perhaps in all blindness, cannot perceive that far distant time when animals shall no longer eat animals; when even dogs shall have ceased to love a bone, having become quite altered in nature—

> "With longer alimentary canals
> Suited to diet vegetarian."

The scientific hygieist fails to picture the period when our successors are to look back to the present flesh-eating days with incredulity; a period when our descendants' imaginations—

> "Aiming at fiction called historical,
> Will vainly try to reconstruct the times
> When it was men's preposterous delight
> To sit astride live horses which consumed
> Materials for incalculable cakes."

Before leaving the illustration of health-law afforded by correlative waste and supply of this muscle-material or flesh-material, a word must be said respecting, not the quantity, but the quality of the muscle-material supplied to the human system. So far as mere percentage of flesh-forming material is concerned, few articles of animal food excel the common vegetable seeds known as horse-beans. But man cannot digest the horse-bean; a fact which serves to show that to maintain health we must not only select food of the right chemical quality, but also of appropriate physical condition. The chemical usefulness of muscle-making food as coarse as that just mentioned is not lost to us. We give it to lower animals, and they convert it into what for us is more or less tender assimilable meat. As to variation in the power of assimilating food possessed by different individuals, that is a matter of ill-health rather than of health, and therefore is outside the scope of the present subject. Defective assimilation must be treated by the expert in matters of ill-health, that is to say, by the practitioner of medicine. Only when assimilation is satisfactory will "good digestion wait on appetite, and health on both."

From the laws governing the frame's income and expenditure of bone-making substances and flesh-forming materials, we pass to the laws illustrated by the last of the three great classes of food, namely, warmth-giving aliments. Most of the bread we eat; the greater part of potatoes; a large proportion of farinaceous puddings, pie-crust, and cakes; sugar; butter and the fat of meat: all these are useless for bone-making and more or less useless for flesh-forming. Their chief office is, apparently, to burn within us night and day; thus maintaining that warmth of the body without which we could not exist for a moment. Not more certainly does fat or oil burn in a firegrate or lamp and give heat than it burns in the human body and gives heat. Further, a given quantity of fat or oil, when fully burnt, affords a given

quantity of heat, and always the same quantity of heat, whether the fat be burnt in a stove, a lamp, or the human body. If we burn an ounce of butter in an appropriate vessel, in the ordinary way, the whole of the heat is evolved in a short space of time, and gives so intense a temperature that we speak of it as raising a thermometer to perhaps a thousand degrees. If we gradually eat an ounce of butter in the ordinary way and thus burn it in the body, we get the same total amount of heat from it as before, but that heat is evolved in a far longer space of time, and maintains the body during the whole of that time at about 98 degrees—the average temperature of the body. Not only does fat thus burn in the body, but all the other substances just mentioned similarly burn, maintaining the whole system at about 98° F. Some of the farinaceous foods mentioned may be converted in the body into fat, and this fat may be stored within us, occasionally to an inconvenient extent, but it is only stored and will certainly during life sooner or later be burnt. It is only right to add that in place of so much heat some other force may be yielded by fuel-like foods, and thus the system be able to perform a certain proportion of its work by aid of the force yielded by such foods.

To sum up respecting the food we eat. A healthy man—taken as the type of all men, all women, all children—may be regarded morally, mentally, physically. His moral and mental health are not now being considered, only his physical health, and, indeed, only his physical health in relation to the laws of nature—especially, just now, the laws of nature which govern the food he eats. Viewed thus physically, man is, like an engine, no doubt a wonderful structure; but, secondly, he is, like an engine, a structure destined to do wonderful work by the aid of what is daily supplied from without. If he is to grow healthily, and to maintain his grown structure in health, he must perfectly assimilate perfect materials, that is, food than will yield him bone, flesh, and warmth. If he is to do sound work internally for himself, and externally for himself and for others, he must be fed with materials that are convertible into such work, materials which are force-holding and force-yielding. Must be, not may be; for he is an absorbing and a radiating focus of irrevocable, irreversible, unchangeable, all-perfect laws. To the extent to which men and women, and young men and maidens, realize the existence of, and can place themselves in harmony with, these laws—eating neither too much nor too little of appropriate, well-selected, and, if cooked, properly cooked and tastefully served food, and avoiding rich luxurious living—to that extent will they have perfect physical health, so far as health is dependent on food. The farther we recede from savagery and advance in civilization, the less can we trust to instinct and the more to knowledge, respecting the kind and the amount of food appropriate for healthy life.

The Fluids we Drink.

A very large proportion of our flesh and a certain proportion even of our bones consists of water; about one hundred pounds of water being thus included within, and forming an integral part of the flesh and bones of an adult of the average weight of one hundred and forty pounds. In breathing out the air from our lungs it carries off some of this water, which is, in fact, visible on a cold day as a little cloud in front of our mouths. The water thus breathed out every moment of our lives, awake or asleep, must be replaced by water, drunk with our food or at other times. For every half pint of water thus lost half a pint of water must be drunk; because the average proportion of water in the body must for various chemical and mechanical reasons be maintained. Once more, be it observed, the case is one of must be, not may be; for it is a case of unalterable law. "But," say a few "we never drink water, we always drink beer;" some others remark, "We rarely drink water, we generally drink tea or coffee;" while a child might say, "I drink quite as much milk as water." Forgive me, my friends, for seeming to contradict you, but you one and all probably drink quite as much water as those who drink little but water. Of 100 quarts of milk about 87 quarts are water; of 100 pints of beer nearly 90 are water; of 100 cupfuls of that favourite beverage you pour out of the tea-pot at least 99 cupfuls are water. Of 100 bottlefuls of claret, hock, or champagne, between 80 and 90 are water: of 100 bottlefuls of port or sherry wine quite 75 are water. Of those tumblerfuls of "grog" in which some people occasionally indulge—even if the gin, rum, brandy or whisky be strong, and the proportion of 'spirit" and water be half and half—three quarters of the tumblerful will be water; for the strongest spirits are usually half alcohol half water. When a man swallows a glass of "neat" spirit, therefore he is really taking alcohol diluted with water. It is a question whether any man could have much undiluted alcohol in his stomach and live. Even the glass of ardent spirit is diluted as soon as swallowed by the fluids then within, or immediately afterwards within, the stomach. It is a question indeed whether a man could live long if he took water in no other form than that of port, sherry or strong grog; that is to say, no tea, no coffee, no milk. Nay, the demand of the system for water probably could not be supplied if the only drink were the weaker wines. (It is to be remembered also that all solid food contains water—ordinary meat, poultry and potatoes 75 per cent.; many vegetables 80 or 90 per cent.; bread 40 per cent.). To maintain healthy bodies in their normal condition, and to enable them to do their life work, they *must* have water. And they *must* have a full proportion of water, no matter what the idiosyncrasy of the individual. If they do not get it they become unhealthy, or die outright.

Doubtless the fluids we drink are important from other points of view than that of their water. The 13 per cent. of solids in milk consist of valuable bone-making, flesh-forming and warmth-giving materials. Beer, wine, tea, coffee, etc., also contain small quantities of useful dissolved solids. But these solids are to be regarded as a part of the foot we eat. So that the interest of the fluids we drink, considered as fluids, derives that interest almost solely from the water they contain.

From the standpoint of nature, some little interest—and from the standpoint of man, a great deal of interest—attaches to the use of stimulants in the fluids we drink; for it would seem to be not more instinctive to man to cook his food than to discover in nature, or by more or less of art to manufacture, substances which are almost purely stimulating principles. The instinct of man in his uncultured and uncivilized state, and in widely separated countries, has led him to discover just those four or five plants, which even now so far as we know are the only plants that, like the tea plant, contain one and the same stimulant. Nearly everywhere also man's needs seem to have led him to the process—a perfectly natural process, by the way; an accompaniment of the growth of the yeast plant—by which sugar is converted into the stimulant termed *alcohol*. What is the use of such stimulants? Taken *in excess* they are poisons more or less insidious and harmful. The *theine* of tea, coffee, maté and guarana, is least liable to be taken in excess, and is least harmful. Alcohol is most likely to be taken in excess, and is therefore most harmful; or, in the epigrammatic words attributed to the Scythian prince Anarcharsis, "The first draught serveth for health; the second for pleasure; the third for shame; and the fourth for madness." If mankind, especially in civilized countries, would consent to live at a slower rate, the second draught would be unnecessary, and probably even the first. But mankind cannot now thus live, apparently.

"Man's life was spacious in the early world:
It paused, like some slow ship with sail unfurled
Waiting in seas by scarce a wavelet curled."

Now with civilization has come the stimulation of alcohol or theine. The first draught and the second are taken by most of the youth and nearly all of the adult of both sexes, either as theine or alcohol; while as alcohol the third and the fourth are taken by sadly too many. Children do not need, and indeed rarely take either alcohol or theine, nor for that matter either pepper or mustard, with their food. These things are mere stimulants. They are not used in the early life of the individual, they were not used in the early life of the race. But swallowed in proper and moderate quantities, at proper times, in these days of civilization, what office do stimulants fulfil in the system? "It would seem," as stated elsewhere by the writer, "that they do the important work of aiding the system, whenever necessary, to digest and to store up food, and to utilize its existing stores of fat and of flesh. A stimulant does some such work as this, whether it belong to the tea class, like the powerful coca; the alcoholic class, as, for example, brandy; or the clear soup class, as, for example, beef-tea. In other words, the purpose of stimulants is, apparently, to stimulate the system the better to live upon itself, and the better to replenish its store of life-sustaining, work-performing, flesh and blood. The imprisoned miner, having no food ordinarily so called, but having stores on his own frame, is able to exist for many days, if only, by a periodical sip of brandy, he can stimulate his organs to utilize those stores. Of course he daily gets thinner, the elements of his thus used flesh passing away as gases and vapours from his lungs and skin. The Indian performs a journey of two or three days on foot without any so-called food; but he really lives and works on the flesh stored in his frame, and lives satisfactorily if only he can chew his coca leaves, and so obtain the stimulus that shall induce his flesh to yield so much extra force. Of course he, too, daily decreases in weight, and must afterwards renew his jaded body by rest and nourishing food. The invalid, unable to take solid food, can generally take stimulating beef-tea, and thus stimulate his own flesh to maintain his life until he again is able to take true nourishment. That he loses flesh in the process is generally too apparent. These are extreme cases of what appears to be the ordinary action of stimulants when taken in proper quantities."

Even without the aid of stimulants all persons can fast, that is, live on their own flesh, for a certain length of time, without much risk of life, although with more or less of suffering. And with commensurate risk they may thus survive—one hesitates to say live—for a longer period, especially if stimulants are taken, and, of course, water. The greater the store of flesh and fat the victim has to begin with; secondly, the greater his powers of slowly but continuously subsisting on—we cannot quite say eating—that store; thirdly, the stronger his power of endurance; and, fourthly, the less external work he has to do: we say the greater his advantages in all these respects the longer will he be able to fast. If the victim is a willing victim—one of the so-called fasting men or women—he or she, so far as nature's laws are concerned, merely illustrates nature's power of working in an unusual direction when nature is foolishly prevented from working in the usual direction. So far as the person himself or herself is concerned, and all who aid or abet, the exhibition is senseless, contemptible, and degrading.

To sum up respecting the fluids we drink. While a few of them, as milk, contain true food, and while some of them, as beer, tea and wine, contain a stimulant, they all consist chiefly of water, and their power of quenching thirst resides solely in their water. The water in these fluids, and the water we drink as water, performs the two important functions of (*a*) by virtue of its solvent powers, conveying the food we eat to every part of the frame; and (*b*) by virtue of its fluidity, maintaining the otherwise solid and rigid tissues of our system in that elastic and pliable condition essential to life and to activity. Nature demands that water, and water alone, shall fulfil these functions; the fulfilment being governed by exact chemical and physical laws.

The Air we Breathe.

A whole series of beautiful natural laws, those which we term chemical and physical laws, regulate the composition of the air we breathe, and regulate its temperature, pressure, purity, and its other properties on which, in a greater or less degree, the maintenance of health depends. The burning within us of the fuel-like portion of our food, already mentioned as maintaining our warmth, is accomplished by the air inspired by our lungs under laws more especially studied by the chemist. The poisonous product of that combustion, expired from the lungs, passes away into the air from the region of the mouth and nostrils, under the laws, chiefly of heat and of diffusion, more especially studied by the physicist—as explained in the previous anniversary address. Again, between the pure air and food we take in on the one hand, and the used-up air and other products we give out on the other hand, there are formed within us numbers of compounds under laws more especially studied by the physiologist. The meteorologist takes note of the effects of those physical laws which govern the pressure, temperature, and moisture of the air; effects which so much influence the comfort and the health generally of man. The study of each and all of these laws relating to the air we breathe is of unbounded interest, and would afford pure and unending pleasure to any student; but especially would the study charm and delight the student investigating them for purposes of mental recreation. At the same time, the breathing of air is so much less under our control than the eating of food or the drinking of fluids, that the majority of persons cannot be expected to find that interest in the study which it is capable of yielding. We are connoisseurs in the matter of eating and drinking, or we think we are; while we take the air pretty much as it comes, having, in fact, no choice in the matter. We do something in cold weather towards warming, and a little towards changing the air of inhabited rooms, subjects that will be noticed in connection with that of the dwellings we occupy; and the inhabitants of large towns have done something, though not so much as might be done, towards diminishing the volumes of grosser impurities discharged into the air from chimneys, impurities which convert a cheerless enough cloud on the ground into a choking and blinding fog. Beyond this man feels so powerless over the air he breathes, that for the most part he treats its rich materials for thought with a shrug, or at least with a *non possumus* spirit. Added to all this, varying conditions of the atmosphere do unquestionably produce effects on health that at present we cannot explain; effects that are scarcely referable to dryness or moisture, coldness or warmth, greater or less volume, or other known conditions. There is still much in connection with the air we breathe that is mysterious. It may, however, be worthy of notice that the scientific chemist has long suspected that some of the effects of vitiated air, and certain effects of normal air, are due to organic matter rather than to alterations in the proportions of natural constituents, a suspicion confirmed recently by the microbiologist, who, while finding abundance of those minute forms of life termed microbes in the atmosphere of cities and the air of a sick room, finds fewer in the air of the plains, and scarcely any in the air of mountains a few thousand feet high. What may be the exact connection between the presence of aerial microbes and the health or ill-health of man remains to be discovered—a discovery, we may add, that will certainly, sooner or later, be made: for it would seem as if all such so-called secrets of nature were merely truths veiled by the haze of our own imperfect understandings; such a haze as always disappears before the earnest, patient, untiring, humble, skilful seeker after truth.

(*To be continued.*)

MEDICATED PENCILS.*

Dr. Unna, of Hamburg, has introduced a new form of applying a variety of remedies in form of thin sticks or pencils, in the same manner as nitrate of silver is applied. Dieterich gives a list of these preparations in the *Pharm. Centralhalle.* The distinguishing title or name chosen for this form of medication is *Stilus dilubilis* ("Pasten-Stift").

The mass from which these pencils are made is prepared from starch, dextrin, sugar and tragacanth. These are carefully mixed to a uniform powder, enough water added to make a plastic mass, and this mass is rolled out to strings of $\frac{1}{5}$ inch in thickness, or made by pressing the mass through suitable orifices in a press. These strings or pencils are dried upon parchment paper at the ordinary temperature, and then wrapped in tin-foil. At one end of the pencil, the label is affixed.

1. *Stilus Acidi Salicylici Dilubilis* 10 per cent.

("10 per cent. Salicylic Pencil").

Salicylic acid	10 parts.
Tragacanth, pd.	5 ,,
Starch, pd.	30 ,,
Dextrin	35 ,,
Sugar, pd.	20 ,,
Water	suff. quant.

Yields 40–45 pencils.

2. *Stilus Acidi Salicylici Dilubilis* 40 per cent.

("40 per cent. Salicylic Pencil").

Salicylic acid	40 parts.
Tragacanth, pd.	5 ,,
Starch, pd.	10 ,,
Dextrin	25 ,,
Sugar, pd.	20 ,,
Water	suff. quant.

Yields 45–48 pencils.

3. *Stilus Arsenico-Sublimati Dilubilis* 10 *et* 5 per cent.

("10 per cent. Arsenic and 5 per cent. Sublimate Pencil").

Arsenious acid, pd.	10 parts.
Corrosive sublimate, pd.	5 ,,
Tragacanth, pd.	5 ,,
Starch, pd.	30 ,,
Dextrin.	30 ,,
Sugar, pd.	20 ,,
Water	suff. quant.

Yields 39–41 pencils.

4. *Stilus Cocainæ Dilubilis* 5 per cent.

("5 per cent. Cocaine Pencil").

Cocaine hydrochlorate, pd.	5 parts.
Tragacanth, pd.	5 ,,
Starch, pd.	35 ,,
Dextrin.	35 ,,
Sugar, pd.	20 ,,
Water	suff. quant.

Yields 48–50 pencils.

5. *Stilus Ichthyoli Dilubilis* 20 per cent.

("20 per cent. Ichthyol Pencil").

Sodium sulpho-ichthyolate	20 parts.
Tragacanth, pd.	5 ,,
Starch, pd.	30 ,,
Dextrin	35 ,,
Sugar, pd.	10 ,,
Water	suff. quant.

Yields 39–40 pencils.

6. *Stilus Iodoformi Dilubilis* 40 per cent.

("40 per cent. Iodoform Pencil").

Iodoform	40 parts.
Tragacanth, pd.	5 ,,
Starch, pd.	10 ,,
Dextrin	30 ,,
Sugar, pd.	15 ,,
Water	suff. quant.

Yields 32–33 pencils.

7. *Stilus Pyrogalloli Dilubilis* 40 per cent.

("40 per cent. Pyrogallic Acid Pencil").

Pyrogallic acid	40 parts.
Tragacanth, pd.	5 ,,
Starch, pd.	13 ,,
Ether. ext. annatto	2 ,,
Dextrin	20 ,,
Sugar, pd.	20 ,,
Water	suff. quant.

Yields 40–41 pencils.

[The ethereal extract of annatto directed in the formula is specified to be that prepared by Gehe and Co. The object of this addition is not stated.]

8. *Stilus Resorcini Dilubilis* 40 per cent.

("40 per cent. Resorcin Pencil").

Resorcin, pure	40 parts.
Tragacanth, pd.	5 ,,
Starch, pd.	10 ,,
Dextrin	25 ,,
Sugar, pd.	20 ,,
Water	suff. quant.

Yields 39–40 pencils.

9. *Stilus Saponis Kalini Dilubilis* 60 per cent.

("60 per cent. Potash-Soap Pencil").

Anhydrous potash-soap	60 parts.
White bole, pd.	40 ,,

Knead them together. This yields 32–34 pencils.

Note.—Anhydrous potash-soap is obtained by heating soft-soap (potash-soap) in a steam-bath under constant stirring with a broad wooden spatula, until it no longer loses weight.

10. *Stilus Sublimati Dilubilis* 10 per cent.

("10 per cent. Sublimate Pencil").

Corrosive sublimate, pd.	10 parts.
Tragacanth, pd.	5 ,,
Starch, pd.	25 ,,
Dextrin.	40 ,,
Sugar, pd.	20 ,,
Water	suff. quant.

Yields 44–45 pencils.

11. *Stilus Zinci Oxidi Dilubilis* 20 per cent.

("20 per cent. Oxide of Zinc Pencil").

Zinc oxide.	20 parts.
Tragacanth, pd.	5 ,,
Starch, pd.	30 ,,
Dextrin.	25 ,,
Sugar, pd.	30 ,,
Water	suff. quant.

Yields 32–34 pencils.

12. *Stilus Zinci Sulpho-carbolatis Dilubilis* 20 per cent.

("20 per cent. Sulpho-carbolate of Zinc Pencil").

Zinc Sulpho-carbolate, pd.	10 parts.
Tragacanth, pd.	5 ,,
Starch, pd.	25 ,,
Dextrin.	30 ,,
Sugar, pd.	20 ,,
Water	suff. quant.

Yields 35–36 pencils.

* From *Pharm. Centralh.* Reprinted from the *American Druggist*, February.

THE CHEMICAL NATURE OF PETROLEUM OINTMENT.*

BY C. ENGLER AND M. BOEHM.

From an interesting paper, by C. Engler and M. Boehm, in *Dingler's Polytechnisches Journal* (vol. cclxii., p. 468), we take the following abstract, after stating that the term *vaseline* is applied by the authors (as, indeed, quite commonly on the continent of Europe) to the commercial petroleum ointments, irrespective of any special manufacturer's product. The word "vaseline," according to American patent laws, is the property of a single firm, and cannot be used by others. In Europe, however, the term has long escaped the bondage of proprietorship, and is used quite promiscuously.

Regarding the chemical nature of vaseline, only a few investigations are on record. Rud. Wagner† designated it as a mixture of heptane (C_7H_{16}) with paraffins. Moss‡ regarded it as a mixture of different, easily-fusible paraffins. Miller considered vaseline and "cosmoline" (which latter is a vaseline of higher melting point) as mixtures of paraffin with volatile hydrocarbons. Naylor§ finally showed that cosmoline contains 98·59 per cent. of hydrocarbons, and that fractions of different melting points may be separated from it by fractional cooling of its ethereal solution.

Most of the investigations refer to its physical or external properties (such as solubility, resistance to acids and chemical reagents, admixture of sulphuric acid, sulphonic acids, etc.), and it is just with reference to these properties that much discussion has been had up to the present time, whether the product obtained from petroleum residues (which the authors here designate as "natural vaseline" or simply "vaseline") or a mixture of heavy paraffin oils with ceresin (which the authors designate "artificial vaseline") is preferable.‖

It has long been known¶ that vaseline may be obtained, not only from the residue of American (Pennsylvania) petroleum—from which it was first prepared—but also from the residues of Galician and Alsatian petroleum. And Mendelejeff and Briel** have shown that a vaseline similar to the American may also be prepared from Caucasian petroleum.

According to Gerstenberger,†† the natural vaselines show slight differences in melting points and specific gravity, which are dependent upon their source and mode of preparation. In their principal properties, however, they do not differ materially. On the other hand, considerable differences have been shown to exist between natural and artificial vaselines, which should be kept in view when using the two substances practically. (Compare at end of this paper).

The investigations of the authors refer almost exclusively to the *natural vaseline*.

This excellent base for ointments may be obtained from petroleum residues either by decolorizing with charcoal, or by "bleaching" the residues with concentrated sulphuric acid, sometimes with the addition of bichromate, and subsequent treatment with charcoal, or, finally by distilling the bleached or unbleached residues.

Since the authors desired to examine vaseline in its natural condition, they purified it for their purposes merely by bone-black. The treatment with sulphuric acid causes the elimination of certain groups of hydrocarbons (of the composition C_nH_{2n}; also some aromatic ones). And even distillation produces changes which materially affect the composition of the product.

Preparation of Vaseline.—The authors used for this purpose two varieties of petroleum furnished by Dr. Fedorowicz, of Ropa, in Galicia. Both of these were strongly dichroic, green by reflected, yellowish to brownish-red by transparent light, and showed the following behaviour on distillation, the several figures given indicating the fractions, by volume or weight, respectively obtained at the stated temperatures:—

	Sp. gr.		Bel. 150°.	150° to 290°.	290° to 340°.	Over 340°.
I.	0·812	p.c. vol.	30·2	35·9	5·3	27·7
		p.c. w't.	26·7	35·5	6·5	31·1
II.	0·820	p.c. vol.	21·8	51·7	8·8	17·0
		p.c. w't.	20·0	51·2	9·4	18·9

From these oils the vaseline was prepared in two different ways:—

1. By dissolving the residues in petroleum-ether, bleaching the solution with bone-black, and evaporating the solvent.

2. By bleaching the petroleum itself, and distilling until a product of the proper consistence remained.

First Method (from Residues).—As the residues, deprived of all fractions boiling below 340°, had still the consistence of syrup, another portion, about one-third, was distilled off, until the residue had the consistence of butter. One part of this was then dissolved in 7 parts of petroleum-ether of specific gravity 0·66, and treated with $1\frac{1}{2}$ parts of powdered bone-black for one or two hours. It required seventeen successive operations to render the magnificently fluorescent solution as colourless as water. After distilling off the solvent with steam, the vaseline remained behind as an odourless, tasteless, and colourless oil of strong fluorescence, which congealed after awhile to a white, very translucent salve-like mass.* This was found to consist purely of hydrocarbons. Its melting point was 32° C. (ab. 90° F). During cooling it exhibited not a trace of crystalline structure, nor were any signs of crystallization traceable in the precipitates obtained by cooling its hot alcoholic solution. This is contrary to Naylor's observations. But the portion previously separated from it by distillation (to render it denser), when treated in the same manner, separated numerous scales of paraffin.

Second Method (from Petroleum).—In order to avoid the laborious repeated boiling of the petroleum with bone-black, and subsequent filtering, the oil was bleached by passing it through a series of filters arranged after the plan of sugar house filters. Each of these was about thirty inches high, two inches wide, surrounded with a steam jacket, and contained $1\frac{3}{4}$ to 2 lbs. of bone-black. The oil became colourless usually after passing six of these filters, but it still possessed then a deep-blue fluorescence. Its specific gravity had at the same time been greatly diminished.

I. From 0·812 to 0·795.
II. From 0·820 to 0·782.

In order to obtain the vaseline from these bleached oils, they were subjected to distillation *in vacuo* (at 10 to 15 mm. pressure) up to a temperature of 250° C. The flask was immersed up to the neck in an air-bath heated to the required temperature. The yield and character of the products were as follows:—

	Yield.	Sp. gr.	Melt. point.
I.	13·8	0·8809	30°–31°
II.	13·2	0·8785	30°–31°

In determining the melting point, it is preferable to use Wimmel's method,† since these substances pass from a

* From the *American Druggist*, February.
† *Dingler's Pol. Journ.* (1877), vol. ccxxiii., 515.
‡ *Pharm. Journ.* [3], vol. vi., p. 623.
§ *Pharm. Journ.* [3], vol. vi., p. 707.
‖ This is a preparation of the last Germ. Pharm. entitled: *Unguentum Paraffini*, with the synonyms "vaselinum; vaseline." It is prepared by mixing 1 part of solid paraffin and 4 parts of liquid paraffin.
¶ *Chem. Centralbl.*, 1882, 319.
** *Jahresb. f. reine Chem.*, 1882, 1458, 1466.
†† *Chemiker Zeit.*, 1885, 1398.

* It is probably in this or some similar manner that the most beautiful of all petroleum ointments, the so-called Caucasine, is prepared.
† *Zeitsch. f. anal. Chem.*, 1868, 267.

strongly translucent into a perfectly transparent condition long before they have attained the melting point proper.

The authors then give the results of analytical determinations of the components of these products. Prepared by either method they were found to consist purely of hydrocarbons. Even the bleached oil itself was free from oxygen or sulphur, and the oils removed by distillation are richer in hydrogen and poorer in carbon than the corresponding residues.

The authors next turned their attention to the nature of the substance abstracted by the bone-black. For this purpose portions of each of the crude oils were distilled *in vacuo* in the same manner as the bleached oils. The residues thus obtained, and not further purified, were found to be free from nitrogen, but contained unweighable traces of sulphur, and the following percentages of oxygen (determined by difference):—

I. 0·46 per cent. II. 1·29 per cent.

Hence, the approximate results of the treatment with bone-black consist in the removal of the oxygenated compounds. Besides, the charcoal retains also certain constituents containing less hydrogen, so that the product has been rendered richer in *saturated* hydrocarbons.

Effects of Distillation.—In order to ascertain how much the melting point of vaseline may be raised by distilling off a portion, and also to determine whether its chemical nature is altered during this process, portions of each of the two crude oils were distilled, *in vacuo*, in fractions, until only a few drops of residue remained behind. It was thereby shown that the melting point of the *distillates* gradually rose with the temperature, while on the other hand the *melting point of the residue* rose only (from 30·5° to 32° to 33° C.) by taking off the first fraction; subsequently, however, it *sank in a continuous ratio.* This proves that by distilling vaseline *in vacuo* its melting point can be raised at most only by 2° or 3°, while on further distillation it sinks again, probably in consequence of slight decomposition.

In these experiments it was particularly remarkable that every one of the *distillates* had a strongly *crystalline* structure, while the residues, down to the last portion, possessed the amorphous condition peculiar to vaseline.

Since the whole appearance of the distillates showed that they consisted of a mixture of solid paraffin with volatile oils, attempts were made to separate these portions. It being impossible to accomplish this by filtration or expression, the authors employed a method depending upon the fact that from an ethereal solution of the mixture alcohol precipitates the paraffin more readily than the oils. The process is as follows (and may be used on the small scale):—The mixture of paraffin and oil is dissolved in the least possible quantity of cold ether, and the resulting solution is mixed under strong agitation with absolute alcohol until it is completely filled with flakes of paraffin. It is now strained, and the alcohol still adhering to the flakes evaporated on the water-bath. The strained or filtered liquid is then further mixed with absolute alcohol, the separated paraffin again removed, and this process repeated until no more flocculi of solid paraffin, but only oil globules are precipitated. From the final filtrate the ether and alcohol are removed by distillation, the residue dissolved in the least quantity of ether, and the solution (placed in a freezing mixture) treated with very little cold absolute alcohol, which causes a further separation of paraffin. This is likewise repeated until only oil separates. In order to obtain accurate results it is advisable to subject the paraffin first separated to a renewed treatment by dissolving it in ether and reprecipitating with alcohol The authors tested this method by employing it upon a mixture prepared by melting together 30 parts of liquid paraffin and 10 parts of solid paraffin (melting at 56° C.). The first separation yielded 16·1, and the second 9·3 parts of solid paraffin (within 7 per cent. of the total). This shows that the method is available for an approximate determination of solid paraffin, while it has the advantage that it can produce no alteration in the constituents. Whether it is equally well applicable to mixtures of soft paraffins and very viscid oils remains to be seen.

While all the fractions obtained from vaseline by distillation yielded, by this method, distinctly crystalline flakes of paraffin, *undistilled vaseline*, when treated in the same manner, showed no crystalline structure whatever in the separated portions.

Separation of Vaseline into a Solid and Liquid Portion.—The method just described was next employed by the authors to separate the solid portion of vaseline from the liquid. In order to reduce the number of operations, a little more alcohol was added to the first prepared ethereal solution, so as to produce a thin magma. The resulting filtrate was deprived of ether and alcohol, and the process was repeated only if it was not entirely liquid. The last precipitations were also made in a freezing mixture, and the first obtained precipitates redissolved and reprecipitated as stated above.

Working in this manner, the authors obtained from 100 parts of vaseline (derived from oil II., having a melting point of 30·31° C.), 40·8 parts of solid matter, which they designate as "solid vaseline" (to distinguish it from "solid paraffin"). This had a specific gravity of 0·8836 at 20° C., and the melting point 40° C. The rest constitutes the "liquid vaseline," had a specific gravity 0·8809, and began to congeal only at 10° C. The curious fact that the original vaseline has a lower specific gravity (0·8785) than either of its constituents thus separated by solvent is not without precedent, since Grotowsky* has shown that certain technical paraffin oils (mixtures of paraffin and oil) are lighter than their constituents.

SPECIFIC GRAVITY OF BEESWAX.†

Herr Dieterich has of late examined into the real specific gravity of beeswax, the different observers giving often widely varying figures. He found that this was due to the different ways in which the "floating" test in more or less diluted alcohol was conducted. The best dilutions are: 0·960, 0·961, 0·962, 0·964, 0·965, 0·966, 0·967.

There are three ways in which the test is applied:

1. A piece of wax is chipped off, cleaned as much as possible from all fragments, and allowed to float. The specific gravity of the diluted alcohol in which the wax floats in the middle (neither on the surface nor at the bottom) is the true specific gravity of the wax.

2. A piece of wax is kneaded in order to make it homogeneous and exclude all air, and allowed to float.

3. Hager's "pearl" method. Heat a piece of beeswax over a small alcohol flame till a drop of melted wax is formed, and allow it to fall into strong alcohol, keeping the wax as near over the surface as possible. Form in this way a dozen "pearls," put them on blotting paper, and let them dry at ordinary temperature for twenty-four hours (because recently made "pearls" are too bulky, and therefore give a too low specific gravity); then allow them to float in the diluted alcohol.

The following figures will show the difference in specific gravity according to the treatment of the same wax:—

Chipped piece.	0·963
Kneading one minute	0·957
Kneading five minutes	0·963
Recently made pearls	0·961
Pearls after twenty-four hours	0·964

Dieterich finds after several years' experience with very large quantities of beeswax that the specific gravity is between 0·963 and 0·966.

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* *Zeitsch. f. Berg-, Hütten- und Salinenwesen* (1876), 24, 42.

† From *Pharm. Zeitung.* Reprinted from the *Pharmaceutical Record*, February 15.

The Pharmaceutical Journal.

SATURDAY, MARCH 19, 1887.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

ANNUAL DINNER OF THE CHEMISTS' ASSISTANTS' ASSOCIATION.

THE annual dinner of the Chemists' Assistants' Association, which took place on Wednesday evening at the Holborn Restaurant, was again a very successful reunion, having been well attended by the members and their friends, while the number of visitors was larger than on previous occasions. The chair was taken by Mr. CARTEIGHE, and among the visitors were Drs. CURNOW and MACNAUGHTON JONES, Mr. GREENISH, Mr. BOTTLE, Mr. F. BARRON and Mr. H. B. SPINK. After the usual loyal toasts, Mr. T. S. DYMOND proposed the toast of "The Medical Profession," which was responded to by Dr. CURNOW, who took occasion to comment upon the necessity for the pharmacists' assistance of the medical practitioner, and to insist upon the desirability of relying upon pharmacists to perform that portion of the art of practical medicine which appertains to the preparation of medicines. He gave an amusing sketch of his own early experiences under conditions where this differentiation of functions was not observed, with the view of illustrating the disadvantages of the neglect of such a division of labour as he thought to be desirable both for the good of patients and for the convenience of medical men. It is a pleasant indication of progress to find this view is now pretty freely expressed on various occasions by medical men when opportunity offers, and Dr. CURNOW's genial exposition of it met with hearty appreciation from his hearers. The toast of "The Pharmaceutical Society," coupled with the name of the Chairman, was proposed by Mr. TAYLOR, in the unavoidable absence of Mr. BURNETT, to whom this duty was assigned in the programme, and Mr. CARTEIGHE in reply referred to some of the salient points in the history of the Society, for the purpose of showing that its aim and endeavour had always been to improve the position of pharmacists, and advance their interests individually and as a body. He pointed out that the original foundation of the Society by individuals of the highes reputation as pharmacists was specially characterized by a desire to benefit their colleagues in the trade, and the provision that was made by the Society in its early days for affording educational facilities to any one connected with the trade was a proof of the disinterested motives which led to its formation. The grant of a Royal Charter of incorporation was a public recognition of the soundness of the principle upon which the pioneers of pharmaceutical organization had acted, and although there were at that time, as well as at the present, scoffers at the Society among the ranks of those who belonged to the trade, it grew in prosperity and influence until at length, in the year 1852, the first Pharmacy Act was passed to give greater effect to the desire to promote a uniform system of educating those who practise pharmacy. Some ten years later a further attempt to obtain improvement in this respect was made by the Society, which resulted in the introduction of a Bill in Parliament providing for an educational qualification of all persons engaged in the business as pharmaceutical chemists, but this was frustrated by the evidence afforded that the members of the body of chemists and druggists were not agreed among themselves. The scoffers at the Society were responsible for this failure, and the Act that was subsequently passed in 1868 fell short of the aim of the Society in consequence of the want of internal agreement. It was contended by the opponents of the Society that there was no need of education, but that a licence to sell poisons was all that was necessary for the safety of the public and for the interests of those engaged in the business. Since that time the defects of this Act have become manifoldly apparent, and, again, the scoffers at the Society have charged it with the blame, though the defects of the Pharmacy Act of 1868 are in no way due to the Society, but to the internal opposition by which its objects were defeated. The experience gained under the operation of that Act showed that the candidates for qualification in accordance with its provisions, instead of being educated in the sciences connected with pharmacy, and trained in the practice of their art, presented themselves in the examination, specially prepared to disgorge a greater or less mass of information that had been obtained for the purpose of enabling them to pass the scrutiny of the examiners, but obtained in such a manner that it was difficult, if not impossible, for the examiners to decide whether it gave evidence of real knowledge or not. Such a state of things was a great disadvantage to the candidates, and the efforts of the Society to establish systematic education should be regarded as an indication of a generous desire to improve the conditions under which candidates seek to prepare themselves for obtaining legal qualification as pharmacists. That such a generous spirit had characterized the action of the Society throughout was evident in connection with the Benevolent Fund, which was in 1868 made available not only for members of the Society, but, generally, for every person registered under the Act. Similar evidence was furnished by the registration under the Act having been carried out by the Society without any charge

of such a fee as is usually insisted upon in such cases. On all of these grounds Mr. CARTEIGHE contended that the Society was entitled to the support of every one connected with the business, and he impressed this upon the consideration of his hearers, not only because as assistants now they might become principals to-morrow, but also because the future of pharmacy was a matter of especial interest to them. That the members of the Chemists' Assistants' Association had not lost sight of the importance of this fact and of the necessity of going forward in the work that the Society was formed to carry out was shown by the memorial addressed by that Association to the Council some time since urging the establishment of a satisfactory system of pharmaceutical education. The Council had taken in hand, upon that instigation, to go on in the work; it was going on with this work at the present moment, and speaking in the name of the Council and of the Society, he trusted to the Chemists' Assistants' Association to support the work.

Afterwards, in proposing the toast of "The Chemists' Assistants' Association," Mr. CARTEIGHE referred in complimentary terms to the excellent work that is being done by it, in common with other Associations of a similar nature, and he expressed his entire disbelief in the justice of those apprehensions that had been entertained in some instances, that the formation of associations among assistants might be productive of bad results rather than advantage. That he considered had been distinctly disproved. In speaking of the progress of the Association, as shown by the increase of members from 131 to 182 during the past year, by the increase in the number of patrons from 27 to 34, and by the prosperous state of the finances, he instanced the publication of an annual report of the proceedings as being a most commendable feature. Mr. MILLHOUSE, the President, in replying, referred to the improvement there had been in the attendance at the meetings of the Association, the average number being now forty-two, or twice as many as last year. The success of the last Conversazione had been so great as alone to make the Association a power in the pharmaceutical world, and he rejoiced to say that it was never more thoroughly in touch with the Society than at present.

The last toast was that of "The Visitors," and in proposing it Mr. R. WINFREY made a digression for the purpose of expressing the opinion that direct representation on the Council of the Society was an object the Association should endeavour to obtain. Mr. H. B. SPINK, in replying to this toast, thoroughly endorsed the view expressed by Mr. WINFREY, but added that he would not stop at that point in carrying out direct representation, for holding, as he did, the opinion that it was highly desirable and necessary that a body so large and important as the pharmacists of this country should have direct representation in Parliament, he looked forward to the time when this would become an accomplished fact. This closed the proceedings of a most agreeable evening, which was enlivened by an excellent musical programme, for the carrying out of which great credit is due to those who took part in it, and in every respect we think the Chemists' Assistants' Association may be congratulated upon having placed on its record another marked success.

On Thursday last the second reading of the Pharmacy Acts Amendment Bill was moved in the House of Lords. It was pointed out by his lordship that the object of the Bill—one of great importance to the general public—was to enable the Pharmaceutical Society to make adequate arrangements for an educational curriculum for students of pharmacy. After explaining the constitution of the Society and the powers which had been conferred upon it by Royal Charter and legal enactments, his lordship pointed out that it had been found the present requirement of mere examination had not had the effect of inducing candidates for qualification to devote themselves to acquiring that practical skill which is absolutely essential for the safety of the public, and that many insufficiently trained persons consequently present themselves to pass. The Privy Council, having felt unable to confirm the Bye-laws framed by the Society for removing this defect, because they were not within the scope of the statute, the present Bill had been introduced with the unanimous approval of the Council of the Pharmaceutical Society, and of the Lord President, subject to a slight technical amendment. The Bill was then read a second time.

* * *

Our readers will remember that at the last Council meeting the letter from Sir Frederick Abel in reference to the Imperial Institute was referred to a Committee to take such steps as might be deemed desirable for carrying out the request contained in it, and we understand it was decided that a circular letter should be addressed by the President to the members and associates of the Society, enclosing a copy of the letter Sir F. Abel had requested him to bring under their notice, together with an intimation that if they had not already subscribed to the Fund for establishing the Institute and proposed to do so, the President would receive any donations they might send, and transmit them with others to the Secretary of the Institute. Such donations would form a pharmaceutical contribution towards the establishment of the Institute, and it has been intimated by the Committee of the Institute that the smallest amounts will be gladly received and individually recorded. The circular letter above referred to was sent out last Wednesday.

* * *

At the annual meeting of the Aberdeen and North of Scotland Society of Chemists and Druggists it was decided to issue a circular calling attention to the present condition of the Society and suggesting to those who are not connected with it the desirability of becoming members. The annual subscription of a member is 10*s.* 6*d.*, and as the Society now possesses a really well-equipped laboratory, museum and library, it offers the use of these facilities for study to assistants and apprentices of members at reduced rates of subscription, the general aim being to promote good fellowship among members of the trade and the education of the younger branches. It has been suggested that the annual dinner of the Society should be held in Elgin, and that there should be a discussion of trade topics on that occasion.

* * *

We regret to report the death, on Sunday last, of Mrs. Annie Whitehead, who was elected an Annuitant from the Benevolent Fund in December, 1878.

Provincial Transactions.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The ninth meeting of the ninth session was held in the Pharmaceutical Society's House, 36, York Place, Edinburgh, on the evening of Wednesday, February 23, at 9.15, Mr. William Duncan, President, in the chair.

The minutes of last meeting having been read and approved, the Chairman called upon Mr. George Lunan to read—

A Note on Commercial Hypophosphorous Acid.

BY GEORGE LUNAN.

Solution of hydrogen hypophosphite or hypophosphorous acid is not an official substance, but the inclusion of the calcic and sodic salts in the Pharmacopœia and the prominent place which it occupies in published formulæ for the preparation of compound syrups of the hypophosphites warrant its being included in the category of officinal preparations. The acid, although containing three hydrogen atoms in the molecule, is monobasic, only one of these being replaceable by metallic bases, and as a consequence the formula is always written HPH_2O_2 and not H_3PO_2.

It is the least oxygenated phosphorus acid, containing one atom less oxygen than phosphorous acid, and two less than phosphoric, in the molecule.

Proctor in 1858 recommended for its preparation the decomposition of 480 grams of the calcic salt by 350 grams of crystallized oxalic acid, making saturated solutions of each; mixing, filtering and evaporating the filtrate to eight and a half fluid ounces, when the solution would contain 10 per cent. of the acid.

In Parrish's 'Pharmacy' this formula is reproduced in detail, 350 grams or a sufficiency of crystallized oxalic acid being specified. Attfield, in his latest edition, says it "may be prepared by decomposing the calcium salt by oxalic acid, or, better, the pure barium salt with sulphuric acid."

Watts's 'Inorganic Chemistry' recommends the decomposition of the baric or calcic salts with sulphuric acid, and Watts's 'Dictionary of Chemistry,' the baric salt with sulphuric acid, or the plumbic salt with sulphydric acid.

It will thus be seen that there is a variety of methods for the preparation of hypophosphorous acid. Commercially, however, the method recommended originally by Proctor is the one, I think, in general use. At least, if any reliance can be placed on the result of the experiments about to be summarized, this would seem to be a logical conclusion, as both calcium and the oxalic radicle were proved to be present in every sample examined.

As the solution that suggested this note was evidently much stronger in acid than would result from its preparation by Proctor's formula, I resolved to obtain supplies from different sources, merely asking for hypophosphorous acid, without demanding a certain percentage, and in that way making comparisons, with regard to their strength and impurities, of which something had been foreshadowed by the original solution. In attempting to deal with these samples as types of the acid of commerce, I wish to preface the communication of the results by stating that I am well aware that there is such a thing as medicinal purity comparable to chemical. To be more explicit, that economic considerations are as worthy of practical application by manufacturing chemists as by others, and that it is unnecessary to free a commercial drug from a non-injurious impurity contained only in small quantity at the cost of doubling the price of manufacture.

Samples A and B were obtained from wholesale drug houses of first class repute.

C was prepared by myself, using 12·6 grams of pure recrystallized oxalic acid, and instead of 17 grams of calcic hypophosphite as the molecular weight would require ·5 gram more (so as to insure, if possible, the absence of oxalic acid in the resulting solution), dissolving separately, mixing, filtering, washing and evaporating the fluid until it weighed 132 grams, when it should have contained 10 per cent. of the acid.

D was a sample kindly furnished me by a retail pharmacist in town. The time at my disposal would not admit of an examination of more, but I believe the above are typical of the commercial article.

The tests to which each sample was subjected, were:—

1st. A solution of calcic acetate containing excess of acetic acid to detect oxalic acid or other oxalates.

2nd. A solution of ammonium oxalate to detect calcium salts.

3rd. A solution of plumbic acetate containing excess of acetic acid to detect phosphorous acid, or other phosphites.

I relied on the last test, from the fact stated in Watts's 'Dictionary of Chemistry,' that phosphite of lead is insoluble in acetic acid.

As these were likely impurities from the known methods of preparation, more attention was devoted to them than others.

In making qualitative estimations, the *modus operandi* consisted in adding to a small quantity of the sample the calcic acetate solution. In none of them was there an immediate precipitate, but on gently heating, or by merely stirring, a characteristic one began to appear in every sample more or less abundantly.

The ammonium oxalate reagent at once produced a precipitate in them all, and, as this seemed to indicate that the oxalic radicle was contained as calcium salt dissolved by the acid, each solution was neutralized by AmHO, and filtered from the precipitate, which formed in every case, care being taken to use a sufficiently diluted solution. The precipitate was examined, and found to consist of calcium oxalate in every case.

The filtrate was tested for the oxalic radicle in the usual way, and for calcium.

The oxalic radicle being absent, the filtrate was tested after an excess of acetic acid had been added by the acetate of lead reagent.

Of other impurities there were none likely and none found in sufficient quantity to warrant notice.

The results are tabulated below:—

Sample.	CaC_2O_4	Excess of oxalic acid.	Excess of $Ca_2PH_2O_2$	H_3PO_3
A .	Abundant	Absent	Abundantly present	Absent
B .	Present	Absent	Present	Trace
C .	Present	Absent	Abundantly present	Absent
D .	Present	Absent	Present	Absent

Comment or inference from these will be left over until the quantitative analyses have been stated. The specific gravities were taken at 60° F. The neutralizing power, not a very reliable test with a readily oxidized acid like hypophosphorus acid, was determined by a quarter normal solution of NaHO, using methyl orange as an indicator.

Ten c.c. of the samples were diluted to 500 c.c. with distilled water. Ten c.c. of the ¼th NaHO standard solution, which would contain ·10 gram of NaHO equal to neutralizing ·165 gram of hypophosphorous acid, were taken, so that the quantity of the diluted sample required to neutralize this contained ·165 gram of the acid. In the case of sample A 25 c.c. of the 1 in 50 solution were required, which would be equal to ·5 c.c. of the original sample, the specific gravity of which was 1·1332, so that it would weigh ·5666 gram, and if that contained ·165 gram of acid a rule of three sum decided that the percentage was 29·12. In making these volumetric estimations the ordinary method, that of running the standard solution into the sample, was not followed, it being thought that having the more dilute solution in the burrette would give more exact results. Also that the in-

dicator would be altered by remaining for any length of time with an excess of so powerful a reducing acid as hypophosphorous.

Practically, however, both methods yielded similar or very nearly similar results.

As it was thought that the determination of the reducing power of the samples would be a truer criterion, a process easily applied was looked for.

A standardized solution of $KMnO_4$ would, it was thought, admirably suit the purpose.

Various experiments were then made in the acid solution and neutralized, but after a series of heart-burnings it was found that the process would not work practically.

Though there can be no doubt that the official hypophosphites can be readily and easily determined by this method it must be borne in mind that in these cases known quantities are operated upon, and the end of the reaction can be ascertained only by filtration. The idea of using $KMnO_4$ was therefore abandoned, and fortunately for me the resources of chemistry were not exhausted. In Watts's 'Dictionary of Chemistry' a process founded on the power of hypophosphorous acid of reducing $HgCl_2$ to HgCl was unearthed. It consists in adding a known quantity of the sample to an excess of mercuric chloride, acidifying with a small quantity of HCl, keeping the solution at a temperature of 60° C. for some time, then throwing on a tared and dried filter, washing, drying at 100° C., and weighing the calomel. The equation is $H_3PO_2 + 4\,HgCl_2 + 2\,H_2O = H_3PO_4 + 4\,HgCl + 4\,HCl$. It was specified in the process that the temperature must not exceed 60° C., as in that case some of the calomel might be reduced to the metallic state. Practically, however, it was found that barely one-half of the reducing power of the samples was exhausted by digestion for nearly an hour at 60° C. A quantity of the acid heated to 100° C. with excess of $HgCl_2$ produced a white precipitate which showed no signs of reduction, either to mercurous oxide or to metallic mercury, and as it was proved that the filtrate could be boiled indefinitely without producing the slightest further precipitation it was deemed that this process would work practically with the alteration of the digestion at 60° C. to heating to the boiling point 100° C.

As an example of this process 20 c.c. of a solution of sample (A) containing 10 c.c. in 500 c.c., which would be equal to ·4 c.c. of the original solution, weighing (seeing the specific gravity was 1·1332) ·45468 gram, was taken; to this was added a known excess of 5 per cent. solution of $HgCl_2$, 3 c.c. of HCl, and the whole diluted to about 100 c.c. with distilled water, and heated to 100° C.

The calomel separated as a lustrous purely white precipitate, which when thrown on a tared filter, well washed and dried, weighed 1·8989 gram.

Now by the equation 942 grams of calomel are produced by 66 grams of H_3PO_2, so that calculation proved that ·45328 gram of the sample contained ·133 gram of pure H_3PO_2 which is equal to 29·48 per cent.

The quantitative estimation is tabulated below :—

Sample.	Sp. gr.	Percentage of H_3PO_2 by NaHO estimation.	Percentage of H_3PO_2 by reduction of $HgCl_2$ to HgCl.
A.	1·1332	29·12	29·48
B.	1·1367	29·95	29·95
C.	1·0442	8·87	8·87
D.	1·0353	8·07	8·07

If any reliance can be placed on the qualitative estimations submitted to you, it would seem that the acid cannot be prepared free from calcic oxalate if the lime and oxalic acid process is used for its preparation.

As there cannot be any doubt but that freshly precipitated oxalate of calcium is to a certain extent soluble in hypophosphorous acid, for I verified this by an experiment, the question arises, "Is the presence of calcic oxalate likely to have any deleterious effects?" Supposing the sample to be required for the preparation of a compound syrup of the hyphosphites containing the calcium salt, it would lead to endless trouble to keep a presentable syrup. Even if it were contained as free oxalic acid it would be more easily got rid of (as it would be all thrown out at once) than by the slow process of precipitation which would go on for months, as in presence of a less acid solution the calcic oxalate slowly separated. If it were required for dispensing purposes it would when diluted gradually deposit its impurity. Again the quantity of impurity introduced into the system would amount to something considerable in time, were the medicine persisted in. In short, the acid is not likely to recommend itself as a mode of exhibiting the hypophosphorous radicle until the commercial article is to be obtained purer. I have never personally come across a sample of the commercial drug that did not deposit more or less after being kept for a week or two.

Mr. A. E. Robinson, in a paper read before the British Pharmaceutical Conference, in 1885, suggested the use of this acid as a preservative agent, for a concentrated solution of ferrous iodide, specifying that care must be taken that the acid should contain no oxalic acid. Then these samples, whether used as a preservative for ferrous iodide, bromide or chloride, would not do. It was thought likely that the more concentrated solution would give evidence of the presence of phosphorous acid, but this was not so, except in one case, and the volumetric and gravimetric estimations taken conjointly confirm this. The high specific gravity of sample C is due to excessive quantity of lime salt it contained. That the neutralizing power of the samples is lower than their reducing power is also borne out by the same fact. The only inquiry suggested by the quantitative estimations is, "Whether a 10 or 30 per cent. sample should be used when acid hypophosphorus is simply ordered?" The quantitative determinations proved one thing, however, which would otherwise have remained a matter of doubt, namely, that phosphorous acid was absent almost entirely from the samples.

This was contrary to my preformed judgment, having thought that at all events the more concentrated solutions would contain appreciable quantities. Had there been another week at my disposal before communicating these notes, I intended preparing a sample of the acid by the barium salt and sulphuric acid process, and submitting it to you with a recommendation. The process which I intended following was to decompose 29·5 grams of the pure barium salt, dissolved in 120 c.c. of distilled water, with 10 grams of H_2SO_4, specific gravity 1·843, filtering, washing to make the filtrate measure about 150 c.c., and concentrating until the fluid weighed 65 grams, when it should contain 20 per cent. H_3PO_2. As I am not certain whether the nascent acid may not render some of the barium sulphate soluble by reducing a quantity of that precipitate to sulphite, I cannot offer the process guaranteed.

Regarding the concentration I feel sure that an acid of 20 per cent. would be suitable for every purpose, and this cannot be said of the weaker, while at the same time it would not be rendered liable to the alteration which further condensation would produce.

I have only, in conclusion, to thank the firm of James Robertson and Co., 35, George Street, for placing samples at my disposal, and for allowing the use of their reagents and apparatus to conduct these experiments. I have particularly to thank Mr. A. A. Lumsden, who has most obligingly rendered me invaluable aid in conducting and verifying the quantitative estimations. Besides he has placed at my disposal his counsel and advice on the whole subject, and backed by his assistance as a technical analytical chemist of many years' experience, I am emboldened to submit these notes to your full and free criticism.

[Since reading the above Mr. Boa has drawn my attention to the fact that my results confirm to a considerable extent those arived at by Mr. Branson, whose published remarks I had not previously seen.]

The reading of the paper was followed by a discussion, and on the motion of the Chairman a very hearty vote of thanks was awarded to Mr. Lunan.

The President then read the following paper on—

Blaud's Pills.

Three months ago the query "What is the best method for making Blaud's Pills?" was put to me at one of the meetings of our Association, and knowing that great diversity of opinion exists among us as to the "best" method of preparing the same, I thought the subject a very suitable one for a short paper. Having procured in all nine samples of the pills, I estimated the amount of iron present in the ferrous state, calculating it as carbonate.

A contained	. . . .	14·9	per cent.	$FeCO_3$
B „	. . . .	14·25	„	„
C „	. . . .	22·0	„	„
D „	. . . .	19·49	„	„
E „	. . . .	20·1	„	„
F „	. . . .	15·4	„	„
G „	. . . .	9·9	„	„
H „	. . . .	14·5	„	„
I „	. . . .	10·0	„	„

These samples, with the exception of G and I, were to all outward appearance passable pills, although some would have been greatly improved if a little more care had been taken in rounding them off with the pill finisher. G and I fell to powder when pressed between the fingers. C and E must have been made with dried sulphate of iron, as the theoretical percentage of $FeCO_3$ in a mass made with 50 per cent. $FeSO_4 7H_2O$, the usual strength, is only 20·8 per cent., providing no oxidation has taken place, a thing which is absolutely impossible if you attempt to form the ferrous carbonate in the mortar. Of course I am perfectly aware that many pharmacists believe the proper course to adopt in making Blaud's Pills is to hinder chemical action as much as possible, trusting to the reaction taking place in the stomach while the pill is being disintegrated; but I do not think that was the intention of the originator of these pills, neither do I think the majority of us follow out that idea in preparing them. We have no right to take for granted that $FeCO_3$ is formed in the stomach, while we all can see for ourselves that it is in the mortar. Inquiry at the various shops where I was supplied with specimens elicited the following amusing differences of opinion regarding their preparation. One gentleman tells me he dries separately the iron sulphate and potass. carbonate, mixes the iron with one-sixteenth of its weight of tragacanth, adds the potass. salt and beats into a mass with treacle. His intention is to prevent chemical action between the salts as much as possible.

Another dissolves 2 oz. $FeSO_4$ in hot water, and the same quantity of K_2CO_3, mixes the solutions and evaporates to dryness, making up to 4 oz. with equal weights of pulv. acaciæ and liquorice. They are then massed with glycerine and syrup. This process I believe yields the minimum of $FeCO_3$. Still the pills seem to be as good medicinally, and no fault has been found either by prescribers or patients. As a matter of fact, Mr. Hill tells me he has known of pills which contained not a trace of ferrous iron and yet were said to act as rapidly on the system as the others. Another gentlemen takes 1½ oz. of dried $FeSO_4$ and the same quantity of K_2CO_3, mixes them, adding 1 oz. pulv. acaciæ, and beats into a mass with simple syrup, cutting into four-grain pills. After standing for some time to harden, he varnishes them with solution of tolu in ether. They are certainly beautiful pills to all outward appearance, but here again he believes the stomach to be the proper place for the chemical reaction between the salts, not the mortar. He has great faith in his own method, and tells me that a customer of his who had gone to the south of England asked her chemist there to send to Edinburgh for A.'s compressed Blaud's Pills. Others either made them by Martindale's or Ince's formula; two I think by simply rubbing the two salts together, and adding tragacanth q.s. to the liquid mass to give it a proper consistency.

Wishing to test the keeping properties of pills made by the methods followed, I made two dozen each from Mr. Ince's formula, Mr. Martindale's and the old way above described. All were made the same night, and estimated with $K_2Cr_2O_7$, using sulphuric acid as a solvent, and checking the results by duplicate estimations, using H_3PO_4 as a solvent to avoid the action of the sugar influencing the conversion of the ferrous to ferric salt. As a matter of fact, the difference between the four estimations was very slight (two with H_2SO_4 and two with H_3PO_4). The following is Mr. Ince's method.:—

℞ 1	Ferric sulph.	℥ss.
	Glycerine (hydrated)	♏iij.
2	Potass. carb..	℥ss.
	Glycerine.	♏ij.

Mix 1 and 2 separately on a slab with glycerine, then mix together in the mortar, add p. tragacanth, gr. vj, and divide into twelve pills. In this formula the K_2CO_3 is very much in excess of what is actually necessary for the conversion of the $FeSO_4$ into $FeCO_3$, the 30 grams $FeSO_4 7H_2O$ requiring only 16 grains of anhydrous K_2CO_3, equal to about 20 grains of the B.P. salt, which contains 16 per cent. H_2O. Mr. Martindale says that a pill made with equal quantities of the two salts will be sure to deliquesce, and in the 'Extra Pharmacopœia' recommends the following improved formula:—

℞	Ferri sulph..	2½ grs.
	Potass. carb.	1½ grs.
	Sacchar.	1 gr.
	Pulv. trag.	⅙ gr.

I also made two dozen by Martindale's formula, but used a little glycerine to rub up the salts, as in Ince's.

The following are the percentages of $FeCO_3$ in the fresh pills:—

	$FeCO_3$ per cent.
No. 1 (Ince's formula)	17·9
„ 2 (Martindale's)	17·0
„ 3 (Martindale's formula, but Ince's mod.)	19·5
„ 4 (with tragacanth only)	16·5

These four sets were laid aside in ordinary chip boxes for two months, the boxes during that time being occasionally opened. They were then carefully examined and estimated. No. 1 (Ince's) were quite hard, and seemed as good as the day they were made.

No. 2 (Martindale's) were very slightly marked with damp looking patches, the pill powder (pulv. amylic. 5 per cent. trag.) being slightly caked on them.

No. 3 were very soft, and altogether unsightly from absorption of moisture, although the glycerine used in them was hydrated, as recommended as not being hygroscopic.

No. 4 were quite dry and round, but fell to powder when pressed between the fingers.

On being estimated,

No. 1 contained	. . .	13·73	per cent.	$FeCO_3$
„ 2 „	. . .	18·3	„	„
„ 3 „	. . .	18·8	„	„
„ 4 „	. . .	11·7	„	„

One pharmacist tells me he had the same difficulty with the pills made from Martindale's formula, namely, sweating, and suggested sugar of milk to be used in place of cane sugar. This, I find, is an improvement only in appearance, for on estimating pills in which the same quantity of iron was used to begin with, and which had been kept a month, I found that they only contained 12·2 per cent. $FeCO_3$.

From these experiments I have come to the conclusion that Martindale's formula is the one that should be adopted by those of us who believe Blaud's pills should be really a preparation of $FeCO_3$, and not a preparation of $FeSO_4$, intended to form the carbonate in the stomach under the assumption that the same reaction goes on in that place as in a glass measure. Their tendency to sweat would be overcome, I think, by varnishing them in tolu and ether, although I have not had time to test the value of that suggestion. Is not this a subject suitable for the B.P.C. Formulary Committee to take under their consideration, and give us an official formula, if not a B.P. one?

The paper gave rise to a good deal of discussion, and on the motion of Mr. Turnbull, seconded by Mr. Henry, a unanimous vote of thanks was awarded to Mr. Duncan.

Mr. George Coull then gave a practical demonstration of the process of volumetric estimation, which was evidently highly appreciated by the members.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

The ordinary monthly meeting of the Sheffield Pharmaceutical and Chemical Society was held in the Society's room on Wednesday night, Mr. Newsholme, President, in the chair.

Mr. G. A. Cubley read a paper on "The Weights, Measures, and Arithmetic of the Pharmacopœia."

The paper was listened to with great interest throughout, and, on the motion of Mr. Newsholme, seconded by Mr. Grierson, a vote of thanks was passed to the lecturer.

TORQUAY CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting of this Association was held at Wood's Temperance Hotel on Tuesday, the 8th inst., Mr. J. Horton in the chair.

The minutes of the previous meeting having been read and confirmed, Mr. Chas. Shapley delivered a lecture on "Pharmaceutical Zoology."

The lecture, which treated mainly of the principal products and educts of the Pharmacopœia, was of exceeding interest, and was listened to with great attention throughout. It was illustrated by a number of specimens kindly lent by the Museum Committee of the Pharmaceutical Council.

At its close a vote of thanks, moved by Mr. F. March and seconded by Mr. Curtis, was spoken to by Messrs. Colebank and E. H. Farr.

It was announced that the papers for Mr. E. Smith's prize on "Pill-making and Pill-coating" would be received from members not later than March 31.

Proceedings of Societies in London.

CHEMICAL SOCIETY.

At a meeting of the Chemical Society on Thursday, March 3, Dr. Hugo Müller, F.R.S., President, in the chair, several certificates were read for the first time, and the following were elected Fellows of the Society :—

Messrs. C. H. Cribb, L. Dobbin, J. F. Geisler, E. Hall, A. Hay, T. A. Hedley, J. S. Jackson, G. McGowan, G. T. Moody, J. W. O'Connor, H. D. Richmond, A. H. F. Ruppel, W. Scrutton, H. L. Snape, A. Stanley, H. Wallis.

The following papers were read :—

Tartaric and Racemic Acids and the Magnetic Rotatory Power of their Ethyl Salts. By W. H. Perkin, Ph.D., F.R.S.—The author has very carefully determined and compared certain physical properties of the diethylic salts of ordinary tartaric and racemic acids, prepared by the usual method by saturating the alcoholic solution of the acid with hydrogen chloride. Both boil at 232°–233° (corr.) under a pressure of 197 mm. They have the same relative density, viz. :—

Diethylic tartrate $d\frac{15^\circ}{15^\circ}=1{\cdot}20972$ $d\frac{25^\circ}{25^\circ}=1{\cdot}20189$.

Diethylic racemate $d\frac{15^\circ}{15^\circ}=1{\cdot}20983$ $d\frac{25^\circ}{25^\circ}=1{\cdot}20214$.

They have also the same mean molecular magnetic rotatory power, viz. :—

Diethylic tartrate at 14·8° = 8·766
Diethylic racemate at 15·5° = 8·759

It may therefore be concluded that the racemate is a mixture of the two tartrates. Racemic is distinguished from tartaric acid by crystallizing with 1 mol. proportion of water; the author finds that silver racemate, like the tartrate, is anhydrous. In preparing silver tartrate he obtained an acid salt, $C_4H_5AgO_6.H_2O$, crystallizing in well-defined monoclinic prisms, measurements of which by Professor Haushofer are given. An acid silver racemate appears also to exist, but is much less soluble than the tartrate, and the crystals are small. The relative densities of aqueous solutions of the two acids were determined, using (*a*) a solution containing 8·333 per cent., and (*b*) a solution containing 25 per cent., the latter being supersaturated in the case of racemic acid; the results are—

Tartaric acid solution $d\overset{(a)}{\frac{15^\circ}{15^\circ}}=1{\cdot}03703$ $d\overset{(b)}{\frac{15{\cdot}3^\circ}{15^\circ}}=1{\cdot}12346$.

Racemic acid solution $d\frac{15^\circ}{15^\circ}=1{\cdot}03712$ $d\frac{15{\cdot}3^\circ}{15^\circ}=1{\cdot}2398$.

The relative densities of the solid acids were also determined :—

Racemic acid, $C_4H_6O_6.H_2O$ . . $d\frac{7^\circ}{4^\circ}=1{\cdot}6873$.
„ dehydrated . . . = 1·7782.
Tartaric acid . . . . . = 1·7594.

These results, the author considers, point to the conclusion that on dissolving in water racemic acid separates into the two tartaric acids, only a small quantity remaining unchanged. He is of opinion that the water is present in crystallized racemic acid as such; and he finds that if the hydrated acid be crystallized from absolute alcohol, well-defined anhydrous crystals are obtained much less soluble than tartaric acid in alcohol.

Anhydracetonebenzil. By Francis R. Japp, F.R.S., and Cosmo Innes Burton, B.Sc.

Condensation Compounds of Benzil with Ketones.—By Francis R. Japp, F.R.S., and Cosmo Innes Burton, B.Sc.

Constitution of Glycosine.—By Francis R. Japp, F.R.S., and E. Cleminshaw, M.A.

Diphenylglyoxaline and Methyldiphenylglyoxaline.—By Francis R. Japp, F.R.S.

Dehydracetic Acid.—By W. H. Perkin, jun., Ph.D.

The Colouring Matter of Drosera Whittakeri.—By Professor E. H. Rennie, M.A., D.Sc.—The author's attention was drawn by Professor Tate to the presence of a red colouring matter in the tubers of the above-mentioned Drosera, which grows plentifully on the hills near Adelaide, South Australia. On inquiry he ascertained that Mr. Francis, of Adelaide, had extracted the colouring matter by means of carbon bisulphide, and had found that it was volatile, and that beautiful tints could be produced with it on silk by means of various mordants, but had not continued the investigation. To separate the colouring matter, the tubers were heated with hot strong alcohol. After distilling off the spirit, a little water was added and the precipitated colouring matter was then dried and sublimed; the product was a mixture of two substances differing in solubility in boiling alcohol and acetic acid. The less soluble was obtained in small brilliant red plates, canoe-shaped under the microscope,

which melted at 192°–193°. Analysis gave numbers fairly agreeing with those required by the formula $C_{11}H_8O_5$, which may represent a *trihydroxy-methylnaphthaquinone*. The reactions of the substance, in so far as they could be studied with the small quantity of material at disposal, serve to support the view that it is thus constituted. The second substance was finally obtained in needles, quite different in appearance from the red plates, though to the eye of much the same colour. Under the microscope single crystals seemed yellow, but wherever they overlapped the colour appeared deep orange to red. It fused at 164°–165°. Analysis gave numbers fairly agreeing with the formula $C_{11}H_8O_4$.

Further Notes on the Di-haloid Derivatives of Thiocarbamide. By GEORGE MCGOWAN, Ph.D.

Parliamentary and Law Proceedings.

PHARMACY ACTS AMENDMENT BILL.

HOUSE OF LORDS.

Thursday, March 17.

The Earl of Milltown, in rising to move the second reading of this Bill in the House of Lords on Thursday, said: This is a short Bill, the object of which is extremely simple, but one of great importance to the general public. The Bill is to enable the Pharmaceutical Society of Great Britain to make adequate arrangements for the educational curriculum of those who are to be enrolled in the body. The matter is one of great public importance. The Pharmaceutical Society was founded in 1841; it received a Charter in 1843 for the purpose of promoting a uniform scheme of education in chemistry and pharmacy. The Pharmacy Act of 1852 confirmed the Charter, and made it penal for any unauthorised person to assume the title of pharmaceutical chemist. But the Act of 1868 went a little further. That Act made it unlawful for any person not duly qualified to sell or to dispense poisons, or to assume the title of chemist or druggist, the latter title being then for the first time introduced. There were certain poisons scheduled to that Act, some of which were of a more deadly character than others which are sold, and power was given to the Society from time to time, with the consent of the Privy Council, to add to the schedule. The Society consists of members, associates and registered apprentices—each class having a separate qualification, and having passed a separate examination. The apprentices were intended to pass a Preliminary examination before admission, and after a three years' apprenticeship to pass the qualifying examination. It has been found, however, that, owing to the extensive prevalence of the system of cramming which now prevails, persons in the position of apprentices present themselves to pass the qualifying examination without previously devoting themselves to acquiring that practical skill which is absolutely essential to the safety of the public. The sixth clause of the Act of 1868 apparently makes it imperative on the part of the examiners to pass any person who presents himself for examination, and who succeeds in passing the examination. The words of the clause are: "they are legally empowered and required to examine all such persons as shall tender themselves for examination under the provisions of the Act." That being so the Council of the Pharmaceutical Society has found it necessary to institute such qualifying examinations as is deemed essential for the safety of the public. The Society accordingly framed a bye-law for remedying this defect and establishing what it considered a sufficient curriculum of study, but the Privy Council to whom the bye-law was submitted felt themselves unable to confirm it, as they were of opinion that the statute did not enable them to confirm such bye-law. In consequence of that opinion this Bill has been introduced. It has the unanimous approval of the Council of the Pharmaceutical Society, and my noble friend the Lord President (Lord Cranbrook), subject to a slight amendment which he proposes to make in the phraseology of one clause, has no objection to the Bill. That is the effect of the Bill. The second clause gives power to the Committee in the case of persons who have acquired sufficient technical knowledge in certain parts of the empire to dispense with the three years' curriculum, but not with the qualifying examination.

The Bill was then read a second time.

PROSECUTION FOR INACCURATE DISPENSING AT A "DISPENSARY."

At the Westminster Police Court, on Wednesday, Ernest Farndon, of 256, Kensal Road, Kensal New Town, proprietor of a "Dispensary," was summoned at the instance of the Vestry of Chelsea for dispensing a prescription not compounded of ingredients in accordance with the demand of the purchaser, in this instance Mr. Michael C. Meaby, an officer of the Vestry.

Mr. C. Pemberton, who prosecuted for the parish, said that Dr. Seaton, the analyst, had found that many prescriptions were inaccurately dispensed, and this very much detracted from the value of the medicine.

Mr. Meaby proved that he left a prescription at the defendant's shop which was for 60 grains of sulphate of quinine in water, a tablespoonful to be taken twice a day. The analyst certified that only 13 grains of sulphate of quinine were put in the bottle.

The defendant said that his son told Mr. Meaby that he could not guarantee the quantity of the drug, as his weights were away to be verified.

Mr. Meaby stated that something equivalent to this was said after it was made known that the medicine was for analysis.

The defendant said he was not in the habit of dispensing other doctors' prescriptions. It was usual to charge at the rate of 1*d.* a grain for quinine, and in a practice of sixteen years he had never had occasion to put anything like 60 grains in one bottle of medicine. It was notorious that dispensers were in the habit of curtailing the doses prescribed by physicians every day in the week, and that if they did not so curtail them hundreds of persons would be poisoned. He did not think there was any law compelling a dispenser to dispense any quantity of a drug given in the prescription. In fact, they were told by the Pharmaceutical Society to use their own discretion if they noticed that a drug was ordered in excessive doses.

Mr. d'Eyncourt said it stood to reason that it would be foolish to make up fatal doses of any drug. The chemist would see that a mistake had been made. Did the defendant say this prescription would be fatal or injurious?

The defendant said quinine was usually prescribed in grain doses, and the prescription pointed to excessive doses. It was not exactly dangerous, but more than 1*s.*, the price paid by Mr. Meaby, must have been charged had 60 grains been used. Nothing of the kind had occurred before.

Mr. Pemberton said he could not let this statement pass unchallenged; other medicines had been found not to accord with the prescription. He thought it was more a case of carelessness than one of gain.

Mr. d'Eyncourt said it was all important that prescriptions should be accurately made up, and fined the defendant 40*s.* and the costs.

The defendant asked if he could appeal.

Mr. d'Eyncourt said no; it was a question of fact and not of law.—*Times.*

Reviews.

YEAR-BOOK OF PHARMACY: comprising Abstracts of Papers relating to Pharmacy, Materia Medica and Chemistry contributed to British and Foreign Journals from July 1, 1885, to June 30, 1886. With the TRANSACTIONS OF THE BRITISH PHARMACEUTICAL CONFERENCE at the Twenty-third Annual Meeting, held at Birmingham, September, 1886.*

PROCEEDINGS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION at the Thirty-fourth Annual Meeting, held at Providence, R.I., September, 1886. Also the Constitution, By-laws and Roll of Members.†

These two volumes, which were received almost simultaneously, may be referred to together as representing analogous societies in Great Britain and the United States, consisting as each does mainly of a report of the proceedings at the annual meeting of the respective society and a *résumé* of a year's pharmaceutical literature. But, as might be expected, the volumes present differences of arrangement. In the American volume the papers read at the annual meeting, instead of appearing in the order in which they were read, each followed by the report of the discussion to which it gave rise, are arranged in three groups, twelve being classed under the heading "Pharmacy," six under "Chemistry," and six under "Materia Medica," whilst the reports of the discussions are interspersed among the "Minutes," which are somewhat more discursive than the members of the British Conference are accustomed to. Another feature of difference is found in the reports presented annually to the American Association, such as those on the Drug Market and on Legislation. From the latter it appears that during the previous year in one State, Virginia, a Pharmacy Act had been passed for the first time; in Iowa, New Jersey, King's County and Erie County, N.Y., amendments of previously existing Acts had been made; and in the States of Florida, Georgia, Kentucky, New York, Ohio and Virginia laws had been passed requiring the labelling of morphine with scarlet labels bearing white lettering. But the most interesting of these reports in the current volume, in view of the appointment of a Committee for a similar purpose in this country, is the "Report of the Committee on National Formulary." This consists of a preliminary draft of a national formulary of unofficial preparations, consisting of 414 formulæ. As divergent opinions have been expressed in this country respecting the preparations to be included in the Unofficial Formulary contemplated by the Conference, it may be useful to quote the proposition as to the "scope of the national formulary" made by the United States Committee and adopted by the members, which runs as follows:—"The National Formulary to be published under the authority of the American Pharmaceutical Association may contain the formulas of such preparations as have either been official in the U.S.P., and have been discarded, though still in demand; or such as have never been official, but deserve recognition, because more or less generally in use. Among the latter may be any preparations contained in foreign pharmacopœias, if there is known to be a sufficient demand for them in any section of this country. It shall also contain the preparations belonging to so-called 'elegant pharmacy,' but it shall not be encumbered with purely technical, trivial or fancy preparations."

In each volume a considerable space is taken up with the usual *résumé* of a year's literary contributions to pharmacy and the allied sciences. The British Year-Book, according to a statement in the Introduction, contains a larger number of abstracts than any of its predecessors; but in this respect it is still exceeded by the American volume, which is also its superior as to classification and arrangement of the abstracts. In the choice of materials and the work of condensation the two editors have shown their usual ability, though not without slips, as, for instance, where Mr. Siebold, on p. 51, makes an unfortunate author say that "cocaine hydrochloride is only slightly soluble in water." Few persons, however, have any idea of the labour involved in searching for grains of wheat among the enormous mass of chaff that now does duty for pharmaceutical literature. Nevertheless, both editors seem to have been actuated by a very catholic spirit in making their selections, though from the nature of things some hunting grounds have proved more productive than others. For it cannot be denied that a large proportion of the matter appearing in many English and foreign journals is essentially of an ephemeral character, and this is hardly to be considered subject for reproach, as it was never intended to be otherwise. Indeed, these year-books and analogous volumes may not unfairly be regarded as presenting evidence of the opinion of skilled and impartial critics upon the relative permanent value of the various journals that pass through their hands. Tried by this test the conductors of the *Pharmaceutical Journal* have no reason to be dissatisfied. It might be assumed, as a matter of course, that the British Year-Book must contain a large number of references to its pages, but perhaps not all would be prepared to learn that the United States Report contains nearly three times as many.

* London: J. and A. Churchill. 1886. Demy 8vo. Pp. i.-xii., 1-606.

† Philadelphia: American Pharmaceutical Association. 1886. 8vo. Pp. i.-xx., 1-753.

Obituary.

Notice has been received of the death of the following:—

On the 8th of March, Mr. George Dunger, Chemist and Druggist, St. Stephen's Street, Norwich. Aged 52 years.

On the 9th of March, Mr. Samuel Wyatt, Chemist and Druggist, late of Tottenham. Aged 62 years.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

SIR JOHN LUBBOCK'S BILL.

Sir,—Will you permit me to say, in reply to your editorial, that the meeting of the Manchester Pharmaceutical Association, referred to by Mr. Woolley at the last Council meeting, was a fairly representative one. It was composed of members of the trade from most districts of Manchester, city and suburban, and certainly included some of what Mr. Hart calls the "working class."

Although several, myself amongst them, raised some objections to the Bill on broad and general grounds, the feeling of the meeting was decidedly in its favour. We were much fewer than a hundred, so the calculation that at least ninety-nine per cent. of us belonged to the "aristocratic" early closing section of the trade necessitates the humiliating conclusion that one of us, at least, is regarded as a mere vulgar fraction. Messrs. Lewis, the drug-dealing tailors, were not represented, or Mr. Hart's arithmetic might have been explained without adopting this painful view of the case. Mr. Hart was not present at the meeting, and I am unaware of the means he has taken to ascertain the opinions of other absentees on whose behalf he appears to have addressed you.

F. BADEN BENGER.

Hon. Sec. Manchester Pharmaceutical Association.

Sir John Lubbock's Bill.

Sir,—Referring to your article, *re* Sir J. Lubbock's Bill, in the Journal, March 12, I am sorry to have to deny the accuracy of my neighbour's statements, but Mr. Hart, in saying that "the meeting was composed to the extent of 99 per cent. of the aristocratic element of the trade who already close at 7 or 8 p.m.," invites denial.

I do not claim to be included in our trade "aristocracy," but as I was present at the meeting in question, and am one of those who, whilst preferring a Bill without exemptions, yet gladly support this effort towards our emanci pation, I unhesitatingly aver that more than half of those present do not close at either 7 or 8 o'clock; and further, that the more aristocratic representatives of the trade—those whose present early closing would not be affected by the Bill—were the only ones who hesitated to endorse the Bill, or who raised any argument against it. It is worth recording, too, that so far as my knowledge goes, one of the most energetic opponents of the Bill which we have in our Association is a scion of a specially aristocratic house on which Royalty once benignly smiled and left its blessing.

The other remark, anent the reason for opponents taking no action against the Bill, hardly coincides with the fact that Mr. Hart, who claims to speak on behalf of the "working class" opponents, was the first to suggest the discussion, and it was he who promised to open the subject. If it did not receive its due treatment I suppose it was owing to the absence of "the opposition," and the blame, if any, rests with Mr. Hart, who should have attended, but did not, to put their view of the question before us.

254, *Stretford Road, Manchester.* H. Kemp.

The Future of Pharmacy.

Sir,—It is with extreme reluctance I again reply to the "Sheffield Student," Mr. Humphrey. I take this opportunity to thank him for the advice he has been pleased to bestow upon me. I assure you, Sir, I feel the weightiness of it, coming, as it does, from one whose experience amounts, in all, to a few years more than my own.

How crestfallen part of "the younger members" must feel on being told by the self-appointed monitor that they are not capable of considering certain matters pharmaceutical—when, probably, some of them can boast of experience as wide, and perhaps more comprehensive than Mr. Humphrey himself.

What an acute perception he must have to fancy he can see a "Wardian" tone in my former letter, which it positively does not possess. I would modestly tell him he has erred in the conclusion arrived at (in spite of all his assumed knowledge concerning Mr. Ward), for my worthy employer never saw a line of the letter until his perusal in the Journal.

Mr. Humphrey charging me with making "rash statements," and coming to "startling conclusions," also saying that "vigorous definitions" and "careful analysis" seem quite beneath my ideas, is tantamount to "Satan reproving sin."

To make a long story short, I am still of opinion that recognized trade standards are desirable for medicinal preparations; also that the Pharmaceutical Society has, for one of its functions, the "care of the public safety," and maintain Mr. Humphrey, in his verbose communication, has adduced no material evidence to the contrary.

T. Lowe Hollely,
Student at the Sheffield School of Pharmacy.

[*** We think the foregoing letter sufficient evidence that the correspondence need not be carried any further.—Ed. Ph. J.]

Sir,—There are many subjects of pharmaceutical politics that are worthy the serious attention of those who take more than a passing interest in their own business world.

The decision in the Edinburgh case will, if followed up by the Council, be of incalculable benefit to the trade. If "Salus populi" be the reigning feature in the Pharmacy Act, then let us have no branch shops in the charge of porters and apprentices; compel every man who has a branch shop to place a duly qualified assistant and strike a blow at the numerous bogus partnerships which, under one disguise or another, exist in every large town; and thus do away with another of the many anomalies that exist under the Act.

The proposed education clauses must enlist the sympathies of those who wish to raise the trade from its unsatisfactory condition, and rescue our young men from the clutches of those parasites who profess to impart the maximum of knowledge in the minimum of time, who eternally ruin the pharmacist of the future, and make the future of the pharmacy as black as Hades. A few years of an enforced curriculum would give us a far better and higher class of men, men who would have an "ésprit de corps" far higher and holier than that manufactured for them in the cramming shops that are so undermining the status of the trade of to-day.

The appeal of the Council on behalf of the Benevolent Fund will have little or no permanent effect, unless backed up vigorously and systematically by our local secretaries. The great curse, both of the Society and the Trade Association, has been hitherto the supineness of local representatives. There must, if vitality is to be of any use to either society, be increased and continued exertion on the part of those who represent them in various centres; without this we shall go on in the same humdrum style. Spasmodic efforts will occasionally be made; the inevitable reactions will invariably follow, and the latter stage will be worse than the former. To those who are continually finding fault with the Council or the Executive of the Trade Association, I would say qualify yourselves by becoming members; exercise your voting powers; elect fresh local secretaries, and fresh councillors, who will carry out your ideas; do not stand outside cursing everybody; come in, turn them out and put in men who will carry out your ideas; but if you fail to do this, if you neglect your very simple duties, then at least leave those who have chosen to do the work you neglect to carry out the ideas of those members who have elected them, and do not act upon the childish and idiotic plan of I will not, therefore you shall not.

131, *Emden Street, Manchester.* J. Hart.

The Benevolent Fund: A Suggestion.

Sir,—I think someone has proposed that a "Jubilee Benevolent Fund" should be started as a temporary appendage to the ordinary Benevolent Fund, but I have not seen that this proposal has been seconded. If not, I beg to second it; and further to introduce a way of raising this Jubilee Fund, which perhaps may commend itself to some of your readers.

Before long most of us will be asked to contribute to a fund for commemorating the Jubilee of Queen Victoria. Some of us have already settled it in our own minds what we intend to give, but most of us are in doubt as to how the money collected is to be expended. Beyond all question some of the plans of commemoration decided upon will not exactly meet our views; some of us may think that money thus raised might be better expended than upon plays and fireworks. Let each of us then, where the object proposed is not in accordance with our wishes, subscribe only a part of the sum we at first intended, and send the rest to the Benevolent Fund of the Pharmaceutical Society of Great Britain. Divide the intended subscriptions; let part go, by all means, to local purposes, but send the rest to Bloomsbury Square for the benefit of the old and infirm among us, those who know nothing of "fifty years of prosperity."

We, as a class, have only ourselves to depend upon; external help there is none. We serve the public for the smallest possible pay, often for no pay at all. Where is there another body of men whose self-denying services are so wretchedly paid for? Well and good, we wish for no alteration; to be thrown upon one's own resources is perhaps best for all of us. But we must, this being the case, look upon these services so slightly remunerated as our contribution to the commonweal; and in justice to ourselves, whatever else we may have to contribute should take the form of cash, and be transmitted, for the benefit of ourselves and our class, to the Benevolent Fund.

I think it possible that a considerable sum may be obtained this Jubilee year in this way; it is also possible that chemists living in small towns or villages, where no Jubilee Commemoration is to be brought about, might consider the present a fitting occasion for giving to the Pharmaceutical Benevolent Fund. Supposing only a

thousand pounds were thus specially subscribed and used for temporary purposes, there are at least a hundred "past" chemists to whom a ten-pound note each would be very acceptable.

Cambridge. H. J. Church.

Dispensing of Terebene and Tolu.

Sir,—The dispensing note by Mr. Bisset on Terebene and Tolu, published in last week's Journal, is, I think, calculated to mislead the younger readers of the Journal with regard to the best method of making an emulsion with such bodies, and I must confess that I am somewhat surprised not to find any comment made upon it at the time by the members of the Association present.

The suspension of terebene by mucilage of tragacanth is most unsatisfactory; from such a mixture, diluted with water, the terebene separates in oily drops in a very few hours, showing that it has not been emulsified, however diligently it may have been rubbed. An ounce of mucilage of acacia is also largely in excess of the quantity required to emulsify the tinct. tolu. Two drachms of powdered acacia is the only addition required, and this is in excess of what is absolutely necessary. The mixture should be dispensed as follows:—Make a mucilage with the powdered acacia and six drachms of peppermint water in a mortar; of this reserve two drachms; with the four drachms in the mortar rub the terebene until emulsified, and dilute with two ounces of peppermint water. Dilute the reserved two drachms of mucilage with peppermint water, transfer to a bottle, and with this emulsify the tincture of tolu; to this add the terebene emulsion and finally the other ingredients.

T. A. W. Sewell.

20, *New Street, Dorset Square, N.W.*

Linimentum Terebinthinæ and Sapo Mollis.

Sir,—My stock of linimentum terebinthinæ, although thick and fairly satisfactory, having slightly separated, and having noticed the letters in your Journal on the subject, I determined that one of my assistants and myself should each make an experimental quantity (about 2½ ounces) with another sample of soap. In this we both failed, as my sample at the Pharmaceutical Evening Meeting showed; a thin mobile (not limpid) uniformly opaque liquid was produced. After Dr. Redwood's reply in defence of the preparation, I sent him a sample of the soap I had used, which he assured me would, if well manipulated, produce a satisfactory preparation. I therefore tried again, and have, even with the same pestle and mortar that I used before, and the same quantities of the same ingredients, succeeded in producing a good opalescent thick emulsion. We have also tried various samples of oil of turpentine—American, Russian, French and one rectified, all of which may be used officially—and have succeeded with all. We likewise tried various samples of soap (some kindly sent by Mr. Umney, one made from cotton seed oil), with all of which we have produced good results. It is, I confess, as Dr. Redwood says, chiefly a question of manipulation.

Very small quantities are not easily made, and if a larger pestle be used than has been made to fit the mortar, better and quicker results are obtained. Careful attention to the mixing of the soap and water and the perfect blending of these with the first additions of oil and camphor are points of importance. The trituration required is not the same as in a copaiba or castor oil emulsion; the movement of the pestle should be quick, but it should not be allowed so wide a play as in making the latter emulsions.

I still think that as the preparation is liable to variations according to its age, even if well made in the first instance, that by using rectified spirit in place of water, and producing a homogeneous transparent liniment, a more satisfactory preparation in every way is obtained.

Regarding the colour of the official soft soap in commerce, I have always found it have a greenish translucent hue when fresh; it soon assumes a "figgy" appearance, and eventually when old it absorbs moisture, and becomes a dirty opaque yellow colour. I, however, wrote to the manufacturers, Messrs. D. and W. Gibbs, who supply me, and requested to know "whether the yellowish-green colour which the soap usually has as met with in commerce, and as described by the Pharmacopœia, is a natural colour due to the colour of the olive oil used in making it, or is it produced artificially by some colouring matter being added." They replied:—"As far as we know colour has very little to do with olive oil being genuine or not, as olive oils are to be met with of various shades. We ourselves always buy the olive oil guaranteed genuine, and if any adulteration has taken place it is not in this country, and we certainly never use colouring matter. The reason of its green shade is the recommendation of the B.P. to that effect, which has caused us to select green oils, but if considered safer of course we can return to the old style of salad oil, which is much 'paler in colour.'"

10, *New Cavendish Street.* Wm. Martindale.

Laudanum and Nepenthes.

Sir,—In looking through an old book, 'Pharmacopœia Londinensis Collegarum, 1651,' at page 229 I find, amongst the pill masses, formulæ given for both laudanum and nepenthes. As possibly they may be interesting to some of your readers, I send them exactly copied from the original.

Laudanum.

℞ Opii Thebaici extracti in Sp. Vini . . . . . unciam unam.
Croci similiter extracti . . . drach. unam semis.
Castorei . . . . . drach. unam.

Excipiantur tinctura semunciæ Spec. Diambræ recentium in spiritu Vini facta. Mox adde—

Ambræ griseæ,
Moschi . . . . . ana grana sex.
Olei Nucis Moschatæ . . . . guttas decem.

Deinde, evaporatione facta ad tepidum Balnei calorem, F. Massa.

Nepenthes Opiatum.

℞ Tincturæ Opii cum accto distillato primum, deinde cum sp. Vini paratæ,
Extracti Croci per Vini spiritum . . . . . ana unciam unam
Salis Perlarum,
Corallorum . . . ana semunciam.
Tincturæ specierum Diambræ . drach. septem.
Ambræ griseæ . . . . . drach. unam.

Misce: Coagula ad formam Pilul. lento Balnei calore.

Hurstpierpoint. F. Mitten.

Huechys Vesicatoria.

Sir,—The *Huechys vesicatoria*, identified for me by Dr. Gray, was described on p. 239 of my 'Chinese Materia Medica,' as the red lady-bug (*Hung-liang-tsz* in Chinese), and is thus spoken of:—"This insect, found upon the *Ailanthus*, and several other trees at Han Kow, is a sort of red cicada, making a grinding noise. It has a red body, and dark wings, and is collected in large quantities by the country people for the druggists, who use them as blistering-flies. They are much less powerful than the *Mylabris Cichrii*."

Shepton Mallet. F. Porter Smith.

South Australia.

Sir,—Kindly allow me, through the medium of the Journal, to ask any reader—who may know—what prospects a chemist might have of success in South Australia. Is there a good field there for qualified men? What salaries are given? and what is the average cost of living, etc.?

I shall be glad of any information through the Journal.

R. G.

Medicus.—Your communication has been handed to the advertising agents, to whom it should have been addressed.

X. Y. Z.—We do not think a formation of an explosive mixture would take place.

A Member.—The conviction was for the sale of a scheduled poison by an unqualified person.

Phœnix.—Possibly there might have been some poisonous compound present resulting from the decomposition of casein mixed with the butter. See a paper by Dr. Vaughan, before, p. 147.

Communications, Letters, etc., have been received from Messrs. Thompson, Allen, Bracher and Co., Heilger and Co.

A THEORY OF EMULSIFICATION.*

BY WILLIAM GILMOUR.

I do not know that the title of this paper is altogether a happy one, but after some cogitation I could not devise a better. Probably the best idea of the scope of the note might be put in the form of a query, namely :—Why are emulsions directed always to be stirred in one direction? A belief of this kind generally prevails, but I have never seen any attempt to explain it. I was led into an investigation of the subject from a theory given by one of our eminent professors, to whom the question was propounded. His theory was (of course it was given off-hand) that so long as you stirred the emulsion in one direction you tended to break the volume of the oil, but immediately you reversed the motion you forced the volume of oil back upon itself. The theory was so simple, and appeared so satisfactory, that one was inclined to accept it as conclusive, and wonder that he had not thought of it before. On trying the experiment with a magnifying glass, the theory to all appearance was borne out. The oil on stirring with the emulsifier was quickly drawn out into long tapering filaments with offshoots in various direction, and of various forms. On reversing the motion these were driven back upon themselves, and caused the particles (or filaments) of oil to assume once more, to a greater or less degree, the globular form. So much for the theory; now for the fact. Carrying my experiments one stage further, I found that I could make an emulsion with the same ingredients and in the same proportions as in the former experiment with alternate motions from left to right and from right to left without the slightest difficulty, so long as I kept the emulsion well in hand, but with this difference that the emulsion took sometimes longer in being completed. I have experimented with castor, almond, and cod liver oils, using mucilage of gum arabic, mucilage of tragacanth, and yolk of egg as emulsifiers and all with the same result. The only difficulty I experienced with the double motion was towards the end of the process, when the emulsifier was, so to speak, approaching saturation. Here certainly the reversing of the motion tended to throw the emulsion out of gear more quickly than if the motion had been confined to one direction, but this I think is easily explained by the foregoing theory. There is therefore, I am disposed to think, a good deal of popular error in regard to the belief that an emulsion must always be stirred in one direction, and what little element of truth there is in it, is probably explained by the theory given.

[*The discussion on this paper is printed on p.* 793.]

PRACTICAL REMARKS ON PEARL-COATING OF PILLS.*

BY WILLIAM GILMOUR.

Pearl-coating has developed to a most extraordinary extent within the past few years, and at the present time is fast revolutionizing the pill-making department of the pharmacist's work. I am very sorry for this, for I quite foresee that in allowing this department to pass into the hands of large manufacturers we are fast drifting on to another rock not less serious than the patent medicine one. This subject is too acute for me to dwell upon at the present time, but let me point out in justification of what I have hinted at that while it is highly improbable that grocers and general dealers will be at the trouble and expense (even were it legal) to buy, spell out and consult the Pharmacopœia for the purpose of making pills, and afterwards coating them, there is nothing remotely improbable in them buying from the wholesale manufacturers, and successfully competing with the more highly educated pharmacist. I do not want to make more of this point than is necessary. It is only because I see clearly both the weakness and strength of our position, and in the hope of strengthening our weakness that I refer to it at all.

The first thing that I would notice in pearl-coating is that it involves a new departure from the modern tendency and spirit of the Pharmacopœia. Every recent change in the formulæ for "pilulæ" has been in the direction of producing a mass at once firm and plastic, and which would at the same time prevent the pills from getting too hard on keeping. Now the only element of success in pearl-coating, so far as my experience goes, is to have a hard dry pill to begin with. Beyond this and a little common sense to adapt quantities, and a little muscular exertion, there is nothing about the process which a child could not perform. But notice how the condition of hardness and dryness just mentioned agrees with the officinal formulæ. In the Pharmacopœia, there are in all, I think, twenty-one different "pilulæ," and of these fully one half contain ingredients which are utterly incompatible with pearl-coating. There are, for example, seven different masses made with such hygroscopic substances as glycerine and treacle; there are other four containing essential oils and other elements equally unworkable, and I venture to say that no human ingenuity will pearl-coat the pills made from such masses, and at the same time strictly adhere both to the letter and spirit of the Pharmacopœia. But if Mahomet does not go to the mountain, the mountain must go to Mahomet, and so the difficulty has been bridged over—But how?

A second point which I would notice is the amount of chalk required in this process. From a series of experiments which I have made, I find the amount required ranges from twenty to thirty per cent. of the weight of the pills coated. This makes a considerable increase both in the size and weight of the old 5 grain pill, and suggests, by the way, an increase in the size of the pill boxes in general use. It is not for me to say what the physiological effects of fifteen or twenty grains of an insoluble silicate per day may be on the human economy, particularly if continued for a length of time, as in the case of Blaud's pills, but it at least suggests the careful examination of the chalk used, in case of its contamination with any deleterious substance. This large amount of chalk may be increased or decreased at pleasure. If the liquid with which the pills are damped be too thick, or if too much be added, more chalk will be required, and the pills will be heavier and larger. Even ten per cent. of an increase by weight of chalk is not a bad profit were we to sell the pills by weight, but as we only retail them by number the hint is probably thrown away.

The three great difficulties which pharmacists will, however, probably require to face as regards successful pearl-coating, are "pitting," "falling" and "discoloration," and to each of these a word.

* Read before the Pharmaceutical Society of Great Britain at an Evening Meeting in Edinburgh, Wednesday, March 16.

I have made a distinction between pitting and falling, as I look upon them as different troubles proceeding from distinct causes. Pitting gives the pills all the appearance of dried peas, while falling simply flattens them on the point of rest. Pitting in it worst form, I think, occurs in the compound colcynth pill, and therefore it may be taken as typical. It is generally ascribed to the resin of scammony, and, certainly, since the resin has been substituted for scammony the evil has increased. Still, other pills containing no resin of scammony undoubtedly pit also, and, therefore, I am inclined to look upon it more as an aggravating cause. As a rule, it will be found that all pills containing aloes, resins or gum resins in excess have a tendency under certain circumstances to pit. What are these circumstances? A theory was given me the other day which I may here throw out, although I have had no opportunity of verifying it. If the essential oil be added to the resin of scammony (reverting to the colocynth pill) before all the ingredients forming the mass are mixed—in other words, if the ingredients are thrown separately into a mortar and the oil of cloves added before mixing, the probability is that the oil might come into direct contact with the resin, and would, in some way, act upon it so as to change its physical properties, and prevent it again immediately hardening. There is this to support the theory, that even with the same ingredients the mass at different times exhibits different properties directly affecting the pill. This, in my experience, applies not only to the colocynth pill mass, but to others, also, which pit more or less on keeping. A soft aloes or a soft resin or gum to begin with, and an overworking of the mass, either with the pestle or the hands, produce very much the same results. In the case of the colocynth pill, if soap is substituted for sulphate of potash the tendency to pit is greatly lessened. I am no advocate for tampering with officinal formulæ, but sulphate of potash is really not required in the present pill, while soap, to my mind, is in every way an improvement.

Add to this suggestion a little care in securing hard dry aloes and resin of scammony, and also in forming a mass neither too hard nor too soft, and the trouble should be reduced to a minimum.

Falling will occur in almost any pill if made too soft, but I refer at present to falling from one peculiar cause, not generally noticed, namely friction. If you want a colocynth pill that will fall, use the rounder or finisher with all your might. Pills that require to be coated, require to be dry and hard. Of course they are rounded from time to time, each time probably as they get harder with increased friction, and so the mischief is done. In a short time the pills assume all forms as if they were not on good terms with each other. I have always attributed the peculiarity to the heat produced by the friction, and the cure is a little more care in finishing, so as not to require too much of the rounder, and a little attention to frequent shaking during the process of drying.

Discoloration however, is probably the most fertile cause of annoyance to be met with in pearl-coating, and as you all know the predisposing causes to discoloration, I need not dwell upon them. As I have already said, I am no advocate for substitution in officinal formulæ, but the difficulty must be bridged over. Fortunately it is here if anywhere that the pharmacist stands strongest. He does not require to stock his pills for twelve months, or even for six months. He has only to stick to the proper formulæ, dry them in the usual manner, coat them, and see how long they will keep, and prepare his stock accordingly. This is troublesome. Of course it is, but we need not expect to get any great good in this world without trouble. I would much prefer myself to mass the comp. rhubarb pill with syrup rather than treacle, and the comp. soap pill with water rather than glycerine, and do many other things not directed in the Pharmacopœia, but I do not see any change which I can make in this direction that would not in the end be to my own prejudice. I know some laugh at the idea of pills losing any of their active properties by the process of hardening, but I have proofs too abundant to doubt the fact for one moment. In the majority of cases the loss may not be noticed, but take an active cathartic pill such as the colycynth, and its action is not only greatly retarded, but also very much impaired.

The drying of pills must always be looked upon as one of the most important parts of the process. I have tried various plans, but have always come back to the old plan of drying on trays in a dry room. The pills are ready for coating whenever thoroughly dry on the outer surface, and while still a little soft towards the centre. In this state they will not keep long, but they will retain their maximum of activity.

In connection with the subject, I may mention that a gentleman, I believe known to you all (Mr. W. L. Howie), the end of last year worked out a process of giving to pearl-coated pills the character and sweetness of sugar by the use of Fahlberg's coal tar saccharine. I have seen some of the pills coated in this way, and from the great sweetening power of saccharine it seems admirably adapted for this purpose. Mr. Howie, I must tell you in case any one should be too enterprising, has patented his process, and I understand the patent covers the use of saccharine in all descriptions of coated pills as well as capsules.

I had intended to touch upon the coating of some extra-pharmacopœia pills, such as "Blaud's," but I am afraid I have already extended my remarks to too great a length. You will quite understand from the current of my remarks that I am not altogether in favour of pearl-coating. They may even give you the impressson that I am more averse to the process than I really am. It has its objections, and these I have tried to put before you. It has one other characteristic still, namely, that it makes a good made pill look much better, and a bad made pill much worse, and this last feature I look upon as the most important, seeing that there should not be such a thing as a bad made pill put out of our hands.

[*The discussion on this paper is printed on p.* 793.]

NOTE ON LIME WATER.*

BY J. INNES FRASER.

Some time ago I was struck with the different results of estimations made of liq. calcis which had been prepared strictly B.P. (*i.e.* shaking the lime in a bottle, allowing it to subside, and siphoning off) and of that prepared in a jar by stirring up the slaked lime, allowing it to subside, then filtering; the one case showed an equivalent of 6·16 grs. CaO

* Read before the Pharmaceutical Society of Great Britain at an Evening Meeting in Edinburgh, Wednesday, March 16.

in the ten fluid ounces, the other, that which had been filtered, 5·26 grs.

The stock bottle from which the former sample had been taken was allowed to stand, about two-thirds full, for two days and another estimation made, when I was surprised to find that it still maintained the high standard of 6·16 grs. The temperature during these two days, however, had remained about the same, viz., 43° F.

The late prosecution in England recalled the circumstance to my memory, and being curious to know how the quality of the lime water sold here would compare with that which was the subject of the prosecution, I got samples—bought in the ordinary way—from different parts of the town, and estimated them ; and it is the result of these estimations that I have to lay before you to-night.

Eighteen samples in all were estimated ; a quadrinormal volumetric solution of oxalic acid being used in preference to the B.P. solution. As will be seen from the table, 50 per cent. of these were below the B.P. standard, which, as you are aware, has been reduced from 5·6 grains to "about 5 grains" in the 10 fluid ounces, a standard which with ordinary care in preparation and storage should be easily maintained even in summer.

Sample.	C.c. used.	Equivalent in grains CaO in 10 fluid ounces.	Grains Ca_2HO in 10 fluid ounces.
A^1 .	10·4	5·82	7·69
A^2 .	11·0	6·16	8·14
A^3 .	9·4	5·26	6·95
B .	10·3	5·76	7·61
C .	10·0	5·60	7·40
D .	9·8	5·48	7·24
E^1 .	6·8	3·80	5·02
E^2 .	6·2	3·47	4·58
F .	10·1	5·65	7·46
G .	10·3	5·76	7·61
H .	3·0	1·63	2·22
I .	4·8	2·68	3·53
J .	0·8	0·448	9·592
K .	9·2	5·15	6·80
L .	7·2	4·03	5·32
M .	7·0	3·92	5·18
N .	6·0	3·36	4·44
O .	8·4	4·70	6·21

The sample marked J., shows merely a trace of lime, being less than a tenth of what the B.P. orders, and, to the palate, lime is just recognizable.

Samples H. and I. are also very bad ; H. showing about a third, and I. about half the official strength.

Samples $E.^1$, $E.^2$, L., M. and N., are not much better; and when it is remembered that 10 fluid ounces of water at 212° F. will dissolve about 3 grains of oxide of lime, it will be seen how little excuse there is for such deficiencies as are here shown, and that the Pharmacopœia does not demand too much. Of course, ordinary care must be taken in the preparation, and freshly slaked lime ought only to be used.

Lime water should be kept in as cool a place as possible, and not on the topmost shelf in the shop, where, I am told, one of the above samples (I.) was taken from.

I do not think any apology is needed for bringing forward such a subject as lime water ; for, I hold it is quite as necessary that such a preparation should be of proper strength as others considered of more importance.

[*The discussion on this paper is printed on p.* 793.]

NOTE ON THE CORROSION OF A ZINC REFRIGERATOR BY AMMONIUM CHLORIDE AND NITRATE OF POTASSIUM.*

BY JOHN HUTCHISON FISHER.

When metallic zinc is brought into contact with a solution of chloride of ammonium and nitrate of potassium in water it rapidly dissolves. This fact came under my notice in rather a striking manner only a short time ago, and the attempt to discover the reason why, which has occupied a considerable portion of my spare time ever since, has resulted in what this paper is meant to disclose.

A party who invested in a cheap ice cream machine, and was recommended to use a freezing mixture rather than the usual agents,—ice and salt,—applied to me for a powder or powders which would suit his purpose. I accordingly gave him a mixture of roughly-powdered sal ammoniac and common nitre. Next morning I learned that the experiment had hopelessly failed. The man, utterly ignorant of the necessary conditions to be observed, but imagining that were the powder dissolved the efficacy would be all the greater, and rightly concluding that most powders dissolve more readily in hot than cold water, actually used hot water in this experiment. After some hours' hard labour, he was more than astonished to find that the milk was not frozen, and simply horrified at discovering that his machine instead was dreadfully corroded and rendered quite useless.

Immediately after this untoward event, which completely wrecked the hopes and aspirations of the budding ice cream manufacturer, a case of poisoning by ice cream occurred in Glasgow, the poison not known, but variously regarded as being carbolic acid, poisonous colouring matter or a ptomaine. Curiosity having been aroused I waited upon the owner of the machine which had come to such a sudden and deplorable end and was supplied with part of the metal of which it was composed. This, upon examination, I found to be a tolerably pure specimen of the metal zinc. Upon making further inquiries in other quarters, I was informed that all ice cream machines were made of zinc, and that even the best of them, although coming in contact merely with ice and salt, were nevertheless constantly becoming worn and needing repairs.

Putting aside the question as to the cause of ice cream poisoning, I decided to discover in the first place, if possible, what really resulted from the action of the two salts upon metallic zinc. All the various text-books on chemistry which were available were silent on the subject, so that I was thrown entirely upon my own resources.

In conducting my experiments, I first of all exposed a few pieces of zinc for twenty-four hours to the action of a cold saturated solution of chloride of ammonium alone, and in a separate vessel to a similar solution of nitrate of potassium alone. In both cases the action or effect was very slight. I then boiled these solutions in separate test-tubes, and found that the effect, although still small, was decidedly greater than in the cold solution. I next made a cold saturated solution of both salts, using equal parts of each, and divided into two portions. One portion, with a few pieces of zinc added, was set aside for twenty-four hours; the other, after

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having been boiled for two or three minutes, was also set aside for twenty-four hours. In the cold solution a marked change had been effected upon the zinc. It had lost its bright metallic lustre, become dull, and coated over with a greyish-white powdery substance. Upon examining the solution, abundant proofs of the presence of zinc were forthcoming. In the boiled solution the effects were still more marked, the presence of zinc being discovered in much greater quantity.

Upon subjecting the experiment to a more critical examination I discovered that when boiled ammonia gas (NH_3) was given off in considerable quantity, easily recognizable by smell. I then poured a fresh portion of the solution into a suitable vessel, added a little acetic acid, and distilled the acetic solution. To the distillate I added a few drops of dilute sulphuric acid, then a little solution of iodide of potassium, and lastly, mucilage of starch. The beautiful deep blue colouring indicating free iodine was at once produced. This as you know is Fleitman's test for a nitrite, which is considered a very delicate one.

The vagaries of the chloride, as well as of other salts of ammonium, and their proneness to combine with other salts to form double salts, is already sufficiently known. The hydrogen atoms in the basic ammonium being replaceable by other elements, both univalent and bivalent. Thus, by substitution of two atoms of univalent mercury for two atoms of hydrogen there is produced chloride of mercurous ammonium, and by one atom of bivalent mercury for two atoms of hydrogen, chloride of mercuric ammonium. From other salts various other compounds of a similar nature may be formed; nitrate of argent-ammonium, iodide of di-mercuric ammonium, and ammonio-sulphate of copper are familiar examples. Remembering this peculiarity of ammonium salts, I inclined to the belief that in the reaction under review a compound of this nature was formed. Accordingly, having made a concentrated solution of zinc, by operating upon a larger quantity of the metal and boiling for half an hour along with solution of chloride of ammonium and nitrate of potassium, I set the mixture aside to cool. I then found that a white curdy precipitate had formed. It seemed probable that this precipitate might be chloride of zinc ammonium having the formula NH_2ZnCl; but I have seen no published statement as to the existence of such a compound.

On thinking over the matter it seemed possible that the precipitate might be nothing more than zinc hydrate ($Zn2HO$) thrown out by the free ammonia produced in the reaction. Assuming this to be the case there were two ways in which the reaction might be explained. It was found that when any metal is heated with dry chloride of ammonium, chloride of the metal, ammonia gas and hydrogen are produced, thus—

$$Zn + 2H_4NCl = ZnCl_2 + NH_3 + H_2.$$

The same reaction was found to take place though much more slowly in solution. The nascent hydrogen thus produced would reduce the nitrate to nitrite of potassium, as represented by the following equation:—

(1) $Zn + 2NH_4Cl = ZnCl_2 + 2NH_3 + H_2$
(2) $KNO_3 + H_2 = KNO_2 + H_2O.$

It was also found that when Zn is boiled in a solution of KNO_3 the metal is oxidized and the KNO_3 reduced to KNO_2. The reaction might, therefore be represented as follows:—

(1) $Zn + KNO_3 = ZnO + KNO_2.$
(2) $ZnO + 2NH_4Cl = ZnCl_2 + NH_3 + H_2O.$

To determine this point the curdy precipitate was boiled in water, filtered and repeatedly washed with cold water until the filtrate ceased to give a precipitate with $AgNO_3$. It was thereafter divided into three portions. To the first portion KHO was added and a gentle heat applied, when ammonia gas was evolved in considerable quantity, instantly turning moist red litmus paper blue, and easily recognized by smell. The second portion was dissolved in dilute HNO_3 and treated with a solution of $AgNO_3$, when a copious white precipitate was at once thrown down, proving the presence of a chloride. To the third portion, which was also dissolved in dilute HNO_3, NH_4Cl, NH_4HO and NH_4HS were added, when a copious greyish precipitate (doubtless iron would be present as an impurity in the zinc) soluble in HCl was at once produced, proving the presence of zinc.

From these data it seems evident that the products of the reaction are chloride of zinc ammonium, which is insoluble in water, chloride of zinc, which is readily soluble in water, nitrite of potassium and ammonia gas. The reaction may be explained by the following equation:—

$$3Zn + 4NH_4Cl + 3KNO_3 =$$
$$2NH_2ZnCl + ZnCl_2 + 2NH_3 + 3KNO_2 + 3H_2O.$$

To determine whether or not the correct formula for chloride of zinc ammonium is NH_2ZnCl, it would be necessary to make a gravimetric analysis of the compound; but time did not permit of my carrying the investigation so far. It would be interesting to know if this compound is produced in the ordinary operation of adding ammonia to solution of $ZnCl_2$ to throw down $Zn2HO$, but this point I must also leave to one who may have more time and opportunity.

Such, gentlemen, is the conclusion at which I have arrived in this interesting chemical problem. I intended as I have said to have proceeded further, and tried to establish a connection between the formation of these poisonous zinc compounds and cases of poisoning by ice cream which occasionally occur. Want of time has hitherto prevented me from doing so. There are besides a number of difficulties in the way which require to be carefully investigated and considered. For instance, are freezing mixtures often used? Does chloride of sodium, which is commonly used, attack zinc in a manner similar to NH_4Cl? Were electrical action induced, as might very likely happen from the presence of other metals as impurities in the zinc, NaCl might act upon zinc in the same way as NH_4Cl. In the Leclanché's battery the exciting fluid is solution of NaCl, and the elements are zinc and carbon. The reaction is likely to be as follows:—

$$Zn + 2NaCl + 2H_2O = ZnCl_2 + 2NaHO + H_2.$$

This may possibly be the cause of the destruction of zinc refrigerators, where ice and salt are employed. In the event of leakage of solution of $ZnCl_2$ into the ice cream would it not immediately become fluid?

Until these queries have been satisfactorily answered it would not, I think, be prudent even to hint that $ZnCl_2$ is the irritant poison, which has hitherto been conjectured to be carbolic acid, poisonous colouring matter, or a poison of the nature of a ptomaine, developed in the milk itself.

It is sufficient meantime to mention that, so far as I have seen, the symptoms of ice cream poisoning correspond very closely to those of $ZnCl_2$ poisoning. I may perhaps at some future time push my investigations still further, and in the event of any real information being gleaned shall write another paper on the subject. Meanwhile, from what has already been shown, it is, I think, very necessary that manufacturers of refrigerators, who recommend freezing mixtures to be used, should understand the dangerous nature of the compound which may be formed, and also that the certain destruction of the machine itself may be only a question of, at most, a few weeks.

Owing to the comparative cheapness of zinc and its superiority over tin, in being more pliable and free from objectionable rust, it is now largely employed in the manufacture of quite a number of vessels and utensils, and on that account it is desirable that as much of its chemistry as possible should be known. If my few notes to-night be a contribution towards this end the reward is gained.

[*The discussion on this paper is printed on p.* 793.]

SYRUP OF TOLU BY A NEW PROCESS.*

BY FREDERICK STEPHENSON.

There are various published formulæ for the preparation of this syrup, the more important of which are as follows :—

1. The B.P. formula in which the balsam is ordered to be boiled with water for half an hour in a lightly covered vessel, filtered when cold, and the sugar dissolved in the filtrate by the aid of heat.

2. The former United States Pharmacopœia formula, in which tincture of tolu is rubbed up with carbonate of magnesia, a little sugar and water, filtered, and the sugar dissolved in the filtrate by the aid of heat.

3. In the French Codex the balsam is ordered to be digested for two hours with one half of the water at the temperature of a water bath. It is then re-digested with the other half in the same way, the mixed liquids cooled, filtered, and the sugar dissolved by heat.

4. In the 1883 United States Pharmacopœia the balsam, sugar and water are ordered to be digested in a covered vessel for two hours at a temperature not exceeding 180° F., and strained though a wetted muslin strainer when cold.

The chief object to be aimed at in syrup of tolu appears to be to secure the full flavour of the balsam which is said to be due to tolene, cinnamate of benzyl and benzoate of benzyl, all of which are volatile liquids. It also contains doubtless small quantities of cinnamic and benzoic acids, but these do not appear to be of primary importance. On this account all the above formulæ strike one as more or less faulty.

Anyone who has made the syrup by the first process must have felt that the boiling caused a considerable loss of volatile odorous principles. The second process is also faulty for the reason that the carbonate of magnesia retains some of the volatile constituents as well as cinnamic and benzoic acids. It also renders the syrup slightly alkaline and, therefore, incompatible with alkaloidal salts.

The third and fourth formulæ, though perhaps a slight improvement on the first, are still open to the objection of employing too much heat. For the fourth process the advantage is claimed that the sugar aids solution of the aromatic principles, but it is open to the objection that a strong syrup is very difficult to filter bright.

In addition to the above formulæ it appears to be a very common practice to use one or other of the many concentrated liquors which are added to simple syrup in the proportion of 1 to 4. It is impossible to have a syrup answering to the official specific gravity by this method, and, so far as I have seen, the syrups so made are either very deficient in flavour, or possess a flavour other than the correct one.

It had often occurred to me that the balsam might be sufficiently exhausted by cold maceration, if the tolu was in a fine state of division, and the syrup completed without the application of heat ; and the following is the result of a few experiments by way of putting this idea to the proof. I proceeded as follows :—

Take of—

Balsam of tolu	1¼ oz.
Finest loaf sugar	2 lbs.
Water	16 ozs.

Reduce the balsam to powder by trituration with 8 ozs. of the sugar. Place them in a bottle with the water, and macerate for forty-eight hours with occasional agitation. Then filter through paper till bright, and dissolve the remainder of the sugar in the filtrate. This is best done by crushing (not powdering) the sugar, placing it in a percolator and passing the filtrate through. The result is a clear and very full flavoured syrup, which I think compares favourably with the product of any other published formula. It takes slow percolation to dissolve all the sugar unless the percolator is placed in a moderately warm place, but it might be worth considering whether so large a proportion of sugar is necessary. It is also a little difficult to completely clarify the syrup, and any suggestion in that direction would be an improvement.

[*The discussion on this paper is printed on p.* 794.]

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PRESENCE OF MANGANESE IN CHLORINATED LIME.*

BY ALEXANDER SHAND.

A few years ago, having occasion to make a quantity of liq. sodæ chlorinata, I used bicarbonate of soda, instead of the normal carbonate, in its preparation. I may mention that it was made by adding the chlorinated lime and bicarbonate of soda to the requisite quantity of water, and allowing the mixture to stand all night. Next morning I was greatly surprised to find the supernatant liquid of a beautiful pink colour. At the time I could not think of any reason for the colour, so, having made another quantity with the same result, I then used the normal carbonate and got the usual clear solution. Immediately afterwards, I looked up some books and made a few inquiries, but without any satisfactory result, except that manganese was thought of as a probable cause.

Two or three weeks ago, while preparing cobaltic hydrate by precipitating nitrate of cobalt with an alkaline solution of sodium hypochlorite, I was

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astonished to find the supernatant liquid pink-coloured after all the cobalt was precipitated. After a few simple tests, I came to the conclusion that the colour was due to permanganic acid, I therefore evaporated the solution down to a small bulk, separated the metal and proved it to be manganese. Of course, in this case, the manganese must have been present in the cobalt nitrate, but it brought back to my memory the facts mentioned before. I then commenced a few experiments on chlorinated lime, to find out for certain if manganese was present, and also the reactions that take place between bicarbonate of soda and chlorinated lime.

(I.) On boiling a small quantity of chlorinated lime with distilled water in a test tube and allowing the insoluble matter to settle, the colour of the liquid was quite pink, and on examination with a spectroscope showed the absorption bands due to permanganates. All the samples of chlorinated lime behaved in the same manner.

(II.) Prepared some solution of chlorinated soda according to the B.P. The first residue, tested by Crum's test showed the pink colour. The filtrate showed no pink colour.

(III.) On mixing bicarbonate of soda and chlorinated lime in theoretical proportions and adding the proper quantity of water, and allowing the mixture to stand, the supernatant liquid was at first of a brown colour, but gradually changing to a reddish-pink. A little of solution filtered off immediately after mixing the compounds, after standing some hours, gradually showed a pink tint, while a slight sediment settled out.

(IV.) A quantity made the same as last (III.), but using carbonate of soda instead of bicarbonate, naturally remained quite clear.

(V.) On passing CO_2 into a portion of (IV.), experiment for four hours. The liquid became quite pink.

(VI.) On passing CO_2 into a mixture of chlorinated lime and water the liquid in half an hour had a yellowish-brown colour. The current of CO_2 was then stopped and the insoluble matter allowed to settle. The liquid gradually became pink coloured.

Now, theoretically, in whatever form the manganese gets into the chlorinated lime, or whether it is there from the first, which is unlikely; the greatest probability being that it is in the form of manganese chloride; the hypochlorite will, in presence of water, precipitate as manganese hydroxide.

So that on boiling chlorinated lime with water the calcium hypochlorite will act on the manganese oxide, oxidizing it to a permanganate, according to formula, $2\,CaCl_2O_2 + 2\,MnO_2 = CaMn_2O_8 + CaCl_2 + Cl_2$, or possibly, $3\,MnO_2 + CaCl_2O_2 = CaMn_2O_8 + MnCl_2$.

The same reaction, of course, will take place with liq. sodæ chlorinata, B.P., when manganese is added to it and the solution boiled, the soda in this case taking the place of the lime in the last. Now, when carbon dioxide is passed into calcium hypochlorite solution the calcium is precipitated as carbonate of lime, and free hypochlorous acid formed, which will slowly oxidize the manganese oxide if present to permanganic acid,

$$CaCl_2O_2 + CO_2 + H_2O = CaCO_3 + 2\,HClO,$$

then

$$4\,HClO + 2\,MnO_2 = H_2Mn_2O_8 + 2\,HCl + Cl_2.$$

The free hydrochloric acid would immediately decompose the permanganic acid, forming manganese oxide and free chlorine, thus,

$$H_2Mn_2O_8 + 6\,HCl = 2\,MnO_2 + 4\,H_2O + 3\,Cl_2;$$

but in the presence of an excess of $CaCO_3$, as we have here, I have found that it acts on the carbonate, leaving the permanganate unaltered,

$$H_2Mn_2O_8 + CaCO_3 + 2\,HCl = H_2Mn_2O_8 + CaCl_2 + H_2O + CO_2.$$

[*The discussion on this paper is printed on p.* 794.]

THE LAWS OF NATURE IN RELATION TO HEALTH.*

BY PROFESSOR JOHN ATTFIELD, F.R.S, ETC.

(*Concluded from page* 767.)

The Clothing we Wear.

From the extremes of heat and cold, even the healthy frame needs the protection of clothes. Now, natural law requires that these fabrics be bad conductors of heat; garments that in summer shall allow the minimum of the sun's heat to pass through to the already over-warm body, and in winter shall allow the minimum of the warmth of the body to escape to the outer cold air. Oddly enough, the best non-conductor is air itself; but it must be non-moving or very slowly moving air; so that if we can manage to enclose a sheet of air between appropriate sheaths, or imprison it in an appropriate net, we shall have a typical garment both for summer and winter wear. Such a garment is found in the woollen clothes or flannel of the cricketer's summer suit, and the woollen dress or overcoat of winter. A blanket is a similar covering, of world-wide appreciation, against the escape of warmth from the body during a cold night. An eider-down quilt is a similar air-enclosing shield of wonderful lightness. These fabrics are those which best enclose a layer of air, and it is this layer of entangled and scarcely moving air which gives to them their usefulness. It is the air within the blanket or cloth of wool, not the wool itself, which arrests the passage of heat. So it is with cotton or with linen. Place the hand on a layer of unspun cotton, commonly termed cotton-wool. The feeling is that of warmth. Spin the stuff into a thread and weave the thread into sheeting, and place the hand on the sheeting. The feeling is that of coldness. Obviously, there has been no change in the material itself, therefore it is the change in the condition of the material that has resulted in the change of effect from warmth to coldness. Either cotton itself or linen itself, that is, flax, is not by any means a bad conductor of heat; a sheet of cotton or of linen feels cold enough to the hand or foot; in other words it rapidly conducts heat away from the skin. Bring that same cotton or that same flax in the unspun or woolly condition against the skin and it feels warm. The fact is that, in the latter cases, very little of the layer of actual cotton or of flax, but a great deal of the entangled layer of air, is brought against the skin; and the layer of air, being a good non-conductor of heat, takes so little heat away that relatively we regard the materials as being warm. Wool or similar hairs of various kinds, silk, flax, cotton, are all useful as materials for clothes, the porous condition of the material rather than the material itself being the main consideration. Even skin, whether thick for foot-covering in the form of boots, or thin for hand-covering in the form of gloves, has its value for health purposes; but any extended use of such a slightly porous material as skin is inconsistant with the laws of health. The non-porous india-rubber waterproof clothing must only be worn when one desires to avoid the lesser of two evils, namely, the lesser disadvantage of over-action of the pores of the skin as against the greater dangers attending the wearing of wet clothes. These "waterproofs" must be taken off at the earliest possible moment.

The laws of heat govern the effect of the colours or pigments with which clothing is dyed as well as the effect

* Presidential Address delivered at the Annual Meeting of the Hertfordshire Natural History Society at Watford, February 15, 1887.

of the material itself. A given fabric will reflect more heat if it is white than if it is black, and, generally, will have a somewhat varying power as a conductor or as a non-conductor of heat according to its colour. This influence of colour is, of course greater in fabrics that enclose but little air than in those which enclose much air. The material of which a given pigment or dye is formed has some influence; different black dyes, for example, differing in their power of absorbing heat.

Chemical and physical science, speaking by the mouth of the goddess Hygieia, has little more to say respecting the laws which govern the clothing we wear. The voice of the goddess of ornamentation is much louder; while the lungs of the votaries of fashion, in one century of one sex, in another of the other sex, drown the voices of many goddesses and ever produce a veritable Babel.

Other Contributories to Health.

No allusion has been made to personal cleanliness; nor to that change of employment termed recreation, nor to physical exercise, nor to rest. For in these four matters, not only is there a fairly extended recognition of the fact that the laws of nature governing them cannot be disregarded with impunity, but there also does exist amongst people generally such a fair amount of knowledge on these subjects that it is now unnecessary to do more than mention them. Whether health will be best promoted at any given time by attention to cleanliness, recreation, more serious physical exercise, relaxation, or rest, must be left to the individual judgment. All are alluded to in the following pretty epigram from the Latin, "On a Natural Grotto near a Deep Stream":—

"Health, rose-lipp'd cherub, haunts this spot,
She slumbers oft in yonder nook:
If in the shade you find her not,
Plunge—and you'll find her in the brook."

The Dwellings we Occupy.

Into the question of healthy houses, regarded merely as dwellings, questions relating either to food or to clothes scarcely enter. Not so the question of water supply, which is almost inseparable from that of the dwelling. Indeed, a full supply of pure water, a proper supply of pure air, and neither excess nor deficiency of warmth, are the chief desiderata as regards healthy habitations.

Man almost necessarily dwells only where nature supplies animal and vegetable life with a fairly regular supply of water. Under the laws of heat, water is drawn up into the atmosphere as a pure invisible vapour from the more or less pure stores on land, or the more or less saline stores of the seas. That vapour condenses to visible cloud in the atmosphere, whence, under the laws of gravitation, it again is drawn to the earth. From the earth over which the fallen rain flows, it dissolves, under chemico-physical laws, certain mineral substances which do not injure and perhaps promote the health of persons drinking the water. From the earth also, especially from its cultivated portions, the water dissolves, again under chemico-physical laws, certain products of animal and vegetable decay which doubtless are or may be harmful to persons drinking the water. No sooner, however, are these impurities dissolved than nature, under chemical laws, begins to burn them up by the air dissolved in the water: and before the water has flowed far over or into the ground, it again has become hygienically pure, that is to say, entirely free from anything injurious to health. The slightest recognition by man of the working of the laws just mentioned, would prevent him adding animal or vegetable impurities to water at the very moment of all others when nature has brought pure water to the actual dwelling he occupies. But alas! man is ignorant of such laws, and ignorant is he likely to remain until some of his teachers, under an enlightened view of nature's laws and their origin, weekly preach those laws into his ears. A comparatively few yards of porous soil free from actual clefts will convert into hygienically pure water all the impurities cast out of a dwelling house. There is not the slightest reason, except what is born of excusable—at present excusable—ignorance, or inexcusable carelessness, why the well-water of more or less isolated rural or suburban dwellings should be contaminated by household drainage or by any similar collections of impurities. Such refuse should be distributed properly instead of improperly to the adjacent ground, and then there would be no risk of the well being contaminated.

How to obtain a proper supply of fresh air to our dwellings, in quantity neither too large nor too small, and in temperature neither too high nor too low, is an extremely difficult question. This difficulty is not due to want of knowledge of the laws governing the matter. The laws of heat are ever at work, and also can be invoked artificially, to provide displacement of impure air by pure air, and the laws of diffusion of gases are ever at work providing for the removal of used up or tainted air. The difficulty chiefly consists in our inability to apply our knowledge under ever-varying conditions. Take even the case of an isolated dwelling, standing within two or three acres or more of ground, where the external air is pure, and occupied and owned by a man who has the means and the will wherewith to obtain a proper supply of that fresh air for his household. The capacity of any given room does not vary; practically it always holds the same volume of air. But the persons who respire the air in that room may vary in number from two or three to twenty or thirty. The air in the room requires to be changed ten times as often for twenty or thirty as for two or three persons. What mechanical system of ventilation without draughts can be trusted to provide for such a state of things? Practically none. This difficulty is increased, obviously, by the facts that we can have little or no control over the temperatures of the external air that is to enter and displace that already within the room, and that those temperatures may vary greatly, especially in such a country as ours. The varying direction and varying force of the wind will also materially complicate the problem of satisfactory ventilation. All these difficulties are enhanced if the house is closely packed amongst others, or if the occupants are poor, or if the external air is liable to be impure.

Of course there is another side to the foregoing picture. An occupied house is always warmer inside than outside, hence the whole bulk of air it encloses is, under the laws of heat, ever rising up through and out of the house, especially from its upper parts, while a corresponding quantity of fresh air is ever entering the house, especially at the ground floor. Again, under the laws of diffusion, the moment the air of a room is rendered impure, and during the whole time that it continues impure, it and the external pure air commence and continue slowly to interchange with each other, through chimneys and open doors and windows, through chinks and cracks, and even through ceilings, walls and floor. Again, the available amount of air in a room may be, and perhaps generally is, under ordinary conditions, much larger than the amount nature demands for the health of the few persons who habitually occupy the room. Again, most persons, even invalids, can bear a considerable change of the air near them, especially if the bulk of air moves, without catching cold. Again, the systems of fairly healthy persons can stand the inhalation of even highly impure air for the short periods of the various kinds of gatherings or meetings they may have occasion to attend without any serious or prolonged harm to health. Lastly, when crowded rooms become unbearably close, yet must continue to be crowded for some time longer, and windows or doors or both consequently have to be opened wide, there are generally some persons who can bear without injury, or with only temporary inconvenience, the strong draught of inflowing air near such openings. With all these mitigations granted, however, there remains the fact that a certain amount of ventilation is essential to the occupants of all rooms; while it also is certain that the purchasable contrivances termed "ventilators" cannot

be efficient ventilators under all the varying conditions mentioned.

What is the remedy against the imperfect ventilation of rooms? Fortunately experience teaches everybody something of the working of nature's laws respecting this matter. A person of even moderate intelligence can open a window or a door where a draught will injure no one. In an average household some of the members will have sufficient knowledge to enable them, at any considerable gathering of persons where perhaps also many air-consuming lights are burning, to distribute the air from open windows by aid of curtains so judiciously disposed as to allow of the entrance of the maximum amount of air with the minimum of draught. Perhaps the best form of ventilator is the old tube reintroduced by Tobin; a wooden or zinc tube a few inches broad, several inches wide, and about five feet long, placed in any more or less out-of-sight place in the room, the bottom end communicating with the external air by a similar, generally very short transverse tube carried through the wall. Such tubes may vary in size, or two or more may be used in large rooms. They really are inverted syphons, the slight warmth of the inside of the room above the outside enabling them by well-known natural laws continuously to carry inwards a current of air which quietly breaks in a fan-like manner into the upper part of the room above the heads of the occupants, a continuous change of air without a draught resulting. Window sashes may be arranged on a similar principle but with less effect. According to the number of occupants of the room each tube should at its upper extremity be closed, or partially closed by a lid, or be left quite open. Even these tubes, therefore, need a little intelligent management. In short, the extent to which a room may be fairly successfully ventilated depends on the extent to which some one or more of its occupants realizes and applies the natural principles involved. A proper supply of pure air to our dwellings can never be obtained merely by ventilators or other mechanical contrivances, it must always depend upon intelligence and knowledge.

The avoidance of extreme heat in summer and extreme cold in winter in our habitations is a matter of considerable importance as regards our comfort, and not inconsiderable as regards our health. Here experience guided by intelligence helps us much, while the natural laws which govern the matter are not at all obscure. A room which in summer has become pleasantly cool during a night may be kept cool until it is wanted, if blinds, curtains and shutters are closed over the windows, and the door or doors not left open. For convection of heat to the walls of the room by currents of hot air from without is thus avoided, diffusion between the hot air without and the cold air within is thus retarded, while any direct rays of heat from the sun are excluded. With a little light admitted such a room may then be occupied by two or three persons, at all events by a few in relation to the size of the room, for several hours before the air inside becomes as warm as the air outside or before ventilation is really needed. When either of the two latter conditions is nearly reached doors and windows must be opened. For the advantage of a lower temperature in the room having ceased, the next best condition of comfort is to provide if possible for a continuous movement of air or gentle draught, "a lovely breeze," the moving air taking away moisture from the skin and producing a grateful sense of coolness.

The avoidance of extreme cold in rooms in winter depends, fortunately in some cases, unfortunately in others, almost solely on expense; for the laws of the matter are well known and their application quite easy. The burning of coals or other fuel in a open grate, as commonly practised in England, is doubtless absurdly extravagant when considered solely as a source of heat, more than three-fourths of the heat escaping up the chimney. Yet the chimney thus draws within itself a quantity of air over and above that needed for the combustion of the fuel, producing better ventilation of the apartment than would be obtained by less escape of heat up the chimney. Secondly, under such an arrangement gradations of warmth are obtained; for one may have general warmth by sitting at some distance from the fire, or may get a large amount of warmth in a short space of time, and exactly at the moment one most wants warmth, by standing for a minute or two quite near the fire. Thirdly, a bright open fire is a thing of beauty worth paying for. To warm the whole atmosphere of a house, or its chief sections, by heated pipes is more economical from the point of view of a mere warming arrangement, and, while less pleasant than an open fire to persons coming in from the cold external air and desiring to be quickly warmed, nevertheless, gives a more general sense of comfort to those who remain for most of their time indoors. However, it is, again, a question whether one is not, on the whole, rendered more susceptible to cold when one leaves the house in winter if one has been living night and day in the temperate climate of pipe-warmed rooms and passages. The whole subject is obviously one rather for individual than general consideration; one to be decided by the conditions, occupations and resources of those dwelling in any given house.

The Towns we Inhabit.

The laws of nature affecting the health of the individual having been considered, and some further natural laws governing the health of households, especially in isolated habitations, having been set forth, there remain for treatment only the laws which operate in the special set of conditions produced by that close contiguity of dwellings characteristic of cities and towns.

The total amount of fluid and solid impurities of all kinds cast forth from the kitchens and other parts of more than a given number of houses per acre of ground —irrespective of dust-bin refuse which can be removed by cartage—quite overtasks the natural chemical purifying powers of that ground. Hence, in the first place, pure water cannot be obtained from wells sunk in such ground, and must therefore be brought to the town from some distant area by a system of open and closed mains and pipes. In the second place, especially with a somewhat larger number of houses, the total quantity of impurity cast forth becomes such a source of contamination, not only to the water of wells in the neighbourhood, but to the air, that it must be taken away from the town by a system of pipes, drains, etc., to some distant area. Here the laws of nature cannot be evaded; and their working is simple. A household must, in nearly every case, get its supply of water, say twenty or thirty gallons per head daily, from the earth, and when that water has done its duty of washing, cooking, etc., it must be returned to the earth. If the dwelling is isolated in an acre or so of porous ground, this intake of pure water and output of sullied water may go on within that area. If dwellings are crowded together, the intake of pure water must be from a distant area in one direction, and the output of sullied water must be to a distant area in another direction. But in both cases there must be ground whence to draw the clean water and ground on which to cast the dirty water. In both cases, too, we may trust to nature, and we may implicitly trust her, to convert the impure water into pure water ready again for the use of man. For, be it remembered, the stock of water in the world never varies. The water man has used before he will use again, and again, and again; each time perfectly purified in nature's perfectly appointed laboratory. It may be that a given country, in its wisdom, believing that it is choosing the lesser of two evils, elects to send more or less of its sullied water direct to its rivers and so into the sea. In that case the only variation in effects—in the intermediate effects—will be that the country will *pro tanto* lose the manurial value of that sullied water. Further, to the extent to which a country thus incurs an expenditure larger than

its income, will it sooner or later become bankrupt. The result may not ensue for many generations, but come it must, unless a true spirit of patriotism realizes and avoids the evil. Be that as it may, the incidence of the laws of nature, fortunately, cannot be avoided. The sulliage of sullied water is sooner or later burnt out of the water by the burning power of the air always being absorbed by such water, or with which the water comes into contact during its flow towards the sea or in the sea itself. From the sea, as already stated, the water is lifted into the air as cloud, and is carried back by winds again to fall in full abundance at the very feet of man.

The gregarious tendencies of human beings not only involve difficulty as regards the getting of plenty of pure water and the getting rid of that water when sullied, but also as regards the getting of abundance of pure air and the getting rid of that air when sullied. And the larger the aggregation of people, the greater the difficulty. A human being in breathing renders a certain and rather large amount of air impure every moment of his life. Every scoopful of coal burned in a grate, every pound of burning candles, every pint of oil consumed in a lamp, every cubic foot of burning gas, renders impure a corresponding and very large amount of air. This impure air passes up and away into the atmosphere, sometimes under the laws of heat which harness and rein the wind, and always under the laws of diffusion. Fortunately the largest city is not yet so large as to interfere with impure air exhaled from throats and chimneys getting away sufficiently fast, and pure air taking its place sufficiently fast, to maintain millions of inhabitants in a fair state of health. The trouble rather is, at present, that owing to imperfections in the construction of domestic fire-grates and large furnaces, the fair and invisible gaseous product of the combustion of all fuel is accompanied by sooty, oily, and other fog-forming intermediate products. For this evil let us hope that art will sooner or later furnish a complete remedy. Nature furnishes the remedy against the accumulation of impure gas in the atmosphere generally; for the impurity which would be poison and death to the animal kingdom is food and life to the vegetable kingdom, and thus is the atmosphere as a whole kept always in a normal health-giving condition.

Another, and, as regards the preservation of health from the attack of infectious disease, more serious source of contamination of the air of towns, is to be found in the delivery of foul vapours from certain of the gratings at our very feet as we walk along our streets and roads. Now this subject is in several senses unsavoury, but it is one that affects the health of ourselves and the health and perhaps lives of our children. Therefore no apology is offered for its introduction. Indeed it is time that the public, men and women too, should speak out strongly once for all on the matter. There is a general impression, and it is probably a right impression, that we have gone a little too far in the matter of sewer-ventilation—a little too far in a wrong direction. We are told, doubtless rightly told, that certain fevers which decimated the inhabitants of our towns up to a hundred or even fifty years ago, were probably largely due to the emanations from open urban ditches and similar collections of impurities. Well, we filled up the unsightly conduits, we avoided pestilential accumulations, and we substituted closed pipes and drains. But now, under some fancy that these tubular channels all need ventilating, we adopt such mechanical contrivances as shall, or, at all events, may and often do, bring the noisome vapour to the feet of adults or children at any moment as they walk past the gratings in the ground, or, much worse, bring it to the mouths and nostrils of girls and boys as they play near or perhaps actually peer into the grid-guarded caverns. True, we do not allow the contents of the passages to stagnate, as in old days, but so far as we ventilate them, that is, wash them out with air, and bring that possibly pestilential air to the lungs of human beings, to that extent we are making a retrograde movement towards the fever-breeding arrangements of pre-sanitary history. If our practice in this respect is right, we ought to increase the number of these gratings, or, indeed, have open ironwork along the whole length of these reeking aqueducts. If the practice is right why not dry up, by the ventilating current of air, not a part only of the fluid, but the whole? But our practice, in my opinion, is not right. These mains do not need ventilation, or not as a rule. In our larger cities, wherever the horrid galleries are of a character to need workmen within them, ventilation is necessary for the sake of the men, lest they "be stifled in the vault to whose foul mouth no healthsome air breathes in." But such large mains generally run under wide roads whence the vapour can, through the gratings in the centre of the road, the more readily escape up into the atmosphere. At all events ventilation then offers the minimum of evil. But why drains into which a man never goes, which are in fact too small for a man to enter, should all be ventilated, is beyond my comprehension. Of course there must be no such pressure within them—caused by the rush of flushing-water or what not—as to drive their vapour-laden air past the water traps of our homes into the rooms in which we live. But some judiciously disposed vent-pipes, such as are largely used already, opening above the ground level, but not near windows or other inlets of houses, will prevent that result. These vent-pipes (do not call them ventilating pipes, for there should be no such current of air through them as constitutes true ventilation) can be kept clear by a semi-annual inspection costing far less than the labour necessary for keeping clear the objectionable ground-level gratings. Some persons seem to be under the impression that poisonous gas is always generated in these sullied-water passages, and that this gas needs to be diluted with as much air as can possibly be drawn into and out of the loathsome watercourses. Now the contents of these courses, in any properly regulated district, are never allowed to stagnate long enough to produce gas; secondly, even the stagnant stuff rarely produces a paltry few bubbles of gas; thirdly, such gas is probably harmless. No, the exact constituent causing harmfulness is not known, but what carries or conveys that constituent is the vapour of the smelling stream. The stream will saturate the air in the drains with its vapour just as a perfume will saturate the air in a scent-bottle with its vapour. Ventilate the scent bottle, that is, arrange for a current of air to pass through the bottle, and what will happen? Each fresh quantity of air will soon be saturated with the vapour of the perfume, and as you drive out or draw out that quantity, fresh air will enter to be again saturated, and so on until you have dried out much of the perfume. Ventilate the polluted passages alluded to, and what happens? Each fresh quantity of air drawn in will soon be saturated with the vapour of the filthy fluid, and as you drive out or draw out that quantity, fresh air will enter to be again saturated, and so on until you have dried out much of the fluid. In fact, the process is not one of fair dilution or ventilation at all, it is a process of slow evaporation; for nobody should dream of truly ventilating any apartment at the bottom of which vapour-yielding fluid is ever running, or on the floor or in the corners of which moist masses of microbe-yielding mud are ever resting. The removal of the vitiated air of such a room by inflowing pure air would immediately be succeeded by the vitiation of the latter, and so on, and so on, night and day *ad nauseam*. That is a fair picture of what its advocates are pleased to term sewer-ventilation. It is not true ventilation at all; it is a slow, continuous but never complete, drying up of liquid and solid sewage, carried on in the midst of our homes, playgrounds, and promenades. There is not the slightest occasion to continue this loathsome, this repulsive vapour-carrying and perhaps fever-carrying process. There is not the slightest occasion to ventilate all these treacherous tunnels. Fortunately air is not often flowing at any important rate into or out of them but

that it is sometimes flowing out most persons who often pass the ground-level gratings can testify. To put the matter shortly and plainly. A sewer is like a scent-bottle, the longer you ventilate it the longer it will smell, while any fluid remains. Don't you want it to smell? No? Then don't ventilate it. Do away with the ground-level gratings altogether, except where men work in the gross galleries below; never attempt to ventilate, really ventilate, all these tubes of turbidity; only where pressure is liable to accumulate place vent-pipes whose external orifice shall be far above the heads of the inhabitants of the town, and as far as may be from the windows of houses. If you *must* extract the vapour-laden air, burn it. But what is required, as a rule, is *vent, not ventilation.*

Conclusion.

In this address an attempt has been made to direct attention to the laws of nature as related to health: as related in the important personal matters of the food we eat, the fluids we drink, the air we breathe, and the clothes we wear; in the important matters of water-supply, ventilation, and due warmth in our dwellings; and in the important matters of refuse-disposal and pure air-supply of our towns.

To the extent to which the individual acts in harmony with natural law, to that extent will he have health. To the extent to which a household acts in harmony with natural law, to that extent will a household have health. To the extent to which a local community acts in harmony with natural laws, both by its units and by the members and officers of its Board of Health—some of whom must possess adequate chemical, physical, and biological, as well as general medical knowledge—to that extent will the town or city have health. To the extent to which a nation realizes and places itself in harmony with the laws of nature that govern the health of its individuals, the health of its households, and the health of its communities, to that extent will the nation have national health, prosperity, and happiness, and to that extent will it contribute to the health, happiness, and prosperity of all nations and races which recognize the sway of natural law. Finally, to the extent to which a generation lives, moves, and has its being, less and less in accordance with the empiricism of past generations and more and more in accordance with the laws of nature, to that extent will the children of that generation, the parents of generations yet to be, become more and more healthy, and the sooner develop into all that man is destined to become.

'Yet I doubt not thro' the ages one increasing purpose runs,
And the thoughts of men are widen'd with the process of the suns."

NOTE ON POTABLE GOLD.

BY ROBERT MODLEN.

Gold has from the earliest times been the subject of innumerable experiments at the hands of alchemists, physicians, etc., in the hope that a medicine might be prepared from it in some degree corresponding to the estimation in which the metal itself was held. In an old book in the Pharmaceutical Society's library there are several descriptions of the mode of preparing gold for medicinal purposes, and the uses for which it was recommended are as numerous as those to which certain so-called patent medicines of our own day may be put.

"The potable golde, sayeth the singular Fioravente, is a dyvine lycour, to which none other may be compared, that the auncient and later philosophers have by dilligent studye, great search, art and practise, dyverselye sought and laboured to dissolve and make this pocion of gold, and have also attempted sundry and dyvers wayes . . . . Some there were that before the distyllation did diverselie calcyne the golde to bring it to dissolving; others there were which laboured to dissolve the golde with aqua fortis, and others, after the calcyning, have endeavoured to dissolve the golde with aqua vitæ; and thus many have travayled without lyght in the searche of the arte, having neyther knowledge, skyll, nor yet experience." He then goes on to give a very long and complicated method of preparing this "most precious lycour, so greatlye and highlye esteemed of mortall creatures, not without desart; in that the same is a substantial essence, and as it were another soule, yea, our lyfe this potable golde may be named, for the sundry effectes, ryght wonderfull, that it in desperate cases hath wrought." The first part of the process is to kill and draw a large hen, and then to distribute an ounce of gold in incisions in the fleshy parts. This is to be done while the body is warm, and the heat is to be maintained in "an apt place" for thirty-five hours in order to dissolve the gold, "for there is a certayne hydde propertye in the hennes flesh for the dyssolving of golde." Then wash the various incisions thoroughly with water of honey, mix this with an equal quantity of aqua vitæ (itself a wonderful preparation), and add a drachm of "salt armoniacke" to each pint of mixture, which is then to be enclosed in a heap of horse manure for three months. At the end of every month the clear liquid is to be drawn off, and the dregs are finally distilled. After mixing the various solutions and the distillate, bury them again in a glass vessel for twenty-five days in a heap of fresh horse manure. "And then have you purchased potable golde, easilye prepared and with small cost; which by his marvaylous propertye and great virtue, rayseth in a manner the dead."

There were, as Fioraventus remarks above, other methods of preparing the gold, but as space is limited, I cannot refer to them in detail, but must pass on to the various uses to which it was put.

As may be supposed, such a precious medicine must be carefully given, so we find that one drachm of the liquid was to be mixed with an ounce of "Juleppe of Violets," and given in broth. "And if any sicke person be at the point of death, in giving such a lycour, shall lyve a farre longer tyme than perhappes he might doe without it; and many by the dryncking of it have recovered lyfe and health a long time after." "It yieldeth or procureth joye of the heart, and increaseth the strength of the same, and putteth awaye sicknesses. It stayeth back olde age, increasing natural humors, and preserveth all the partes of the body without harme or decay; it cureth the Lepry, clenseth the blood, helpeth the shedding of heyre, if it be given with Endyve water." Unlike Macbeth's physician, it could "minister to a mind deceased," removing melancholy and restoring "memorye corrupt;" given in borage water it cured "all maner of madnesse." It "helpeth an astonished sicknesse," whatever such a complaint may have been, and if taken with a decoction of peony roots, collected in the waxing or waning of the moon, it cured the falling sickness. In short, of all the ills that flesh is heir to, the greater part would seem to be more or less amenable to this wondrous medicine.

At a time when gold was much less common than now, there appears, in fact, to have been a fascination in it, which led men to imagine that they could discover in it a panacea, if they only went to work the right way.

It is worthy of remark that while silver is very much more used than gold in modern practice, in the work from which this account is taken the preparation of silver for medicinal purposes is dismissed in six lines, no notice being taken of its properties, while the description of the various forms and uses of gold occupies no fewer than twenty-six pages. The silver was made into an acetate.

The work from which this account is compiled is called the 'Newe Jewell of Health,' and is by Conrad Gesner, of whom, and of another of whose works, I recently gave a short description (p. 625). Like the 'Treasure of Euonymus,' it is a translation from the Latin, but published in 1576, seventeen years later, and is not so well got up, either as regards the engravings or letter-press.

Gillingham, Chatham.

The Pharmaceutical Journal.

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THE BENEVOLENT FUND.

WE are now within a few weeks of the expiration of the period of ten years since the last Benevolent Fund Dinner was held in 1877, and the Council having at its last meeting decided that the practice hitherto adopted of having a Benevolent Fund Festival should not be departed from, it will not be out of place to remind our readers of these facts, and at the same time to point out for the information of those who have not hitherto taken much interest in the Benevolent Fund some of the circumstances which should recommend this institution to the consideration of all members of the trade, and especially of all who are more directly connected with the Pharmaceutical Society. In the first place it must be remembered that while the expenses of working and administering the Fund are borne almost entirely by the Society, the whole of the income arising from interest upon invested capital and from subscriptions or donations is now made available for the relief of cases of distress or misfortune affecting all persons who are upon the Register of Chemists and Druggists, whether connected with the Society or not. This is a circumstance that should alone be an inducement to members of the trade to become subscribers to the Fund, and we again call attention to it because we believe that it is still far from being so generally understood and appreciated as it ought to be. On no other view does it seem possible to account for the comparatively small number of those on the Register of Chemists and Druggists who are contributors to this useful Fund. This will be evident from the fact, that although many persons subscribe from one to ten guineas annually, the whole income in the shape of subscriptions to the Fund has never yet risen much above fifteen hundred pounds a year. But if every member of the trade were to subscribe only five shillings a year the amount raised would be upwards of double that sum, and the capacity of relieving distress would be proportionately increased. This is a view of the matter which we believe only requires to be made sufficiently well known to ensure a considerable accession to the number of supporters of the Fund, and it is to be hoped that the Society's local secretaries, in their annual visit to the members of the trade in their respective neighbourhoods, will not relax their efforts to extend this knowledge. Even those who, we regret to say, are not disposed to support the Pharmaceutical Society itself, may be led to perceive that, by subscribing to the Benevolent Fund, they would not be rendering a service to the Society, but to the great body of chemists and druggists to which they belong, and we cannot imagine any reasons that would be sufficient to deter them from taking part in that good work to the extent of their ability.

In urging this view of the matter upon the consideration of all members of the trade, it must also be pointed out that from the nature of the Fund, and by reason of the restricted application of it to registered chemists and druggists, it is only from that class that subscriptions can be looked for. There are certainly many subscribers and donors to the Fund who do not hold that position, but are in other ways more or less connected with the drug trade, such as wholesale drug houses and other firms, but that does not in any degree lessen what may be termed the obligation of individual members of the trade to aid in supporting an institution that is for the good of the body to which they belong. A reference to the work that is now being done by the Benevolent Fund will furnish additional reasons for their subscribing. According to a circular that is in course of being issued it appears that there are now forty-nine annuitants, who receive on the aggregate nearly seventeen hundred pounds a year. To meet this expenditure in annuities the Fund has only a permanent income of £780, and the annual subscriptions are relied upon to make up the remainder. In addition to the annuities a considerable expenditure is incurred every year in grants for temporary relief, no less than six hundred and thirty pounds having been spent in this way during the past year. Comparing these disbursements with those of ten years ago, it appears that the number of annuitants has actually been more than doubled, and that there is in this circumstance evidence that the Fund is growing in its power of affording relief. But at the same time the claims upon it are increasing every year, and there is every reason for seeking to augment its capability of being useful.

Those who are in the habit of asking what use the Pharmaceutical Society is to the trade or to themselves individually may, we think, take cognizance of the work that has been done by the Benevolent Fund, which it has instituted and thrown open to all with the result of finding that in this direction there is a satisfactory answer to their question. The long list of annuitants who have received assistance by this means ought to convince them, if nothing else would do so, that the Society has been of benefit, and when it is remembered that the Council has repeatedly added to the invested capital of the Fund by liberal grants, it will be evident that there has been a desire to extend to the entire body of chemists and druggists the advantages that such a

corporate representative body can confer. If there be any failure to realize all that might have been desired, it will be worth consideration whether the causes of that failure are not to be sought elsewhere than in the Society itself.

The festival that is to be held this year with the special object of securing an increase in the capabilities of the Fund will offer a favourable opportunity for new subscribers to contribute to its resources. The dinner will take the place of the annual dinner that it has now become customary to hold on the evening before the annual meeting of the Society, and it will be held at the Freemasons' Tavern on the 17th of May next. We trust that the local secretaries throughout the country will take advantage of this occasion to impress upon their neighbours the merits of the Benevolent Fund and the claims it has upon their support, and, also, that they will be able to send in such good lists of subscriptions and donations as to make the present year a notable epoch in the history of the Benevolent Fund.

REDWOOD TESTIMONIAL FUND.

A MEETING of the Executive Committee was held on Wednesday, March 23, the President of the Pharmaceutical Society in the chair. Professor DUNSTAN, on behalf of the Sub-Committee, submitted a draft deed of trust by which the sum of six hundred pounds, in the form of Indian Railway Guaranteed Stock, is to be transferred to the Pharmaceutical Society for the endowment of a REDWOOD Scholarship, to be held in connection with the School of Pharmacy of the Pharmaceutical Society; the award to be made on the results of an examination, the subjects of which, as well as the time of the award, to be determined by the Council of the Pharmaceutical Society. It is probable that the scholarship will be awarded annually, and will be tenable for one year, the subjects of the examination being for the present the same as those of the JACOB BELL Memorial Scholarships. After a short discussion, the draft deed was unanimously approved, and the Treasurer was directed to proceed with the investment. It was also reported that the well-known portrait painter, Mr. SYDNEY HODGES, had accepted the commission for a portrait of Professor REDWOOD, and that the picture would in all probability be ready for presentation to the Society next May.

The announcement recently made (before, p. 722) of the issue of a Japanese Pharmacopœia lends special interest to a note on Ancient Japanese Pharmacology, by Dr. Whitney, in the current number of the *Sei-i-Kwai Medical Journal*. From this it appears that since a period nearly contemporary with the commencement of the Christian era the practice of medicine in Japan has been largely influenced from China, though the Japanese materia medica would seem to have been more limited than that of the Celestials, and confined more closely to the vegetable kingdom. Some of the remedies were as peculiar in their nomenclature as in their composition. One which was known as "*Shin-sen-chinja-guwah*," or "the heavenly mountain sprite chinja pellets," consisted of myrrh, dragon's blood, musk, cinnabar, elecampane and liquorice, reduced to powder, mixed well and made into small pellets, one of which was a dose, to be masticated well and washed down with a decoction of ginger and salt. Another contained twenty-three ingredients, including cinnamon, cubebs, *Ranunculus sceleratus*, *Aconitum Fischeri*, *Fœniculum vulgare*, *Aquilaria Agallochum*, *Alisma Plantogo*, *Pachyma Cocos* and another fungus, and a chrysalis, which were powdered, made into paste with an alcoholic liquor and rolled into pellets. The applications of this specimen of polypharmacy answered in number and diversity to its constituents, for it was used in the treatment of kidney diseases, "five kinds of consumption of the lungs," seven kinds of fevers, spasm of the smaller intestines, pains in the four extremities, jaundice, dryness of tongue or lips, amblyopia, tinnitus aurium, palpitation of the heart, mental excitement, nightmare, mental prostration, excess of joy or anger, melancholy, dropsy, paralysis, urinary troubles, impotence, eczema, and a number of other complaints.

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On Friday, the 18th inst., the House of Lords considered the Pharmacy Acts Amendment Bill in Committee, when the Earl of Milltown moved the insertion of the words "authorized on that behalf" after the word "Council" in clause 2, and in clause 4 the insertion of the word "eight" after "eighty," which was agreed to. On Thursday the Bill was read a third time and passed.

* * *

Last July we called attention to the proposal to commemorate the centenary of M. Chevreul by the striking of a medal. We have now much pleasure in stating that this has been carried out, and that a bronze copy of the medal has been sent to each of the subscribers by the President of the Committee which undertook the work. The medal was executed by M. Roty, and bears an excellent portrait of M. Chevreul on the obverse, while on the reverse there is an allegorical figure representing the youth of France presenting a laurel wreath to M. Chevreul as the doyen des étudiants.

* * *

We have been requested by Messrs. Burroughs and Wellcome to state that, as no copies of Professor Remington's 'Practice of Pharmacy' were to be obtained in this country, they have now undertaken to supply them. A review of this work appeared in the *Pharmaceutical Journal* of 24th June last.

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We regret to have to record the deaths of two more annuitants on the Benevolent Fund, Mr. Thomas Townson, who was elected in 1878, and Mr. John Richard Collins, who was elected in 1885.

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The annual meeting of the Chemical Society will take place on Wednesday, the 30th inst.

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The next meeting of the School of Pharmacy Students' Association will take place on Thursday, March 31, when Mr. Arthur Smith will read a paper on "The Officinal Succi," and a Report on Inorganic Chemistry will be given by Mr. L. W. Hawkins.

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On Wednesday next, the 30th inst., a meeting of the Chemists' Assistants' Association will be held at the rooms, Great Russell Street, when the papers read will be a "Note on Ipecacuanha Wine," by Mr. F. C. J. Bird; and a "Note on Water Softeners," by Mr. E. J. Millard.

Transactions of the Pharmaceutical Society.

EVENING MEETING IN EDINBURGH.

The second Evening Meeting in Edinburgh of the present session was held in the Society's House, 36, York Place, on Wednesday evening, March 16, at 8.30. Mr. H. Bellyse Baildon, B.A., F.R.S E., Chairman of the Executive of the North British Branch, in the chair.

The minutes of last meeting having been read and approved, the following papers were read:—

Note on a Theory of Emulsification.

BY WILLIAM GILMOUR.

The paper is printed on p. 781, and gave rise to the following discussion :—

Mr. Nesbit (Portobello) said he believed the explanation of the theory of stirring certain emulsions in one direction, brought forward by Mr. Gilmour, was the correct one. He thought this practice had arisen mainly in connection with the making of salad creams, in which no emulsifying agent was used, and in such cases it might be advantageous, but in making emulsions with gum arabic he had found it quite immaterial in what direction the stirring took place.

The Chairman said he did not quite understand from the paper that Mr. Gilmour had got to the bottom of the subject, which was capable of being worked out still further. He suggested that the finished emulsion might be examined by a microscope as to whether it consisted of globules of one liquid coated with the other, or of globules of one floating in a body of the other.

Mr. Gilmour replied that he had not gone very fully into the subject. In connection with the culinary emulsions referred to by Mr. Nesbit it would occur to most people that in the ordinary egg-switch we have a good illustration of emulsification, which exploded the stirring in one direction idea, because in this case you have simultaneous motion in exactly opposite directions. A little consideration, however, would show that although there is simultaneous motion in two opposite directions the moving particles from each current constantly meet in the centre, and perfect harmony in the mixing is preserved.

Practical Remarks on Pearl Coating of Pills.

BY WILLIAM GILMOUR.

The paper is printed on p. 781, and gave rise to the following discussion :—

The Chairman remarked that he had recently met with two instances in which saccharine had acted as an emetic, and he thought it would require to be thoroughly tested before being used for such a purpose as pill coating.

Mr. Ainslie said he had found that coating the pills with a solution of tolu in chloroform, and dusting on a little French chalk answered all the purpose.

Mr. Nesbit thought the substitution of resin of scammony for the gum resin in such a pill as colocynth was not an improvement, as such pills were more liable to pit from the absence of the gum. He did not approve of pearl coating. The objection to tolu coating on account of its insolubility was groundless, as the coating immediately bursts on placing the pill in water. He had seen an American Blaud's pill, the coating of which was almost insoluble.

Dr. Clark remarked that in his experience he had not been able to gelatin coat Blaud's pills satisfactorily. He had always found, on cutting up such pills, that they were of a bright red colour inside, showing that the iron was in an unsatisfactory state.

Mr. Boa disapproved of pearl coating, especially in such cases as Blaud's pills, where the swallowing of such large quantities of an insoluble powder like French chalk might give rise to the formation of dangerous intestinal concretions.

Note on Lime Water.

BY J. I. FRASER.

The paper is printed on p. 782, and gave rise to the following discussion :—

Mr. Maben (Hawick), said he had listened with much interest to Mr. Fraser's paper. The results corresponded pretty closely to those he had himself obtained in a similar inquiry several years ago. Latterly he had adopted the practice of having his lime water estimated from time to time and found it sometimes above and sometimes below the official standard. He did not think it was absolutely necessary to have freshly slaked lime each time, provided the stock of slaked lime was carefully preserved from the atmosphere. There was no difficulty in having lime water of full B.P. strength.

Mr. Nesbit said he agreed with Mr. Maben that it was not necessary to slake the lime each time, but fresh lime should be used every time the jar is filled up. It was also desirable to estimate the lime water occasionally.

Mr. Ainslie said it was very important that lime water should be of full strength, and it might be a very serious matter if some of the samples referred to in the paper were supplied to the order of a medical practitioner.

Dr. Clark remarked that sample J was about the strength of ordinary Edinburgh water. Mr. Fraser's paper emphasized the necessity for a frequent examination of stock on the part of pharmacists.

Note on the Corrosion of a Zinc Refrigerator by Ammonium Chloride and Potassium Nitrate.

BY J. H. FISHER.

The paper is printed on p. 783, and gave rise to the following discussion :—

Mr. Fisher showed a zinc vessel completely destroyed by exposure for two hours to a hot solution of ammonium chloride and potassium nitrate.

Mr. Gilmour said he had had some experience of this action, from the fact that he had a very intelligent plumber for a neighbour who had sometimes consulted him regarding troubles of this kind. He had seen evidence of the powerful effects of NH_4Cl on metallic zinc.

Mr. Dott said the paper was a very interesting one. It was known that ammonium chloride acted readily on many metals. The action was probably fundamentally electrical, due to presence of more than one metal. He did not think pure zinc would be acted on in the way described. He had doubts about the formation of NH_2ZnCl. He objected to the use of the term "univalent" mercury. There was no evidence that mercury was so.

Mr. Fraser said he had recently seen a zinc percolator which had rapidly become corroded. On examination it was found to be bound with copper, and he thought electrical action had a good deal to do with the corrosion in all cases.

Dr. Clark mentioned that he had recently had some zinc trays placed in his conservatory. These had been filled with ordinary furnace slag, and he observed that they very soon became completely covered with a white substance which he took to be zinc hydrate.

Mr. Nesbit stated that in many places in the colonies the domestic water supply was derived from galvanized iron roofs. He thought that must be a dangerous practice in view of the statements made in Mr. Fisher's paper, and these facts ought to be made well known to the public.

Mr. Shand stated that he had been working recently with pure zinc prepared by electrolysis. He found it to be soluble in a solution of ammonium oxalate, and thought it would also be soluble in a solution of ammonium chloride. With regard to the amine, said to be formed in this reaction, Roscoe and Schorlemmer mentioned a zinc amine having the formula $Zn(NH_2)_2$, and the compound referred to in the paper might be formed

from this by substitution of one atom of chlorine for one NH_2 radicle.

The Chairman remarked that they were much gratified to see a provincial member coming so far to contribute to their evening meetings, aud they would be very glad to see Mr. Fisher on any future occasion.

Syrup of Tolu by a New Process.

BY FREDERICK STEPHENSON.

The paper is printed on p. 785, and gave rise to the following discussion :—

Mr. Smith suggested that the syrup might be clarified by filtration through pumice stone.

Dr. Clark said the gist of Mr. Stephenson's paper was not in the making of a clear syrup, but in the avoidance of loss of aroma. This object might be attained by the use of an inverted condenser, and this would allow any more thorough exhaustion of the balsam which might be secured by the aid of heat. He had observed that some tolu syrups, specially those made from a liquor, though they had a cinnamic odour at first, gradually changed and acquired a benzoic odour. It would be interesting to know what was the cause of this change.

Mr. Boa said this paper was one of the most interesting he had heard at these meetings for some time. He could confirm what was said as to the loss of aroma in the ordinary process. Some time ago, the process had been conducted in his front shop, and it was found necessary to open the door and have the place thoroughly ventilated. He felt inclined to adopt the suggestion made by Mr. Stephenson.

Mr. Fraser said many of the commercial liquors contained excess of benzoic and cinnamic acid from the addition of spirit to the liquor before it was thoroughly cold.

Mr. Nesbit said he had frequently observed a marked benzine odour in empty bottles which had contained syrup of tolu. He thought this might possibly be due to the use of magnesia in clarifying some of the commercial liquors.

Presence of Manganese in Chlorinated Lime.

BY ALEXANDER SHAND.

The paper is printed on p. 785, and gave rise to the following discussion :—

Mr. Dott remembered that, as a student, when following the process of Fresenius for separation of iron, aluminum, chromium, zinc and manganese, by means of $BaCO_3$ and hypochlorous acid, he was warned about the development of a pink colour due to manganese. He had observed the pink colour produced in chlorinated lime solutions when heated, and attributed it to the presence of manganese which he thought was a very likely thing. The source of the manganese was no doubt the chlorine generator used in making the chlorinated lime, in which MnO_2 and HCl are used.

Mr. Baker said manganese was a frequent constituent of ordinary limestone, and that might perhaps account for its presence in the chlorinated lime.

The Chairman then proposed a hearty vote of thanks to the authors of the papers, which was unanimously passed with acclamation.

Attention was then directed to some specimens and donations which had been placed on the table. These included various drugs presented by Messrs. Christy and Co., London, and cinchona barks and caliche, a native sodium nitrate, containing considerable quantities of iodate, from Bolivia, presented by Messrs. T. and H. Smith and Co. Among the specimens was a peculiar fungus growing on a quantity of exhausted opium, from Messrs. J. F. Macfarlan and Co. It was thought to be a species of *Mucor* or *Pilobolus*, but had not yet been certainly identified. There was also shown a squill bulb which had been standing in a jar in the museum for many years, and which had recently begun to show signs of life and growth.

The Chairman intimated that it was proposed to have the next meeting on April 13. Then Mr. Thompson will contribute a paper on "Gelatin Coating of Pills," and will show a specially-designed machine in operation.

The meeting then closed.

Provincial Transactions.

REGISTERED CHEMISTS' TRADE ASSOCIATION OF LIVERPOOL.

The annual supper in connection with this Association took place on Thursday, the 17th inst., at the Merchants' Dining Rooms, 5, Castle Street. The attendance was large and representative.

Mr. Councillor Joseph Woodcock, President of the Association, occupied the chair; the vice-chair being occupied by Mr. B. Dickins, Vice-President.

After the usual loyal toasts, the President proposed the "Registered Chemists' Trade Association of Liverpool." In doing so, he said his duty was like proposing "Our Noble Selves," and it was on that ground he felt he was not called upon to say much in submitting the toast to them. He could not, however, let the occasion pass without offering a few words. Naturally their Association had not achieved as much good as they could desire, but they had to remember that associations, like individuals, could not command success. The Association had done as much as it fairly could to redress grievances and to consider complaints; it had done its utmost to foster and encourage earlier closing and had cultivated a kindly feeling of sympathy and forbearance among its own members. Benevolently, the Association had assisted those who under fortune's frowns had fallen in need of pecuniary help, and it had busied itself in many ways in benefiting the members in their entirety, and if they had no other record of its existence than the Liverpool chemists' price list, they could point to that achievement as a lasting monument to its memory.

The toast was drunk amidst enthusiasm, and was acknowledged by Mr. John Bain, the Honorary Secretary, who appealed for more members to assist the Association in more thoroughly carrying on its useful work. He pointed out that, among other objects for which the Association was founded, were the taking cognizance of proposed legislation affecting chemists and assisting in the prevention and suppression of illegal trading, and to do this effectually it was necessary that the chemists of Liverpool should be a well organized body.

Mr. B. Dickins proposed "The Liverpool Chemists' Association," which was acknowledged by Mr. A. C. Abraham, F.C.S.

Mr. J. J. Smith proposed "The Pharmaceutical Society of Great Britain," and remarked that he never yet saw cause to ask what the Society was doing for them, as he considered it performed its functions satisfactorily.

Mr. Charles Symes, Ph.D., in acknowledging the toast, defended the Society from the unwarrantable attacks which were so frequently made upon it by those who themselves do nothing to assist in promoting its objects. He also spoke of the advantages which would accrue from the proposed curriculum, which would prove a valuable corrective to the present system of cramming.

Mr. F. J. Mackinlay, in proposing "The Chemists and Druggists' Trade Association of Great Britain," urged those present who were not members to join.

Mr. R. Parkinson, Local Secretary, in responding, hoped and believed the Association had many useful years before it.

Mr. W. T. Warhurst proposed "The Wholesale Trade," which was responded to by Mr. Edward Evans.

Mr. J. Hocken proposed the toast of "The President," and referred to the advantages the Association enjoyed in having so eminent a gentleman at its head. Mr

Woodcock's value was not only appreciated by the chemists of Liverpool but also by their fellow-citizens, and no one could be more indefatigable in the performance of his public duties as city councillor and as churchwarden.

The toast was drunk with musical honours, and suitably responded to by the President.

Mr. G. Alexander proposed "The Vice-President."

"Our Musical Friends," proposed by the President, was responded to by Mr. N. F. Burt.

A high-class musical programme was gone through, to the evident delight of those present, this portion of the entertainment being in the hands of a quartette party from the cathedral church of St. Peter, viz., Messrs. N. F. Burt, D. J. Davies, W. Dakin and E. Grime. Mr. Martin Schneider performed the duties of accompanist with skill. The recital "Mark Antony's Oration over the Dead Body of Julius Cæsar," and the laughable sketch "Facts Concerning Jay Gould," were rendered by Mr. H. Jackson in the acceptable manner for which he is so well known. The reunion was amongst the most successful yet held by the Association.

LEICESTER AND LEICESTERSHIRE CHEMISTS' ASSOCIATION.

An address, entitled "Hints to Students," was delivered by Mr. W. B. Clark, at the Old Town Hall, Leicester, on Friday evening, March 18. Mr. E. H. Butler presided.

The lecturer thanked the Council for the honour done him in selecting him to deliver the inaugural address to the members of the Association. He was very pleased to meet them once more and renew his former close connection with the students of pharmacy in Leicester. The first question was for the students to have a clear idea as to what they were called upon to fulfil. Some called the calling of pharmacy a trade, others a profession, and he thought they had a clear claim to the latter title if only on account of the high abilities that were required in carrying out the ordinary calling of pharmacists; a man could not lose his professional status by performing trade duties, for "all labour should bring honour with it." The important point for them was, how soon ought apprentices to be students? His answer was, from the first hour of apprenticeship. It was of great importance that they should pass the Preliminary examination before apprenticeship so that they could then give their whole time to the study of subjects connected with their future calling. There was no merit in this examination, it was merely a proof that a young man possessed the right kind of knowledge to fit him for his calling. It also gave the student, in the event of failure, an opportunity of turning his attention to other callings. The technical part of their business could be learnt during the ordinary routine of shop work; the theoretical and more important part would require them to work hard to acquire. He advised them not to take more than two subjects at a time; it was a mistake to take three or four, whilst the concentration of the mind on one subject was apt to cramp the intellect. It was a very wholesome rule for students to cultivate close friendship, to select some fellow-student so that they could question each other, compare notes, and by viewing subjects from different standpoints arrive at the truth. He strongly urged them not to forget those old principles which went so far to ensure success in life: strict conscientiousness, untiring industry, truth, carefulness, and scrupulous cleanliness. The lecturer then referred to the many points to be particularly studied with reference to their calling, the lists of the Pharmacopœia, the study of the synopsis, and the prospects of the trade in the future. He urged the pharmacists to cultivate a feeling of *esprit de corps*, to be united so that they might resist successfully any encroachment on their legitimate rights. He strongly advised the students to attend regularly the excellent classes now being held at the Association, and to acquire thoroughly that knowledge which would entitle them to the respect and confidence of the public.

Mr. Burford proposed a vote of thanks to the lecturer for his able and exhaustive lecture. This was seconded by Mr. Thirlby and carried.

Votes of thanks to the Chairman for presiding, and to the Mayor for the use of the hall brought the meeting to a close.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The tenth meeting of the ninth session was held in the Pharmaceutical Society's House, 36, York Place, Edinburgh, Mr. William Duncan, President, in the chair.

The minutes of last meeting having been read and approved, the Chairman called upon Mr. Hill to read a paper on—

Irish Pharmacy.

BY JAMES JACK, PH.C., CORK.

Mr. Jack began by stating that Ireland was to many a hot-bed of sorrows, but it was not so to the enterprising chemist, to whom it offered a fair field for the successful prosecution of his calling. He also mentioned that in Ireland, as contrasted with Scotland, the social position of the chemist was higher than that of the ordinary shopkeeper, and he was looked up to by the majority of the people as a man little inferior in skill and knowledge to members of the medical profession.

The Irish pharmacist took a pride in his shop, and spared neither pains nor expense to have it elegantly fitted with all the latest improvements. It was also the custom to make all B.P. preparations, with the exception of chloroform, ether and such like, on the premises, thus affording valuable opportunities to apprentices for acquiring a thorough practical knowledge of their profession.

Mr. Jack then dealt with his subject under the two heads of "Business (Retail and Dispensing)" and "The Requirements of the Irish Pharmaceutical Society." Irish retail trade was, he said, very mixed, many chemists apparently selling anything on which they could turn an honest penny. Proprietary articles were very common, each chemist having his own specialities. One objectionable feature was the universal practice of selling coated pills, nearly all of which were imported from England or America.

Mr. Jack then made the following remarks on dispensing:—"This, where possible, is conducted in a separate department, which has many advantages, chief of which are the quietness given to a dispenser, allowing of that attention to the compounding which is so requisite for a true rendering of the much hackneyed phrase, 'Prescriptions dispensed with the utmost care and accuracy,' and when separate books are kept, of making known the best paying part of the business. For convenience, let us follow a prescription in its wanderings from the time of being received until sent out ready for the patient. A recipe on being handed in is examined. The name of the party and address asked, whether to be sent or called for, time received, and a note of the medicine required, all written on a specially prepared docket. To prevent confusion or different orders getting mixed, a system of small trays has been introduced. On these a small spring is fixed which holds the individual recipe, and its accompanying docket till wanted. There are in the compounding room a senior and one or two assistant juniors, no apprentice being allowed within its sacred precincts. The senior, being in charge, receives from the counterman the tray and contents, which after perusal he assigns to its proper place to be dealt with in turn. Should it be a mixture containing salts in solution, the dispenser

invariably strains it through either well washed very fine tow or lint. This done, after corking and polishing, the bottle is placed on its tray and returned to his senior. It is immediately, where a third hand is kept, given to him. Being as a rule a good round penman he copies, writes labels, etc. This process gone through, it is once more returned to the senior, upon whom now devolves the responsible duty of checking dispenser, copy and label. He being accountable for any mistakes must have all his wits about him. Having satisfied himself that all is right, he affixes the label and then considers the necessity of adding such labels as 'Shake the Bottle' 'Caution,' 'Poison,' or 'Not to be taken.' The former is put on all mixtures where there is the slightest possibility of a deposit. Finally as a guarantee of having passed through his hands, he affixes a small check label with his initials. The cork having been carefully sealed by means of a spirit lamp flame, the bottle is now ready for wrapping. For this purpose paper of the finest quality is used either white or of a lilac tint.

"It is the custom that returned bottles should never be refilled, new ones being always substituted. This in itself prevents much waste of valuable time, which scraping off of dirty labels and washing old bottles entails on an assistant, a duty which can be easily undertaken by a message boy.

"To save his reputation by preventing as far as possible the occurrence of a mistake the chemist uses distinctive bottles for each kind of medicine. All liniments are dispensed in blue actinic fluted bottles, eye-washes in green or white according to the colour of the solution. Gargles are sent out in French rounds, mixture in squares. Pure white glass, though costing a little more than the ordinary dispensing bottles, is generally used. Drops are sent out in bottles with a small lip for convenience. This way of dispensing, besides being conducive to safety, simplifies the washing of returns; thus greasy liniments are easily distinguished from mixtures or eye-washes. It also makes it easy for the unsophisticated to recognize their application and gives no loop-hole of escape from blame should they by chance or otherwise take a dose of liniment instead of their mixture. Pills by prescription are usually silver coated, except for the very poor. Many may think such an amount of trouble and fuss needless, and that so many apparent complications only tend to the making of mistakes, but where the maximum of work is to be taken out of the minimum of assistants, the above system, from well-tried experiments, has proved the most complete; combining dexterity of manipulation with the utmost safety to all.

"The dispensary being entirely apart from the retail necessitates a complete stock of its own. This, however, does not need to be large but varied. A few dozen 2 ounce wide-mouthed stoppered bottles and a like number of 12 or 16 ounce narrow-mouthed bottles with recess labels, makes a tidy little place."

Mr. Jack then referred to the history, present position, and examination requirements of the Irish Pharmaceutical Society, and concluded an interesting and racy paper as follows:—"My little experience of Irish chemists has proved them to be gentlemen in all senses of the word. They meet you, if a stranger, with 'Welcome to Ireland,' and part, as all Irishmen do, with 'God bless ye.'"

The Chairman moved a cordial vote of thanks to their absent member, Mr. Jack, for his interesting and humorous paper.

In seconding the motion, which was passed with acclamation, Mr. Boa said he had had some experience of pharmacy in the North of Ireland, and could confirm much that had been said by Mr. Jack. The practice in the South appeared to correspond very closely to that in the North.

The Chairman then called upon Mr. A. R. Bennet to read a paper on:—

The Calamines of Commerce.

BY A. R. BENNET.

When I was asked at the commencement of the session to deliver a paper before this Association, I felt that I had not a subject in view which I could treat in a satisfactory manner; but our President coming to know of the difficulty suggested that I should make some experiments on a few commercial samples of calamine, and report the results, which I have much pleasure now in bringing before you.

Before I proceed further, perhaps it will not be out of place to refer briefly to the history of calamine. The word calamine is derived from the Latin *calamus*, a reed of corn, from the mineral being found in long reeds. Although we are only familiar behind the counter with one kind of calamine, which has a pinkish tint, and is usually in the state of a fine impalpable powder, yet there are two kinds known to mineralogists. The one is a silicate of zinc, which is found native in Cornwall among the rocks, and adds to the beauty of the surrounding district. The other is the impure carbonate of zinc B.P. with which we are all acquainted, and of which I am about to speak. It is found in various parts of England, and also in some places on the continent. It is hard, sometimes presents a greyish appearance, but more commonly a yellowish or reddish colour, has an earthy fracture, and is soluble with effervescence on the addition of acids, but frequently not at all, either because silicated calamine has been wrongly used in its preparation, in which case it is insoluble, or it has been roasted too strongly before being pulverized, and therefore does not effervesce. At the best it is a very impure substance, containing generally as impurities iron, lime, alumina, and various other earthy matters, as well as a large amount of sulphate of barium.

It is only used externally, and for that purpose it must be in the state of a very fine powder; the B.P. therefore directs that it should be calcined at an ordinary temperature, powdered and freed from gritty particles by elutriation.

During the process of calcining, if too strong heat has been applied, the CO_2, if not wholly, is to a large extent driven off, hence the non-effervescence on the addition of acids, and this is also the reason for the official direction to use an ordinary temperature.

I tested four samples all got from various sources in town, and now report the following results:—

Sample No. I.—This was a pinkish coloured powder, and in the state of very fine division, and had the physical appearance of ordinary calamine as seen in shops. One hundred grains of this sample was carefully weighed and treated with HCl and HNO_3, and subsequently boiled.

The soluble matter was then filtered off, and the residue, when dried, was found to weigh 72 grains. It was observed that on the addition of acid the sample did not effervesce, showing that the CO_2 had been driven off by excessive heat during the calcining process, or silicated calamine had been wrongly used in preparing it.

The filtrate was treated with H_2S, but no precipitate was thrown down, showing the absence of copper, lead, etc.; it was then made alkaline with NH_4Cl and NH_4HO, and NH_4HS was added. This threw down an abundant precipitate, which was collected and washed. The precipitate was next dissolved in HCl, afterwards adding a few drops of HNO_3 to convert any iron that might be present into the ferric state, and then adding AmHO to form the $Fe_2 6HO$, and dissolve out any zinc. This precipitate was treated with KHO to dissolve out any alumina as $Al_2 6HO$, and the alkaline solution of the $Al_2 6HO$ was neutralized by HCl and treated with NH_4HO, which threw down a white gelatinous precipitate of $Al_2 6HO$. This was collected, washed, ignited and found to weigh 12 grs. Al_2O_3.

The residue consisting of $Fe_2 6HO$ was dried, ignited, and found to weigh 2·5 grs. Fe_2O_3.

The NH_4HO solution was treated with a current of

H_2S, and an abundant precipitate of ZnS was thrown down. It was collected, washed and dried, and found to weigh 5·5 grs. ZnS corresponding to about 4·5 grs. ZnO.

The filtrate from the NH_4HS precipitate was treated with $(NH_4)_2CO_3$ which threw down a white precipitate. This was collected, dried and ignited, and found to weigh 5·5 grs. CaO.

Na_2HPO_4 added to the $(NH_4)_2CO_3$ filtrate gave no precipitate, indicating absence of magnesia.

The residue weighing 72 grains I supposed to be a mixture of sulphate of barium and silica. It was fused in a crucible with Na_2CO_3, so as to produce double decomposition and form Na_2SO_4, Na_4SiO_4, and $BaCO_3$.

The fused mass was treated with water to dissolve the Na_4SiO_4, and filtered from the $BaCO_3$ which is insoluble in water. The filtrate was treated with HCl which formed NaCl, soluble in water and precipitated the SiO_2. The SiO_2 was dried, ignited, and found to weigh 50·5 grs.

The $BaCO_3$ which was left behind on the filter was dissolved in HCl, and H_2SO_4 was added to the filtrate. This treatment threw down the barium as the insoluble sulphate, which, on being thoroughly washed with hot water, dried and ignited, was found to weigh 11·5 grs. $BaSO_4$

Sample No. II.—This presented a greyish appearance, and was also in the state of a very fine powder. On the addition of HCl and HNO_3 it effervesced briskly and left no residue. On passing H_2S nothing was thrown down, showing the absence of lead, copper, etc., but on making alkaline with NH_4Cl, and NH_4HO, and adding NH_4HS an abundant precipitate was thrown down. This precipitate was collected, washed, dissolved in HCl with a few drops of NHO_3 in the same manner as the first, and then treated with excess of NH_4HO, filtered and the residue treated with KHO. The KHO solution was filtered, neutralized and NH_4NO added, which threw down the Al_2 6 HO and this was collected, dried and ignited—the residue weighing 10·4 grs. Al_2O_3.

The residue of the KHO solution consisting of Fe_2 6 HO was washed, dried, ignited, and found to weigh 12 grs. Fe_2O_3 A current of H_2S was passed through the NH_4HO solution, and an abundant white precipitate was thrown down. The precipitate was collected, washed and dried. It weighed 98 grs. ZnS corresponding to 81·8 grs. ZnO.

The filtrate from the NH_4HS precipitate was treated with $(NH_4)_2CO_2$ and nothing was thrown down, showing the absence of lime. It was then treated with Na_2HPO_4 and nothing was thrown down, showing absence of magnesia.

Sample No. III.—This was a small portion of the native ore, and, from the results obtained, I think it must have been a fairly good specimen. On treating it with HCl and HNO_3 it effervesced briskly and dissolved entirely. On adding H_2S nothing was thrown down, but on adding NH_4Cl, NH_4HO, and NH_4HS an abundant precipitate was thrown down. The precipitate was collected, washed and dissolved in HCl with a few drops of HNO_3 and then treated with NH_4HO in the same manner as the foregoing. The residue of the NH_4HO solution was treated with KHO and the filtrate neutralized and treated with NH_4HO which threw down no precipitate, showing the absence of alumina.

The residue of the KHO solution consisting of $Fe_2$6HO was dried, ignited, and found to weigh 18 grs. Fe_2O_3. A current of H_2S was passed into the NH_4HO solution, and an abundant precipitate of ZnS was thrown down, which, when collected, washed and dried, weighed 79 grs. ZnS corresponding to 65·9 ZnO.

On adding $(NH_4)_2CO_3$ to the NH_4HS filtrate no precipitate was thrown down, showing the absence of lime. Na_2HPO_4 when added threw down no precipitate, showing absence of magnesia.

Sample No. IV.—This sample is rather interesting from the fact of its forming part of a wholesale order. An order was received for 1lb. calamine, and an article at 5*s.* 6*d.* per lb. was sent, but it was returned, saying that the calamine wanted was the kind at 2*d.* per lb. It had the physical appearance of ordinary calamine, but on drawing a spatula carefully over it particles of Fe_2O_3 were observed, as if it had not been thoroughly incorporated. On putting a few grains under the microscope the particles of Fe_2O_3 were easily observed.

I proceeded as in the other cases. I dissolved as much as possible with boiling HCl, and HNO_3, and filtered. The residue in this case, after being washed and dried like the others, weighed 84 grs.

The filtrate yielded nothing to H_2S, but a copious precipitate was thrown down with NH_4Cl, NH_4HO, and NH_4HS. This was collected and washed, dissolved in HCl with a few drops of HNO_3, and NH_4HO added, then filtered. The filtrate was treated by a current of H_2S, but nothing came down, showing the absence of zinc. The residue was treated with excess of KHO, and the filtrate was neutralized with HCl and NH_4HO added, but nothing was thrown down, showing absence of alumina.

The residue of the KHO solution when ignited weighed 12·5 grs. Fe_2O_3.

The residue of the original solution was fused in a crucible with Na_2CO_3, and the fused mass treated with water filtered, and the filtrate treated with HCl, but nothing was thrown down, showing the absence of silica.

The residue on the filter was dissolved in HCl, and the filtrate treated with $HgSO_4$ to throw down the barium as $BaSO_4$. This when dried and ignited weighed 84 grains of $BaSO_4$.

The results are tabulated as follows :—

	1.	2.	3.	4.
Al_2O_3 . . .	12	10·4	None	None
Fe_2O_3 . . .	2·5	18	12	12·5
ZnO	4·5	65·9	81·8	None
CaO	5·5	None	None	2·5
SiO_2	60·5	None	None	None
$BaSO_4$ . . .	11·5	None	None	84
Loss	3·5	5·7	6·2	1
	100·0	100·0	100·0	100·0

From these results I have come to the conclusion that the brightest coloured specimens of calamine are the worst, while the grey coloured specimens are the best. I have also been a little surprised to find that a calamine similar to that marked No. 4, appears to be very largely used in pharmacy, and it is quite the exception to meet with a sample corresponding, even approximately, to the official characters and tests.

The Chairman, in moving a vote of thanks to Mr. Bennet, stated that Mr. Martindale described calamine as an oxide of zinc. He had himself had experience of calamine made by adding Armenian bole to zinc oxide, but he did not think that was what was intended by the Pharmacopœia.

Mr. Lunan, in seconding the vote of thanks, said that it was clear that in many cases where calamine was ordered in cooling lotions, the patient would be applying sulphate of barium and that was certainly not the intention of the prescriber. He had observed that since the reintroduction of calamine to the Pharmacopœia, manufacturers had attempted to accommodate themselves to the new conditions, and fine-coloured calamines, soluble in acids, could be had, but whether these were native calamine or an artificial imitation was open to doubt. He was surprised at the apparent small percentage of CO_2 even in the best samples examined by Mr. Bennet and that seemed to indicate that the zinc really existed in the mineral as oxide to a considerable extent.

Mr. Hill remarked that a calamine which produced a

green colour when shaken off a spatula into a Bunsen flame and gave red streaks when a spatula was drawn firmly over it on a sheet of white paper might be certainly regarded as spurious, being a mixture of ferric oxide and heavy spar.

The vote of thanks having been heartily awarded the meeting was closed.

Proceedings of Societies in London.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting was held on Thursday, March 17, Mr. E. J. Woolley in the chair.

The proceedings commenced with some remarks by the Secretary, Mr. F. W. Short, on the difficulties experienced and the errors most commonly fallen into by beginners in analysis. The discussion of the subject was continued by the Chairman, Miss Munro, Messrs. White, Eastes, Thomas, Bird and Daintree.

Mr. F. J. Yeatman then read a Report on "Physics," the subject of which was "Magneto-Electric and Dynamo-Electric Machines." The author first dealt briefly with the general phenomena bearing on the subject and the laws governing them, describing more particularly the solenoid, and showing its resemblance to the magnet; this led to the magnetization of an iron core by a current passing round it, and the induction of a current in a coil of wire by the insertion or withdrawal of a magnet. Next, the effect of a smaller coil of wire with a current alternately increased and diminished, replacing the magnet, was considered. From this the author proceeded to trace the development of the magneto- and dynamo-machine from its first crude conception of a horse-shoe magnet revolving its poles in front of a pair of bobbins, to its present state. Many typical machines were described, and special reference made to the Siemens and Gramme armatures. The report was illustrated by means of a small magneto-electric machine, and gave rise to a discussion in which the Chairman, Secretary, Messrs. Bird and White joined.

The meeting then adjourned.

CHEMICAL SOCIETY,

At a meeting of the Chemical Society on Thursday, March 17, Dr. Hugo Müller, F.R.S., President, in the chair, several certificates were read for the first time, and the following were elected Fellows of the Society :—Messrs. H. G. Colman, J. T. Cundall, A. J. Evans, A. Harden, W. Houlding, T. H. Redwood, G. Robertson, W. H. Stanger, P. T. O'Sullivan.

The following papers were read :—

The Action of Heat on Nitrogen Peroxide. By Dr. A. Richardson, University College, Bristol.—The dissociation of nitrogen peroxide has been investigated by Deville and Troost and other experimenters at temperatures between $-12°$ and 180° ; and it has been shown that while at low temperatures the molecule of the substance is represented by the formula N_2O_4, dissociation into nitrogen dioxide, NO_2, takes place with rise of temperature, being complete at 140°. Experiments have been made by the author to determine the change which takes place at temperatures above 140°. On heating the peroxide at about 500°, the gas becomes nearly colourless, and is found to consist of nitric oxide and oxygen : the presence of the former being indicated by the formation of the dark blue liquid which results from the interaction of nitric oxide with nitrogen peroxide when the gas is condensed ; and the presence of oxygen being demonstrated by the rekindling of a glowing match. At a temperature at which decomposition is complete, the change would be represented by the equation $2NO_2 = 2NO + O_2$; the vapour density of the dioxide being 23, that of the product is 15·5. On determining the density of the gas at temperatures between 130° and 500°, the numbers obtained were in agreement with the formula NO_2 at 140°, but as the temperature rose they more and more nearly approached that corresponding to complete dissociation. The curve representing the density of the gas at different temperatures shows that the decomposition of N_2O_4 into NO_2 is complete at 140°, and is immediately succeeded by the further dissociation of nitrogren dioxide into nitric oxide and oxygen. The form of the curve is that usually exhibited by dissociating substances, the change of density being most rapid at the temperature at which half the total number of molecules of the original substance are decomposed.

Supersaturation of Salt Solutions. By W. W. J. Nicol, M.A., D.Sc.—This paper contains an account of experiments on the physical constants of supersaturated and dilute salt solutions. The solutions were examined in two ways : 1st, concentration constant and temperature varying ; 2nd, temperature constant and concentration varying ; in this was it way possible to pass from dilute to supersaturated solutions, and to examine the change in the various physical constants. The electric conductivity, specific viscosity and rate of expansion were examined by the first method. The specific vicosity and density by the second. In every case it was found that the curve corresponding to the non-saturated solutions was perfectly continuous with that for the supersaturated solutions. From this the author concludes that the constitution of dilute, saturated and supersaturated solutions is the same. Supersaturation is explained by the hypothesis that the substance in solution is not the same as that which crystallizes out. A supersaturated solution of sodium thiosulphate deposited crystals of the composition $Na_2S_2O_3,H_2O$ when evaporated *in vacuo*, showing that the solution does not contain the pentahydrate. The author believes that the salt in solution is combined with the whole of the water, an opinion based on his experiments on vapour-pressures and molecular volumes. Colour changes in solution are not, he believes, due to hydration, but to rearrangements of the salt molecule similar to that which occurs in the case of chromium sulphate.

The Formation of γ-Naphthalenesulphonic Acid by means of Sulphuric Anhydride and on γ-Dihydroxynaphthalene. By Henry E. Armstrong and W. P. Wynne, B.Sc.

α-Cyanonaphthalenesulphonic Acid. By Henry E. Armstrong and S. Williamson.

Addendum to Paper entitled An Explanation of the Laws which govern Substitution in the case of Benzenoid Compounds. By Henry E. Armstrong.

The Transformation of Citric Acid into Pyridine-derivatives, and on the Constitution of Pyridine. By S. Ruhemann, Ph.D., Jacksonian Demonstrator in the University of Cambridge.—Hofmann and Behrmann have shown that citramide is converted by heating with sulphuric acid into citrazinic acid, the dihydroxypyridinecarboxylic acid in which both hydroxyls are in ortho-positions to the nitrogen-atom, the carboxyl being in the para-position. The author finds that the formation of the pyridine-derivative takes place even at ordinary temperatures if ethylic aceto-citrate be mixed with strong aqueous ammonia and the mixture allowed to stand several days ; dilute chlorhydric acid then precipitates citrazinamide. The production of a pyridine-derivative in this manner is a strong argument, he thinks, in favour of Riedel's contention that the nitrogen-atom of pyridine is in connection with the carbon atom which relatively to it is in the para-position ; and in further support of this view he states that no condensation takes place if methylamine be substituted for ammonia, there being in this case no available hydrogen-atom associated with the nitrogen-atom to separate with the hydroxyl and thus permit of the union of the nitrogen-atom with the para-carbon-atom. Incidentally it is mentioned

as an indication of the mobility of the acetyl-group that if ethylic aceto-citrate be treated with phenyl hydrazine, the acetyl-derivative of the latter is formed; ethylic aceto-malate and diacetotartrate behave similarly.

Silver containing Bismuth. By WILLIAM GOWLAND, A.R.S.M., Chemist and Assayer of the Imperial Mint, Osaka, Japan, and YOSHIMASA KOGA, Assistant Assayer. —An account is given of assays and metallurgical experiments made with the object of determining the effects produced by the presence of small quantities of bismuth on the ductility of silver, and on the uniformity of composition of silver bullion when in ingots of the form and size ordinarily met with in commerce. It is found: α. That when silver is obtained from copper containing bismuth by the liquation process with subsequent cupellation of the argentiferous lead, it contains part of the bismuth which was present in the copper; β. That this silver is brittle even when containing bismuth in but small amounts; γ. That ingots of such silver are not uniform in composition throughout their mass, the parts which have solidified last being richer in silver than the others; and δ. That when coinage bars of 900° millesimal fineness are prepared from it, they cannot be rolled without special treatment, and even then are hard and unsuitable for mintage.

Obituary.

Notice has been received of the death of the following:—

On the 14th of March, Mr. William Henry Howlett, Chemist and Druggist, Edward Street, Bethnal Green Road, E. Aged 60 years.

On the 14th of March, suddenly, at 52, Woodstock Road, Finsbury Park, N., Mr. William Sheehan, jun. Aged 27 years.

On the 19th of March, Mr. Richard Weatherill Duck, Chemist and Druggist, Bute Docks, Cardiff. Aged 48 years.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE BENEVOLENT FUND.

Sir,—In reference to a letter signed by a Mr. H. J. Church, headed "The Benevolent Fund: A Suggestion," I venture, whilst quite agreeing with the writer in his idea as to a movement to celebrate the jubilee year of Her Gracious Majesty's reign, to suggest that, whereas the advantages to be derived from the Benevolent Fund are as at present sufficiently liberal, a scheme by which presentations to Christ's Hospital or the Royal St. Anne's School might be obtained would be of more real assistance to the profession at large.

I may add that in making the suggestion I have no personal interest to serve, as I have no children to plead for.

Peckham Rye. C. H. SNELL.

THE FUTURE OF PHARMACY.

Sir,—A "*tu quoque*" answer is always very unsatisfactory; nevertheless, I feel I must, in justice to myself, trespass upon your courtesy and the indulgence of your readers, whilst I reply to criticisms of our worthy Honorary Secretary and also of my esteemed friend, Mr. H. Kemp. I would, however, first of all premise that a perusal of the two letters would scarcely endorse the impression conveyed by Mr. Woolley's remarks in Council, viz., that Manchester pharmacists were in favour of the Bill. Mr. Benger says several (himself amongst the number) were opposed to it. Mr. Kemp conveys the idea that a very large minority were opposed to the Bill; will Mr. Kemp say that those gentlemen who "formed more than half," *i.e.*, and who numbered, I am told, considerably under twenty, would arrogate to themselves the right to speak for the whole body of Manchester chemists? At all events, the most I can gather from Mr. Kemp's letter is that only "more than half" of those present cordially endorse the Bill. Why does Mr. Benger, the most scientific pharmacist we have, and an ex-examiner, to boot, continue the old-fashioned system of vulgar fractions? Perhaps the large number of cyphers necessary after the decimal point startled him. Well, certainly ·00001 would not look well concerning a meeting supposed to represent the whole trade of Manchester. However, of this Mr. Benger may rest satisfied, that those who know our courteous and genial Hon. Sec. would certainly not assign any fraction to him, but a very large whole number, one which would beyond all doubt bury the total far beyond the sum requisite to do away with any vulgar or other fraction. In reply to Mr. Benger's last paragraph, will he accept my assurance that, of the members of the Association who live in this district, the percentage opposed to the Bill is not ninety-nine but exactly one hundred. One word in reply to my friend Mr. Kemp. His letter not only "invites," but absolutely demands an emphatic denial. Mr. Kemp's excessive innate bashfulness precludes him acknowledging his position in the trade. I can tell you, Sir, that by his neighbours Mr. Kemp is looked upon as an aristocrat of the aristocrats, in fact the chiefest among ten thousand; his last paragraph is so utterly at variance with his world-wide reputation for accuracy, that I can scarcely imagine the conditions under which it was written, except, perhaps, that his junior apprentice in his (Mr. Kemp's) temporary absence has written part of it for him. I never said, either in the meeting or out of it, that I would open the discussion; I certainly suggested the subject at the December meeting, but if nothing else had prevented me, my native modesty would have effectually hindered my proposing to inflict myself a second time in six months. I knew nothing at all about the meeting until three or four days before, when Mr. Benger wrote me to say that he had put me down to open the discussion; but an important meeting of the Council of the Microscopical Society, prevented me (as I informed Mr. Benger) being present, otherwise, no doubt, I should have been there. Mr. Kemp, however, seems to be unaware of the fact that by staying away and destroying the truly representative character of a meeting, an opposition may perform its duties perhaps better than by attending. Such, however, was not my idea. Surely, Sir, a Bill that has the support of only 10 per cent. of the trade and one trade journal, is opposed by the whole of the Council of the Society, and vigorously denounced by almost every journal and newspaper of any importance throughout the whole country, a Bill which even a many of its supporters admit is built on a rotten basis, surely a Bill like this can confer very little benefit on the drug trade. In conclusion, can you, Sir, or any of your correspondents, who are well versed in psychology, explain how it is that when the Council (composed of men thoroughly conversant with the drug trade, whose sole interest it is to look after our best interests) attempt to bind us, even with silken cords, there is such a howl of rage; whilst, when a gentleman who knows nothing about our wants, and who derives his inspiration from the trade "Tits Bits," attempts to place heavy wrought-iron fetters upon us, so very many of these same gentlemen hail him as a deliverer?

131, *Embden Street, Manchester.* J. HART.

Sir,—Upon reading the advertisements contained in a recent issue of your valuable Journal, I was greatly surprised at seeing the following:—"Wanted.—A smart young man as Manager of Branch just opened. Must be accustomed to extract teeth, mix paints, and the general routine of a mixed trade."

At first, I was inclined to think that some pharmacist, with a view of opening a discussion, had desired to have it inserted; if that were the case he ought to be highly commended; but upon reconsideration, I could hardly imagine that such was his idea.

Our friend, I presume, required a qualified manager, and he appears to have overlooked, or forgotten, the fact,

that the "art of mixing paints" is not, at present, one of the subjects required for the Minor or Major examination; but I would certainly suggest (if only in order to prevent our friend from disappointment) that such an addition to the list of subjects be made.

It is our duty, as chemists, to wish our brother pharmacist success in his recently opened branch; but I can hardly conceive the idea of many patients submitting themselves to the torture of having teeth extracted, when they would probably be conducted to the surgery by the operator, whose attire would undoubtedly be smothered with paint, or other ingredients, equally as disgreeable, contained in its preparation.

For my part, I should like to see such advertisements returned to the senders. They are, in my opinion, insults to chemists generally, and have a powerful tendency to reduce the trade of a chemist to the level of that of an oil and paint store.

PRO BONO PROFESSIONIS.

LINIMENTUM TEREBINTHINÆ AND SAPO MOLLIS.

Sir,—As probably the earliest and largest manufacfacturers of B.P. soft soap, we think that a few remarks from us on the subject of Professor Redwood's "Note on Linimentum Terebinthinæ and Sapo Mollis" may be of interest to your readers.

Whilst we are at one with the Professor in regarding the green shade required by the Pharmacopœia as no special guarantee of the purity of the oil employed, we cannot agree with him that "yellowish-white" is necessarily the proper colour of a genuine olive oil soft soap. Good quality olive oil may be obtained of various shades, and when properly saponified yields a transparent soap of a colour ranging from green to yellow, according to the oil used.

Doubtless artificial colour is employed by some, and a soap produced solely from cotton-seed oil is made to imitate the shade specified by the Pharmacopœia, but it would be very unfair on this account to stigmatize all green soaps as fraudulent imitations, or, on the other hand, to assume that soap of a yellow shade is of necessity made of olive oil.

Owing to the recommendation of the Pharmacopœia we have been led to select olive oils of a green shade for the manufacture of medical oil soap, and have often found difficulty in securing them pure. We are consequently glad that the matter has been ventilated in your valued Journal, as on more than one occasion we have had a perfectly pure olive oil soap rejected because its shade of colour was not considered sufficiently green.

If we might offer a suggestion it would be that pharmacists should depend on the character and standing of the makers rather than on the colour of the soap.

In conclusion we may add that we very much doubt the value of laboratory-made samples of soap, as it requires practical knowledge and experience to obtain a proper chemical combination between oils and alkalies in small quantities.

The City Soap Works, London. D. and W. GIBBS.

LIQUOR STRYCHNIÆ, B.P., 1867 AND 1885.

Sir,—Having observed the same phenomenon for a long time in the liq. strychniæ, B.P., 1867, as noticed by Mr. Farr and Mr. Maddison to occur also in that prepared according to the 1885 B.P., viz., the separation of crystals of the strychnia from the solution, and as I had the occasion to make up some the other day from the new formula, before doing so I examined the shop bottle in which there still remained about 1½ fluid ounces, and I found a goodly crop of fine, large, well-defined crystals of strychnia. Some measured one-half to five-eighths of an inch long, showing that they must have been slowly formed. These were carefully separated and dried between folds of filter paper and weighed, their weight being found to be 7 grains.

After having found the weight of the separated crystals I then wished to determine the amount of strychnia in the remaining solution, and, having measured 120 minims, carefully evaporated it to dryness and weighed the residue, found it to be ·75 grain, therefore, ·75×4 gave 3 grains of strychnia in solution to the fluid ounce, indicating a loss of 25 per cent. in the strength of it.

The foregoing results were obtained from 8 ounces of liq. strychniæ, 1867, B.P., so that when we add the weight of separated crystals to the weight of strychnia left in solution, the loss of strength is accounted for, as it shows that about 1 grain per fluid ounce of strychnia separates slowly out of solution on standing.

Consequently, when we find the strychnia separating from the solution in the 1867 B.P., which contained 4 grains to the ounce, we will probably find an increased quantity separate from the liq. strychnia, 1885 B.P., as the amount has been increased by ½ a grain to the fluid ounce, the solvent remaining proportionally to the strychnia the same. However, I intend to watch carefully if the deposit of crystals from it be greater than those obtained from the old formula.

JOHN C. HUNTER, A.P.S.

99, *Great Western Road, Glasgow.*

DISPENSING OF TEREBENE AND TOLU.

Sir,—Allow me to corroborate Mr. T. A. W. Sewell's observations regarding the non-emulsification of terebene with tragacanth. I failed to get a satisfactory result, the terebene separating in small globules.

At the meeting of our Association, Mr. W. S. Turnbull said he had made the mixture to his entire satisfaction by the same method as Mr. J. Bisset's, but using only mucilage of acacia.

It is not to be expected that the discussion on each paper can be printed when so many notes are read on one evening.

ALEXANDER ROBBIE.

Royal Asylum, Morningside, Edinburgh.

ERGOTIN, B.P.

Sir,—Having recently prepared two or three small batches of ergotin, B.P., I have been somewhat surprised to notice the small yield of the purified extract when compared with the quantity of liquid extract originally employed.

The result is all the more noticeable if contrasted with the price for ergotin as given in ordinary trade lists, which, with tolerable uniformity, quote it at 1*s.* per ounce.

Working with 4 lbs. of ext. ergotæ liq., prepared from fine Spanish ergot, and costing about 3*s.* per lb., I can procure no more than 1000 grains of ergotin, which involves a net cost at or near 10*s.* per ounce. I should be glad to know whether the experience of any of your readers coincides with my own in the preparation of this article, and at the same time I should be interested to learn in what particulars the manufacture of commercial ergotin differs from those authorized by the British Pharmacopœia.

Kilburn. CHARLES B. ALLEN.

Erratum.—H. J. Church's letter, page 779, about the middle of second paragraph, *for* "plays and fireworks," *read* "flags and fireworks."

Query.—The paper on the "Spectroscope in Pharmacy," by Mr. W. Gilmour, was published originally in the *Pharmaceutical Journal*, [3], vii., pp. 529 and 569, and was briefly referred to in the 'Year-Book' for 1877. We would remind you that a General Index of the 'Year-Book' has recently been published at a nominal price.

P. H. Marsden.—You have sent two species: *Evernia prunastri* and *Ramalina pollinaria*: Lichenes.

Aberdeen and North of Scotland Society of Chemists and Druggists.—In reference to the subject of a paragraph respecting this Society that appeared on p. 772, we have been requested to state that the annual subscription of a Town Member is one guinea, and that of a Country Member half-a-guinea. It is expected that the annual dinner will take place on the 29th of June.

G. A. Cubley.—Your letter has been received, but we do not think it desirable to alter the decision announced last week to close the discussion.

G. F. Brimson.—Butter of antimony or a mixture of blue vitriol and chloride of iron is usually used for the purpose.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Hooper, Flückiger, Plowman, Madsen, Baxter, Sanger, Sears, Prust, C. B. G.

"THE MONTH."

Antithermin.

"Antithermin" is the name that has been proposed for a new synthetically prepared compound which has just been added to the army of antipyretics (*Nouv. Rémèdes*, March, p. 102). The systematic name of the compound is "phenylhydrazinlevulinic acid," from which it is evident that it has a near chemical relationship with "antipyrin." It will be remembered (see before, vol. xv., p. 341) that one of the intermediate products in the formation of this widely used antipyretic is phenylhydrazin, the composition of which is represented by the formula—

$$N_2\begin{cases}C_6H_5\\H\\H\\H\end{cases}$$

This compound has the property of combining with other compounds to a remarkable extent, as, for instance, with aldehydes, ketones, sugars and ketone acids, antipyrin being, in fact, a methylated derivative from a compound of phenylhydrazin with acetoacetic acid. The new antipyretic is a compound of phenylhydrazin with acetopropionic acid, a homologue of acetoacetic acid, to which the name levulinic acid also has been applied because it can be prepared by oxidizing levulose. Phenylhydrazinlevulinic acid, or antithermin, is said to be obtained by dissolving phenylhydrazin in dilute acetic acid, and adding to it a solution of levulinic acid, which gives rise to a yellow precipitate that yields well-formed crystals upon recrystallization from alcohol.

Acetyl-Amidophenol.

Still another antipyretic that is threatened to invade us from Germany is described variously as being p-acetphenetidin (*Cent. f. med. Wissensc.*, 1887, No. 9) and p-acetphenidin, or acetylized p-amidophenol, $NH_2.C_6H_4O.CH_2.CO_2H$ (*Pharm. Centralh.*, March 17, p. 143). A writer in the *Pharmaceutische Zeitung* (March 26, p. 178) points out that this leaves the identity of the compound still in doubt, for not only is the formula given inconsistent with either name, but that para-amidophenol is theoretically capable of yielding two acetyl derivatives, an acetyl residue replacing hydrogen in the NH_2 group in one and in the HO group in the other. Probably, however, as the compound is the subject of a patent this is of little practical importance. The compound is said to occur in small colourless or faintly reddish needles, which are tasteless, difficultly soluble in water, but somewhat more freely soluble in alcohol and strong acetic acid; and melt at 135° C. The preparation is given in doses of 0·2 to 0·5 gram, but according to Messrs. Hinsberg and Kast, who have experimented with it, doses of 1 to 2 grams have proved harmless. Up to the present time this new antipyretic does not appear to have been favoured with a trivial name, but should it come into sufficient use to make one desirable, it may be hoped that an effort will be made to get outside the monotony of "anti" which now threatens to become a source of confusion.

Action of Antipyretics.

Whilst lecturing recently in Vienna on the treatment of typhoid fever Professor Nothnagel made some interesting remarks on the relative action of certain antipyretics when administered for the purpose of reducing temperature in that disease (*Med. Press and Circ.*, March 16 and 30, pp. 238, 291). The Professor laid it down as an axiom that the more energetically and rapidly a "chemically acting antipyretic" reduces the temperature the more marked are certain phenomena which have been recognized as concomitant symptoms, and under some conditions as dangerous concomitants of the natural reduction in temperature of the crisis. This is seen very markedly, for instance, when such a substance as resorcin or kairin is administered: the temperature falls rapidly; the patient sweats profusely; a pulse and cardiac action are set up that suggest collapse, or there is even collapse; afterwards the temperature rises again with a rigor or chill. The same appearances may be observed after the administration of thallin, antipyrin or antefebrin,—which he considers to be about equal as antipyretics,—but not to so great a degree. The temperature, after the administration of one of these, does sometimes fall with more or less pronounced symptoms of collapse, but not always, nor even as a rule; this may depend partly on the size of the dose, or partly on individual susceptibility. Professor Nothnagel therefore denounces as incorrect and unphysiological the practice of introducing a new antipyretic with the statement that it produces no disagreeable bye-effects, since the most that can be justly claimed for any of this class of antipyretics is that such symptoms following its use are relatively infrequent. With quinine the fall of temperature is still less rapid, the effect is more lasting, and the subsequent rise, when it occurs, takes place more slowly; whilst the objectionable symptoms are practically absent. Sodium salicylate stands about half-way between quinine and the thallin group.

Alantol and Alantic Acid.

Helenin, the stearoptene obtained from elecampane root (*Inula Helenium*) has been recommended in the treatment of tuberculosis and diphtheria and credited with being a powerful antiseptic (*Pharm. Journ.*, [3], xv., 890; xvi., 919). But according to Herr Marpmann (*Pharm. Centralh.*, March 10, p. 123) the root yields two other compounds, both of which are more powerful antiseptics than helenin; these he has named alantol and alantic acid, apparently from the German popular name of the root "Alantwurzel." They are obtained by the distillation of the root, which yields a mixture of helenin, alantic anhydride and alantol. Alantic acid ($C_{15}H_{22}O_3$) is described as crystallizing from alcohol in white crystals, melting at 91° C., and subliming as the anhydride ($C_{15}H_{20}O_2$). Both the acid and anhydride are insoluble in water, soluble in alcohol and fixed oils, and form with alkalies readily soluble salts. Alantol ($C_{20}H_{32}O$) is an aromatic lævogyre liquid that boils at 200° C., combines after a time with water and possesses "ozonizing" properties. It is probably formed during the distillation from some other constituent of the root. Alantic acid and alantol were always obtained as a mixture, and this mixture is said to have given better results than helenin in the treatment of tuberculosis, whilst its use can be continued a long time without inconvenience. The author states that only fresh roots should be used for distillation, as the roots appear to lose their active constituents with age. Dr. Dono reports (*Nouv. Rém.*, p. 142) that he has employed helenin with favourable results in three cases of chorea, in doses of 2 centigrams three or four times a day. It is also reported to have been given with success in bronchitis and spasmodic cough.

Hydrangea arborescens, used in the United States as a remedy for urinary calculi, has been submitted to an analysis by Mr. C. S. Bondurant, with the view of ascertaining the character of its active principle. He was unable to find in it any evidence of the alkaloid reported by a previous investigator (*Am. Journ. Pharm.*, 1881, p. 157), but obtained a glucoside in stellate clusters of crystals. To this body the name of hydrangin has been given. In presence of an alkali, the aqueous solution gives an opal-blue fluorescence, destroyed by acid. From æsculin it differs by its ready solubility in ether, its insolubility in strong hydrochloric acid, and by not being precipitated by argentic nitrate, mercuric chloride or neutral lead acetate. A characteristic reaction for this glucoside is obtained by dissolving it in sulphuric acid, and adding a small crystal of bichromate of potash, when a dark purple colour is produced, fading after some minutes to violet. On the addition of a few drops of water an olive-green is produced, which gradually fades. Hydrangin melts at 235° C., and on the temperature being increased, sublimes without decomposition. Absolute alcohol was found to extract the glucoside together with a resin insoluble in ether, and a reddish colouring matter soluble in chloroform. Another resin, soluble in ether, is also contained in the root. Water extracts mucilage, saponin and sugar (*Am. Journ. Pharm.*, March, p. 124).

Hydrangea arborescens.

In the *Boston Medical and Surgical Journal* (March 10, p. 227) attention is directed by Dr. J. S. Howe to the poisonous effects of the common moon daisy (*Leucanthemum vulgare*) upon certain individuals, chiefly those who suffer similarly from the poison of *Rhus Toxicodendron*. The symptoms produced are those included in the description of dermatitis venenata, and consist in the troublesome heat and itching and the formation of vesicles, followed by desquamation of the cuticle. It is curious that this action does not appear to have been noticed in this country, where the plant is so common, although *Anthemis Cotula* is known to cause somewhat similar symptoms.

Leucanthemum Vulgare.

The aloin of Curaçoa aloes has been examined by Professor W. Stoeder (*Nieuw Tijdschrift v. de Pharm. Neder.*, p. 98). The aloin was obtained by Tilden's method; 250 grams of the aloes were dissolved in 2 litres of water, containing 1 per cent. of sulphuric acid, and the solution after twenty-four hours was decanted from the resinous deposit which had formed, and was evaporated on a water-bath to half its volume. In a few days a crystalline crust had formed, which, drained, pressed between blotting-paper, and recrystallized from spirit of 92 per cent., afforded sulphur-yellow microscopic obtuse needles. The yield of aloin thus obtained was 5·5 per cent. It is odourless, has a bitter taste, melts when heated, becoming black and diffusing an odour of caramel, and then burns leaving no ash. It is moderately soluble in water, very soluble in spirit, and in pure ether and chloroform almost insoluble. The solution in water is of a light yellow colour; ammonia makes it darker and then red. When the aqueous solution is heated, the upper layer becomes red, and this colour spreads quickly through the solution, turning to wine-red, indicating oxidation to aloetin. It quickly reduces Fehling's solution when warmed. Sulphuric and nitric acids colour it a pure red, but on stirring the mixture it becomes yellow. If then the vapour of fuming nitric acid be passed over it, a greyish blue colour is produced, which, however, quickly disappears. Bromo-bromide of potassium gives an abundant precipitate in an aqueous solution of Curaçoa aloin. Solution of tannin gives no precipitate. It thus resembles nataloin in the effect produced on it by fuming nitric acid, and is like barbaloin and socaloin in the formation of a bromo-derivative, but differs from barbaloin in not giving a precipitate with tannin.

Curaçoa Aloin.

A false kola nut is described in *Nouv. Rémèdes* (p. 123) by Messrs. Heckel and Schlagdenhauffen, which they consider to be an intentional adulteration due to the increasing demand for kola nuts. It consists of the kernels of the seeds of *Heritiera littoralis*, Ait., a tree belonging to the same family as the kola, and extending from Australia and the Philippines to the east coast of Africa. Under the microscope the adulteration can be detected by the smaller size of the polygonal starch grains, which are only half the size of those of the true kola nut. In the entire state the kernel is easily distinguished by the fact that one of the cotyledons is hardly half the size of the other, fitting into the substance of the larger one, and that the shape of the seed is orbicular and flattened. It did not afford any trace of caffeine.

False Kola Nut.

The seeds of *Eugenia jambolana* have been tried by Dr. G. C. Kingsbury, as a remedy for diabetes, with some degree of success. In a case which had lasted for six months, and in which the patient was quite prostrate, and suffering from great thirst, the administration of 5 grains six times in twenty-four hours for a fortnight removed the abnormal thirst and hunger, and enabled the patient to get up and walk for an hour at a time (*Brit. Med. Journ.*, March 19, p. 617.)

Eugenia jambolana.

A crystalline acid possessing more powerful reducing properties than glucose, has been detected in urine by Dr. John Marshall of Pennsylvania University. It was obtained by precipitation with tribasic plumbic acetate solution, decomposing the washed precipitate with hydrogen sulphide and allowing the filtrate, after concentration, to deposit crystals. The new acid crystallizes in opaque white tetragonal prisms melting at 140° C. It is soluble in water and ether, in ordinary and absolute alcohol, sparingly so in chloroform, and insoluble in benzol, toluol and petroleum ether. When the ethereal solution is evaporated at a temperature of about 60° C., a slight claret-red tint is produced, soon resolving itself into spots of purple. This purple substance (somewhat resembling murexide) attaches itself to the crystalline mass. When the crystals are dissolved in water the purple coloration disappears. No change of colour is observed on the spontaneous evaporation of the aqueous solution. The new acid does not contain either sulphur or nitrogen and has been provisionally named glycosuric acid. After passing the urine containing the acid through animal charcoal, the filtrate becomes of a dark claret-red colour and has lost its reducing property.

Glucosuric Acid.

The result of a number of experiments as to the mode of action of colchicine administered in therapeutic doses, has been reported by Messrs. Mairet and Combemale (*Comptes Rend.*, civ., 515). It has been found

Action of Colchicine.

that colchicine acts, according to the dose, either as a diuretic or a purgative, consequent upon a congestive and irritant effect produced upon the kidneys and digestive canal. The therapeutic effects are the same whether it be administered subcutaneously or by way of the stomach, but the action is more rapid by the former mode, and the dose required is smaller. Human beings are three times more susceptible to the action of colchicine than dogs or cats, the total dose fixed by the authors to produce the diuretic effect in a man being 2 or 3 milligrams, and for the purgative effect 5 milligrams. Colchicine augments the excretion of uric acid and reduces the quantity contained in the blood; but its accumulation in the system and great toxicity suggest great prudence in its employment.

Liquor Strychninæ.

An editorial note appears in the *Canadian Pharmaceutical Journal* (March, p. 113) apparently confirming the opinion that under certain conditions the official solution of strychnine becomes unstable, depositing crystals of the hydrochlorate. The writer states that in December a sample of the liquor, said to have been prepared by the pharmacopœial process, was received for examination. Most of the salt appeared then to have deposited in a crystalline mass at the bottom of the bottle. The sample was set on one side, until the receipt of the *Pharmaceutical Journal* containing a note on the subject by Mr. E. H. Farr (Jan. 15, p. 580) again called attention to it. The quantity of crystals was then found to be somewhat less, though still considerable, but meanwhile the surrounding temperature had frequently risen above 80° F. The remaining crystals were not redissolved until the bottle had been made sensibly warm; but on putting the bottle outside the window, in melting snow, they were again quickly deposited.

Emulsion of Cod Liver Oil.

Mr. Adolph Tscheppe calls attention to the advantages presented by decoction of Irish moss for preparing an emulsion of cod liver oil (*Pharm. Rec.*, March 15, p. 82). He uses a decoction made at a water-bath temperature and strained, with the moss in the proportion of one drachm to five fluid ounces of water, with which he says an emulsification can hardly fail. The formula recommended is:—Decoction of moss, 5 parts; glycerine, 2 parts; alcohol, 1 part; flavour with oil of wintergreen and oil of bitter almonds, and when cold add cod liver oil, 8 parts, in three portions, shaking vigorously after each addition. The glycerine and alcohol are introduced for preserving and sweetening only, and play no part in the emulsification. If salts require to be added they may be dissolved in the strained decoction, or they may be added in solution to a correspondingly more concentrated decoction. Mr. Tscheppe also mentions that a solution of gelatin (1 drachm in 8 fluid ounces of water) will emulsify an equal bulk of oil, the emulsion on dilution resembling milk very closely; but this preparation is subject to great changes in consistency with differences of temperature, and congeals completely in the cold.

Oil of Peppermint.

During a trial which recently took place in Wayne County, United States, concerning fraudulent oil of peppermint, it was shown that the oil had not only been deprived of menthol, but had been largely adulterated with oil of camphor. According to Dr. Duffield, the removal of menthol may be detected by subjecting the oil to a low temperature (−12° F.), and the presence of camphor oil by the use of a Mitscherlich polariscope, since oil of peppermint, if pure, polarizes to the left −64°, and oil of camphor to the right +57°.

Adulterated Eucalyptus Oil.

In a paper on the means of testing the purity of essential oils, published in the *L'Union Pharmaceutique*, p. 103, by M. Noel, it is stated that oil of eucalyptus often contains a large proportion of oil of turpentine. In four samples examined by the author he found 20 per cent. or more of this adulterant. Oil of lavender he states to be often adulterated with oil of spike (*Lavandula Spica*).

Liquid Paraffin for Hypodermic Injections.

The hypodermic administration of iodoform, eucalyptol and carbon bisulphide having been suggested recently for the treatment of pulmonary tuberculosis, Dr. Meunier, of Lyons, recommends the use of liquid paraffin as a vehicle presenting the advantage over solvents usually employed of modifying the irritant properties of these medicines (*Archives*, March, p. 97). Dr. Dujardin-Beaumetz confirms the beneficent influence of the liquid paraffin, without at present pronouncing definite judgment on the therapeutic effects of the treatment, beyond saying that after the injection of eucalyptol dissolved in an equal quantity of liquid paraffin the patient expectorates less, coughs less frequently and sleeps better. He, however, recommends great care to be exercised in the selection of the paraffin, any sample that has been treated with sulphuric acid being objectionable. Besides being neutral to litmus and free from taste or smell it should not give off vapour below 180° C., as the lighter fractions used for burning, etc., give rise to abscesses, and the sp. gr. at 15° C. should be between ·870 and ·895. Liquid paraffin dissolves ether, chloroform, fixed and essential oils, myrtol, eucalyptol, menthol, thymol, terpinol, benzine, and carbon bisulphide in all proportions, and considerable proportions of iodine, bromine, phosphorus and iodoform. The proportion of iodoform may be increased by adding it to the liquid paraffin in ethereal solution.

Antidote to Cocaine Poisoning.

The use of nitrite of amyl as an antidote in cases of poisoning by cocaine is recommended in the *Lancet* (p. 587), for relieving the cerebral anæmia, and that of bromide of potassium and the application of cold for the convulsions which appear to be the main cause of death in fatal cases.

Remedy for Snake-bite.

A remedy used for snake-bite by the Sioux Indians has recently been brought to light. The *Pharmaceutical Era* states that the plant is *Echinacea* (Rudbeckia) *angustifolia*, and that the popular name of the plant is "black Samson." The fresh root is used, being scraped and administered to the person bitten. It produces an excessive flow of saliva and perspiration. The pungency of the root is said to resemble that of prickly ash bark, and it, therefore, probably may be classed among the active sialogogues.

Poisoning by Robinia.

The tree commonly known as the acacia tree (*Robinia Pseudacacia*, L.) in English gardens, and which is readily recognized by its white flowers bearing a family likeness to those of the laburnum, and by its pinnate leaves, appears to be as poisonous as the last-named tree, since Dr. Z. T. Emery reports the poisoning of thirty-two boys, at the Brooklyn Orphan Asylum, from chewing the inner bark of

the tree (*Am. Journ. Pharm.*, p. 153). The symptoms produced were similar to those of laburnum poisoning. The cases were treated with subcarbonate of bismuth and brandy internally, and with morphine hypodermically administered. The poisonous principle of the bark does not appear to have been investigated.

Optical Properties of Mosses.

Recent observations have shown that the peristome of some mosses possesses curious optical properties. According to Mr. M. J. Aumann, sometimes the outer layer of the peristome and sometimes the inner layer rotates the plane of polarization, and exhibits, when a thin plate of mica or selenite is interposed, very brilliant colours, varying with the position of the two nicols relatively to each other. In the Grimmiaceæ and Dicranaceæ this action is feeble; in Pottiaceæ and Weissiæ almost nil; and strong in Mniaceæ and Hypnaceæ. There exists a curious relation between these optical properties and the amount of tannin contained in these membranes, the endostome of *Camptothecium lutescens* (Hypnaceæ) affording a particularly good illustration of this fact (*Ann. and Mag. Nat. Hist.*, p. 248.)

Genetic Affinity of Algæ.

In a paper read at the Linnean Society, on March 3, on "The Genetic Affinities of the Algæ," Mr. A. W. Bennett suggested that in many of the groups difficult to classify retrogression had apparently taken place in the form of suppression of development of either the vegetative or reproductive organs, the organs which predominated leaving the others degenerate. Thus the Desmids are considered to be a degenerate group, which should not be classed as hitherto with the diatoms. The views expressed in the paper are, however, likely to be critically discussed by continental cryptogamists.

Botanical Magazine.

The *Gardeners' Chronicle* (March 12, p. 345) gives an interesting sketch of the history of the *Botanical Magazine*, a publication which has just reached its hundredth year. In noticing the botanical publications before the founding of the *Botanical Magazine* the author quotes from the 'Grete Herball' of 1526, which is apparently the earliest English printed book containing figures of plants, a passage concerning rosemary, in which it is stated that the flowers of rosemary were called "anthos," and the electuary made of them "dyanthos" or "dendrolibanas." Under the name of "anthos" rosemary is enumerated as one of the simples in some of the earliest London Pharmacopœias.

Anthos.

Analysis of Pollen.

At a recent meeting of the Royal Horticultural Society, Professor Church communicated the result of some chemical examinations of pollen. He found that the proportion of nitrogen, potash and phosphorus pentoxide was about seven times greater in the pollen than in the leaf scales, corresponding with the more important functions of the sexual organs as compared with the merely temporarily protective scales. The dry pollen of *Cupressus fragrans* he found to yield 3·7 per cent. of ash, of which 100 parts contained as much as 20·14 of phosphoric acid and 35·34 of potash (*Gard. Chron.*, March 12, p. 358.)

Ustilago Phœnicis.

At the same meeting specimens of dates and figs affected by the black sooty spores of *Ustilago phœnicis*, Corda, and *U. ficuum* Rchdt, were shown. These are found as a rule only in the inferior qualities of the fruits. The fungus develops in the interior of the fruit. The occurrence of this fungus in any quantity might possibly prove deleterious to health if eaten by women, should the fungi be found to possess properties similar to that of *Ustilago maydis*.

New Plants.

The Journal of Botany for March gives an illustration of the new British plant *Equisetum littorale*, Kühlewein. It appears to be intermediate between *E. palustre* and *E. limosum*, differing from the former by the much larger central hollow of the stem, and by the more numerous and shallower furrows; and from the latter, by the smaller hollow, by the furrows being fewer and rather deeper, by its paler colour and, conspicuously, by the funnel-shaped uppermost sheaths. In the same journal a new Rubus is recorded by Mr. Linton, from near Sprowston (East Norfolk), which, in general aspect and mode of growth, resembles *R. Bellardi*, Weihe, frequent in some of the copses of that neighbourhood, but differs from it in the thinner armature and the glabrescence of the more angular barren stem; the glossy character of the upper surface of the leaf, particularly obvious on the barren shoots, suggested the name of *R. lucens*.

Kew Seed List.

The exchange list of seeds issued this year by Kew is an exceptionally long one, comprising forty-six pages, and compares favourably with the lists of other botanical gardens. The labour involved in getting up these lists and in distributing the seeds must be simply enormous. The list includes a large number of medicinal plants of this and other countries, and still more of economic plants. The names of the seeds are arranged alphabetically under their respective orders. The Kew Museum appears to have

Kew Museum.

gained considerably by the Colonial Exhibition last year, especially in timbers. A description of some of these acquisitions is given in the *Gardeners' Chronicle* (March 12, p. 351), among which may be noticed some of the Borneo timber, known as mirabon, which contains a blood-red astringent juice, hardening into a kino when exposed to the air. This timber is attributed to *Afzelia Palembanica*, and is considered to be the best timber tree of Malacca. Another timber possessing some pharmaceutical interest is that in which the Borneo camphor is found; of this wood a fine slab 12 feet high by 2 feet wide has been acquired by the Kew Musuem. A third object of interest is a plant of *Lyperia crocea*, the flowers of which are known as Cape saffron, from affording a dye similar in colour to saffron (*Gard. Chron.*, March 12, p. 351).

Palladium Amalgam.

The use of palladium for filling teeth is strongly recommended by Mr. W. A. Hunt in the *Journal of the British Dental Association*. The amalgam made with this metal is, he says, the most durable known, bearing wear and tear perfectly, and not being acted on by saliva. The only disadvantages attending its use are that where the filling is exposed to view it shows of a dark purplish black colour, and that its manipulation requires special care. The grey unoxidized palladium powder should alone be used. He remarks that although apparently more costly than gold (140*s*. to 147*s*. per ounce) it is much lighter, so that one ounce of palladium is nearly equal in bulk to two ounces of gold. By the few who recognize the value of this metal for dental purposes it seems to be extensively used, since it is said that a noted London

dentist has paid for palladium as much as £200 to £300 at a time for use in his own practice.

Artificial Rubies.

Many visitors to the Paris exhibition of 1878 will remember an interesting collection of artificial rubies exhibited by M. Fremy. These had been obtained either by heating together at a high temperature a mixture of alumina and minium, or a mixture of equal weights of alumina and barium fluoride, with a trace of potassium bichromate in each case to impart the rose colour. As earthern crucibles had been used in the operation it was then supposed that silica derived from them might have determined the crystallization of the alumina. This, however, has since been disproved in respect to the latter mixture, and numerous experiments made by M. Fremy in conjunction with M. Verneuil have demonstrated that nearly all the fluorides possess, to a remarkable degree, the property of determining at a red heat the crystallization of alumina (*Comptes Rend.*, civ., 738). Calcium fluoride, especially, appears to exercise over alumina an enormous power of mineralization; for when pure native calcium fluoride and pure alumina were calcined for some hours at a white heat in the same crucible, but separated by a platinum plate pierced with holes, the emanations from the fluor spar proved sufficient to cause the alumina to change its amorphous state and form a crystalline mass. In order, however, to prevent any "perturbation in the commerce of precious stones" being caused by this announcement, M. Fremy adds, in a footnote, that although the rubies obtained by this method are of fine colour, good shape, very distinct in crystallization, and in every respect more beautiful than previous products, they are still small, and therefore without commercial importance.

Phosphorescence of Calcium Sulphide.

The causes determining and modifying the phosphorescence of calcium sulphide, upon which the peculiar property of the so-called "luminous paint" is dependent, have been the subject of several recent investigations. It is pretty well known now that not only the intensity of the luminosity, but also the colour of the phosphorescence, varies under different conditions. Thus M. Verneuil found that a calcium sulphide occurring in commerce, remarkable for the intensity and duration of its purple phosphorescence, could be imitated by roasting together a mixture consisting of lime from a kind of mussel shell (*Hypopus vulgaris*), 100 parts, sulphur, 30 parts, and a trace of bismuth subnitrate; but when pure lime was substituted the product was only feebly phosphorescent (*Comptes Rend.*, civ., 501). Analysis of the shells showed that they consisted almost entirely of calcium carbonate, but contained also 0·99 per cent. of sodium carbonate, sodium chloride 0·06 per cent., silica 0·02 per cent., magnesia 0·01 per cent., and traces of phosphoric acid. Further experiment proved that the phosphorescence of the roasted mixture was due principally to the presence of the sodium carbonate and sodium chloride. Nevertheless when these were added to a mixture of pure lime and sulphur with bismuth subnitrate, in the proportions in which they had been found in the mussel shells, the product, although showing a beautiful phosphorescence, was inferior in luminosity. Upon doubling the proportions of the sodium salt, however, an equally brilliant product was obtained, and the more favourable result with the shell lime is attributed to the more intimate admixture of the constituents in the natural substance. Besides these original ingredients M. Verneuil evidently considers the final result improved by the formation of a little calcium sulphate during the roasting. Apparently all the active agents experimented with act as simple fluxes, and M. Verneuil thinks that any matter capable of vitrifying the surface of calcium sulphide without discolouring it will yield a very phosphorescent product; hence M. Verneuil also considers that the result is due to the influence of the foreign substances in producing a change in the molecular condition of the calcium sulphide, as originally suggested by M. Becquerel. In commenting upon this communication (*Comptes Rend.*, civ., 551), M. Becquerel mentions that an admixture of traces of potassium persulphide with calcium sulphide causes a very luminous green phosphorescence, manganese peroxide an orange-yellow phosphorescence, and lithium carbonate a brilliant green phosphorescence; but he points out that nevertheless the potassium, manganese and lithium sulphides are scarcely luminous, or not at all. Temperature also exercises a remarkable modifying influence over the colour of the phosphorescence. A preparation of calcium sulphide showing a green luminosity at ordinary temperatures has a blue phosphorescence at 100° C., which becomes a brilliant violet-blue between 200° and 300° C., but returns to green when the ordinary temperature is recovered. Still more remarkable in this respect is the behaviour of strontium sulphide prepared from caustic strontia and sulphur, which, after exposure to light, emits a violet-blue phosphorescence at – 20° C.; becomes light blue at +40° C., at 90° greenish-yellow, and at 150° C. orange; upon the temperature falling it resumes at each stage the characteristic tint.

A STUDY OF THE ALKALOIDS OF GELSEMIUM ROOT AND SOME OF THEIR CRYSTALLIZABLE SALTS.*

BY F. A. THOMPSON, PH.C.

Having occasion to examine several samples of gelsemium root (*Gelsemium sempervirens*, Aiton., Nat. Order, *Loganiaceæ*), I was led to suppose that there was more than one alkaloid present, and also to take up the investigation as far as time and appliances would permit, which I will say were far from being sufficient to establish the identity of the important constituents present.

I found no literature stating the possible presence of two alkaloids until, just after having finished my researches, I had an opportunity to consult Bentley and Trimen's work on Medicinal Plants, p. 181, and there found it stated that Ringer and Murrell were led to believe, from the physiological action of the drug, that it contained two alkaloids, one a paralysing and the other a tetanising agent. The first analysis of this drug, showing the presence of an alkaloid, was made by M. H. Kolloch in 1855, and since then there have been three examinations made by different chemists, Eberle (1869), Wormley† (1869), and Gerrard‡ (1883), showing also the presence of gelsemic acid, which I have considered of insufficient importance to investigate further than has already been done.

An elaborate botanical description of the root, and engravings of the same, can be found in the *Pharmaceutical Journal and Transactions*, 1875-6, vol. vi., by E. M. Holmes, Curator of the Museum of the Pharmaceutical Society, London.

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* From the *Pharmaceutical Era*, January.

† *Amer. Journ. Pharm.*, 1870, p. 1.

‡ *Pharm. Journ.*, [3], xiii., 641.

Method of Extracting the Alkaloids.

The following method was found to be the most practical of the various ones tried :—

The drug, in fine powder, was thoroughly mixed with about one-sixth its weight of freshly slacked lime, and exhausted with strong alcohol.

The addition of the lime was considered an advantage in setting free the alkaloid from its combination with organic acids, thus rendering it more soluble in the strong alcohol, and also reducing the amount of extractive matter which is desirable in extracting the alkaloids.

The percolate was rendered slightly acid with dilute sulphuric acid, the lime removed as a sulphate by filtration, and the filtrate, evaporated to a semi-liquid, allowed to cool, and water added to this as long as a precipitate was produced. This was allowed to stand for twenty-four hours, when it separated into two strata, the upper being mostly gelsemic acid and the lower the alkaloids in form of a salt, which were easily separated by drawing off the liquid portion and washing the precipitate of organic acids with water. This solution was evaporated until only one pint represented about twelve pounds of the drug, and then washed with several portions of ether to remove as much gelsemic acid as possible, which is very troublesome to remove from the alkaloids.

The fluid containing the alkaloid was put in a suitable separating apparatus, and three or four times its volume of chloroform added and shaken for some time, which should remove most of the gelsemic acid. The chloroform solution was drawn off after completely separating, and to the original fluid the same amount of fresh chloroform was added. The alkaloids were now precipitated by the careful addition of a solution of alkali, and dissolved out by shaking with chloroform, this being done with great care to avoid the formation of an emulsion, which requires some time to again separate. The chloroform solution was drawn off and the alkaloids washed out by shaking with water, containing some sulphuric acid (hydrochloric acid will not answer), and in this way the same chloroform was used for washing out the entire alkaloids.

The solution of the alkaloids as sulphates was quite dark, due to the presence of the soft or second alkaloid and some foreign matter. To further purify the alkaloids they were again precipitated with an alkali, and dissolved out with ether, and from the ethereal solution were removed by shaking with water containing hydrochloric acid, converting the alkaloides into muriates. The gelsemine chloride, being quite insoluble in water, was deposited out upon standing, while the chloride of of the second alkaloid, being soluble in its own weight of water, was held in solution, and by filtering, the two alkaloids were fractionally separated. The gelsemine chloride was then further purified by repeated crystallization from hot alcohol, until a perfectly white crystalline salt was obtained.

The exact proportion of the alkaloids was not determined, but they were approximately estimated to be in the relative proportion of three of gelsemine to one of the soft alkaloid (gelseminine). The drug yields from ·15 per cent. to ·25 per cent. of total alkaloids.

Combustion of Gelsemine.

Obtaining the alkaloid in the form of a pure crystallized salt, I was able to extract the organic base in a pure state, and having it in this form I was anxious to study its ultimate composition, and so made several estimations of it by combustion, with the following results, viz. :—

	First estimation.	2nd.	3rd.	4th.
	Per cent.	Per cent.	Per cent.	Per cent.
Carbon .	66·00	65·90	67·50	—
Hydrogen.	7·35	7·05	7·27	—
Nitrogen .	5·77	5·82	5·73	5·66

The carbon and hydrogen were estimated by combustion with lead chromate, and the nitrogen by Will and Varrentrapp's method.

Calculating the oxygen by difference, the above figures allow the construction of the following chemical formula ($C_{54}H_{69}N_4O_{12}$) which theoretically requires 67·15 per cent. C, 7·15 per cent. H, 5·7 per cent. N, and 19·9 per cent. O.

Two estimations of the chlorine were made from the chloride, finding 10·3 and 10·1 per cent. calculated as hydrochloric acid ; also the amount of alkaloid dried at 100° C. which was found to be 90 and 89·8 per cent. respectively, which concludes the composition of the salt to be $(C_{54}H_{69}N_4O_{12})(HCl)_3$, containing theoretically 89·81 per cent. alkaloid, and 10·19 per cent. hydrochloric acid. Three portions of the purified platinum salt of the alkaloid were submitted to ignition, with these results : 18·33, 18·51 and 19· per cent. of platinum, which allows the composition of the precipitate to be

$$(C_{54}H_{69}N_4O_{12})_2(HCl)_6(PtCl_4)_3,$$

containing 18·58 per cent. platinum.

Two estimations of the gold were made by ignition from the purified gold salt of the alkaloid, which was found to contain 29·5 and 28 per cent. respectively. This allows the composition of the salt to be

$$(C_{54}H_{69}N_4O_2)(HCl)_3(AuCl_3)_3,$$

requiring 26·7 per cent. of gold for its construction or composition.

The above results differ materially from those obtained by A. W. Gerrard,* which are as follows :—

	1st estimation.	2nd.	3rd.	4th
	Per cent.	Per cent.	Per cent.	Per cent.
Carbon .	70·4	70·1	70·3	70·45
Hydrogen.	7·2	7·3	6·9	7·3
Nitrogen .	7·	7·3	6·9	—

Taking the oxygen by difference, his figures allow the construction of the following formula ($C_{12}H_{14}NO_2$), which, properly written, would be $C_{24}H_{28}N_2O_4$, as the first formula would show a division of an atom. Theoretically calculated, it contains 70·6 C, 6·86 H, 6·86 N, and 15·68 O.

His determinations of nitrogen were made by the absolute method of collecting the gas, and not by Will and Varrentrapp's method, but as my results agreed very closely, I felt warranted in accepting them as correct, from which all my calculations were made.

Gerrard also made estimation of the chlorine from the chloride, and found 8·1 per cent., showing the composition of his salt to be $(C_{24}H_{28}N_2O_4)HCl$, containing 7·96 per cent. chlorine ; also the bromide was found to contain 16·21 per cent. $(C_{24}H_{28}N_2O_4)HBr$., and theoretically containing 16·3 per cent. bromine.

Purified platinum and gold salts he found to contain 16·7 and 36·9 per cent. respectively, pointing to the composition of the platinum salt as $(C_{24}H_{28}N_2O_4)(HCl)_2PtCl_4$, and the gold $(C_{24}H_{28}N_2O_4)HCl(AuCl_3)_2$, the former containing 16·09 platinum, and the latter 37·4 per cent. gold.

Gelsemine $(C_{54}H_{69}N_4O_{12})''' = 965$.

Properties.—A brittle, transparent, solid mass, crystallizing with difficulty from alcohol. According to Gerrard, the alkaloid fuses at 45° C. (113° F.) to a colourless viscid liquid, which, on cooling, solidifies to a transparent vitreous mass, and submitted to a higher heat it is entirely dissipated, from the fumes of which no crystals were produced on a cooled surface.

It is almost insoluble in cold water, requiring 650 parts for solution, even when digested with an excess for some time. From hot water it separates on cooling in a granular amorphous form. It has strong basic properties, completely neutralizing acids and forming crystalline salts, except the sulphate.

Gelsemine is freely soluble in ether, chloroform and alcohol, sparingly so in petroleum ether. One part of the dried alkaloid dissolves in about 25 parts of ether, and when freshly precipitated in about 10 parts.

It dissolves in concentrated sulphuric and nitric acids without colour, and solutions of its salts are precipitated by ammonia and fixed alkalies, which precipitates are soluble in excess of the reagents.

* *Pharmaceutical Journal*, [3], xiii., 642.

Ammonia precipitates the alkaloid as a white amorphous precipitate, which is soluble in excess of the precipitant, and if this solution be exposed to spontaneous evaporation, the ammonia will be eliminated, leaving the alkaloid in form of a crystalline salt.

Concentrated sulphuric acid and *manganic oxide* produce a *cherry red*, changing slowly to an olive green. This test is exceedingly delicate with the pure alkaloid, one milligramme giving a distinct reaction. Potassium bichromate produces a *deep red*, rapidly changing through a series of colours to a green ; ceroso-ceric oxide gives a *deep crimson*, changing to a brown, finally becoming green.

The statement is made that gelsemine may be mistaken for strychnine (when tested with concentrated sulphuric acid and manganic oxide), if not compared side by side, but I have failed to notice any similarity between the two, gelsemine producing at once a *cherry red*, and strychnine a *deep blue*, passing at once to a purple, if the pure alkaloid be used. If the alkaloid gelsemine contains only a slight trace of the second alkaloid (gelseminine), the purple will be produced, as this alkaloid gives such a colour. (See reactions under gelseminine.)

Solutions of gelsemine.—Solutions of the salts of the pure alkaloid are colourless, and have a distinct bitter taste, which is marked with one drop of a solution of the alkaloid 1 : 1000.

Comparative Reactions ascribed to Gelsemine and Gelseminine.

Reagent.	Author.	Gerrard.	Sonnenschein.	Wormley.	Gelseminine (Author).
Concentrated sulphuric acid.	No reaction.	No reaction.	Yellow - green, passing to reddish - brown colour, and upon heating to deep red.	Dissolves with a red or brown colour, which, after a time, assumes a pinkish hue. Warmed, it acquires a chocolate or violet hue.	A light yellow colour.
Concentrated nitric acid.	No reaction.	No reaction.	Yellow - green colour.	Brownish - green, changing to a deep green colour.	A deep green colour
Concentrated sulphuric acid and manganic oxide.	Cherry - red, changing slowly to an olive-green.	Damask-red passing to green-blue.			A deep purple, fading slowly to a bluish-purple, the purple predominating.
Concentrated sulphuric acid and potassium - bichromate in crystals.	Deep red, changing through a series of colours to a green.	A crimson - red, evanescent redness passing to a green colour.	Cherry - red colour, changing a little to a violet, which soon forms a bluish - green spot.	Reddish - purple streaks along the path of the crystal.	Reddish - purple, fading quickly to yellow-green, finally becoming a green.
Concentrated sulphuric acid and ceroso - ceric acid.	A deep crimson, changing to brown, finally becoming green.				Reddish - purple, changing slowly to a purple colour.

Picric acid produces a yellow precipitate from a solution in 1 in 500, 1 in 1000 a greenish-yellow precipitate.

Iodine in potassium iodide throws down in moderately weak solutions a brown amorphous precipitate, sparingly soluble in acetic acid. A precipitate is produced in a solution 1 to 10,000 of the alkaloid.

Auric chloride produces a yellow precipitate, soluble in water, having the composition of

$$(C_{54}H_{69}N_4O_{12})HCl_3(AuCl_3)_3.$$

Platinum chloride precipitates from tolerably strong solutions a yellow precipitate, soluble in water. Its composition is $(C_{54}H_{69}N_4O_{12})_2(HCl)_6(PtCl_4)_3$.

Potassium mercuric iodide (Mayer's) produces white precipitate, sparingly soluble in water. This reagent is used in estimating the amount of alkaloids in the drug, as 1 c.c. of a N 1-20 solution precipitates 8·5 m.g. of gelsemine,* when diluted to the strength of 1 part of the alkaloid to 400 parts of water, containing ·2 per cent. of sulphuric acid.

Gelsemine Muriate $(C_{54}H_{69}N_4O_{12})(HCl)_3$; 1074·5.

Gelsemine chloride crystallizes from alcohol, or better from water, in groups of white acicular-shaped crystals, anhydrous, permanent in the air, and having a distinct but not a persistent bitter taste. Reaction neutral.

Not very soluble in water or alcohol, requiring 39 parts of water and 170 parts of alcohol to dissolve it. Insoluble in ether, petroleum benzin or chloroform. Solutions of the pure salt are precipitated by the fixed alkalies and ammonia, soluble in excess of the reagent. If a solution containing an excess of the ammonia be exposed to the air, the ammonia will be eliminated, leaving the salt in its natural crystalline form.

Solutions of the salt are precipitated by all the alkaloidal reagents, as stated under gelsemine.

Concentrated sulphuric acid produces no colour in the cold, and the same colour reactions as the alkaloid, with oxidizing agents.

Gelsemine Nitrate $(C_{54}H_{69}N_4O_{12})(HNO_3)_3 = 1154$.

This salt crystallizes from a hot saturated aqueous solution upon cooling, in distinct white six-sided rhombic prisms, some being terminated by a six-sided pyramid. Permanent in the air, anhydrous, and having a distinct, but not a persistent bitter taste, and neutral reaction. Soluble in 40 parts of water (59° F.) and 135 parts of alcohol. Insoluble in ether, petroleum benzin or chloroform. When heated on platinum foil the crystals fuse, finally becoming entirely dissipated.

Concentrated sulphuric acid and manganic oxide produce a *pinkish* colour remaining some time, finally becoming a pale green, which reaction is different from the crimson red, produced by the alkaloid or its other salts. Concentrated sulphuric acid produces no colour in the cold, and solutions of the salt behave to the alkaloidal precipitants the same as the muriate.

Gelsemine Sulphate $(C_{54}H_{69}N_4O_{12})_2(H_2SO_4)_3 = 2224$.

This salt is of a yellowish tint, non-crystallizable, permanent in air, and readily soluble in water. Further

* 'Pharmaceutical Assaying,' Lyons, page 94.

than this I have made no study of it, being unable to crystallize it.

Gelseminine or the Second Alkaloid.

This alkaloid differs greatly as to physical and chemical properties from gelsemine. Whether it differs in medicinal action is a question as yet, though I am inclined to believe that this acts as a tetanizing agent, and gelsemine as a paralysing agent, according to Ringer and Murrell's statement.

Not having been able to obtain this alkaloid in the form of a crystalline salt, I am not certain as to its being pure, though it must be comparatively so, being washed from ether solution to acid water several times. It is upon the alkaloid in this state that I made the examination as far as I did, and hope to have the time to study it further; if not I hope it will be taken up by someone who will complete the investigation. The alkaloid is of a dark brown, resinous mass, permanent in the air, but when broken up and powdered is of a yellow colour, quite bitter, resembling the taste of the root. Sparingly soluble in water, readily so in alcohol, ether and chloroform, and sparingly in petroleum ether. Has strong basic properties, completely neutralizing the acids, forming neutral amorphous salts.

Reactions in solid state.—When a small portion is added to concentrated sulphuric acid it dissolves, forming a light yellow colour, and when mixed with concentrated nitric acid produces a *deep green.*

Manganic oxide and concentrated sulphuric acid produce a *deep purple*, fading slowly to a bluish-purple, the blue predominating. *Ceroso-ceric oxide* produces a *reddish purple*, fading slowly to a light purple.

Potassium bichromate and *concentrated sulphuric acid* produce a *reddish-purple*, fading rapidly to a *yellow-green*, finally becoming green. *Strong hydrochloric acid* dissolves the alkaloid without further colour, forming a clear solution on diluting.

The muriate and sulphate of this alkaloid are, when dried, of a brownish, resinous nature. Soluble in less than their own weight of water; readily soluble in alcohol; insoluble in petroleum benzin, ether or chloroform.

Solution of the salts.—The solution of the salts of this alkaloid are a deep brown when concentrated, and yellowish on diluting.

Potassio-mercuric iodide (Mayer) produces a precipitate in a solution of 1 in 1000, sparingly soluble in water, and produces a distinct one in 1 in 20,000 of the salt.

Saturated solution of picric acid produces a yellow-white precipitate in 1 in 500 solution, and when diluted to 1 in 10,000 a slight greenish-yellow precipitate is formed.

Iodine in potassium iodide produces in 1 in 1000 a granular reddish-brown precipitate, 1 in 5000 a chocolate-coloured, and gives a distinct reaction when diluted to 1 in 50,000 of the salt.

Sodium phospho-tungstate produces a fine white precipitate in 1 in 1000, and 1 in 10,000 hardly perceptible.

Platinum chloride produces a brownish-yellow precipitate in moderately strong solution, and a portion purified was found, on ignition, to contain 18·3 per cent. platinum.

Tannic acid, a greyish-white precipitate, sparingly soluble in excess of the reagent; 1 in 10,000 produces a slight turbidity.

Ammonia and the *fixed alkalies* produce copious precipitates, somewhat soluble in excess of ammonia.

When the alkaloid was first discovered in 1855, the name gelseminia was given it; since at that time *Gelseminum sempervirens* was the name of the plant. The name having been changed since to *Gelsemium sempervirens*, the alkaloid has also been renamed gelsemine, though some works give gelsemia and gelseminia as synonyms.

As the drug heretofore was supposed to contain but one alkaloid, I have adopted the name gelsemine given it, as the name for my first or crystallizable alkaloid, and the name gelseminine (which has also been used by some for gelsemine), as the most desirable for the second or non-crystallizable alkaloid. These names at first might be thought to be somewhat confusing, but I think no more so than those of the alkaloids of cinchona bark.

Upon further study of the second alkaloid it may be proven that it is a derivative from the first during the process of extraction or by decomposition, or that it may be composed of more than one alkaloid. I hope it may be further studied by some one having more time than myself.

I will not enter into details regarding the medicinal action of this important drug, as different authors make different and even contradictory statements in regard to its use, which may be partially attributed to the prescribing of preparations varying in strength. It is used largely for facial neuralgia.

Having the constituents isolated, this trouble may be to a certain extent obviated, as they undoubtedly represent the medicinal action of the drug, and it only remains for physicians to take up the alkaloids and make a thorough study as to their physiological action and therapeutic properties.

Having performed my researches in the analytical laboratory of Parke, Davis and Co., it is to this enterprising firm that I am indebted for supplying drugs and chemicals, and would add that samples of the two alkaloids will be furnished by them to physicians for experiments.

A TEST FOR OIL OF PEPPERMINT.*

BY E. C. FEDERER, PH.C.

When the oil has been found by the iodine test to be free from fireweed oil, camphor oil or other fulminating oils (so-called weed oils) or by the chloral-sulphuric acid test to be free from contaminating pennyroyal oil, and if it is found soluble (without cloudiness) in 3 parts of 94 per cent. alcohol or 4 parts 85 per cent. alcohol, to show absence of resinified or old oxidized oil, and lastly if its odour is such, that experts pronounce the oil prime by previously confirming above tests, there may still be room for doubt as to its quality.

This doubt is based on the known fact of oils being placed on the market having all the appearance, transparency, solubility, freedom from fulminating oils, etc., and a fair good odour like that which a good oil possesses but for the abstraction of a part of its menthol.

A more expeditious, if not a more reliable test, would be acceptable than the freezing test, as this seems to be somewhat indefinite to such an extent in proportion as to how far or little the oil suspected has been dementholated, also as to quantity of oil to operate on, size of test tube, or amount of menthol required to start crystallization.

This refers to Fritsche's test, as this requires addition of menthol for a nucleus towards hastening congelation; no particular quantity is specified, nor is there any definite quantity of menthol used, simply four or five crystals, or whether they should be small or large or mixed in sizes. It would seem that a small quantity of oil quite thoroughly dementholated, with five fair-sized crystals added, might appear to be very rich in menthol when reinforced by that it may still retain through partial dementholation, and quickly congeal to a solid mass alongside of a better oil, but in a little larger quantity, with only four *smaller* sized crystals added. This test made on known partially dementholated oil alongside of one of good quality and pure oil, with the result in favour of that which was partially dementholated, which became solid in fifteen minutes, the better oil only partially solidifying in this time, and to become approximately as solid as the poorer kind required as much as twenty-three minutes.

If the menthol is regarded to be a camphor, an alcohol or body having weak acid property, it would seem that a test might be applied which would at once be found accu-

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* From the *Pharmaceutical Era*, February.

rate, definite, and at all seasons convenient. On this principle were the ideas based for procuring a test.

Assuming that menthol is capable of being acted on by alcoholic potash solution in such a way, when an oil containing menthol is mixed with a due quantity of such a solution of a requisite percentage of the alkali and time allowed for the reaction, then a quantity of water added should hold in solution the so formed (in theory) menthol-potassium, allowing *menthene* to separate with or without some or all the alcohol.

Theorizing this way, a great many experiments were made, until it was found better to hit upon some definite quantity of test material in definite proportions; therefore a reagent was prepared by dissolving 1 part by weight of white potassic hydrate (in sticks) in 9 parts by weight of 94 per cent. alcohol and filtered through absorbent cotton.

When 1 part of good oil peppermint containing the normal quantity of menthol as it usually is found to be in natural oil is mixed with 2 parts of the alcoholic potash solution, and in a few minutes (say ten) afterwards 1 part of water at 40° F. is added (parts by volume), there will be a separation of 2 equal parts, *i.e.*, 10 c.c. oil pure + 20 c.c. sol. KOC_2H_6OH + 10 c.c. HOH = 20 c.c. upper layer + 20 c.c. lower layer.

If menthol is added to pure oil, and the oil so enriched is mixed with the above reagent and water added in the above proportions, there will be a *larger* supernatant layer in proportion as there is more free menthol added.

If dementholated oil is so treated the substratum becomes so large, that if no menthol at all were present it would leave only the menthene to separate and free itself from the alcohol, water and potassic hydroxide, which would form a 25 per cent. supernatant and a 75 per cent. lower layer, conjecturing this from what the effect has been found to be, and believing menthene to have the same general properties as to solubility, etc., as terpenes, or oils very rich in terpenes.

If any other oil be mixed with the pure oil, *e.g.*, oil of camphor, dementholated oil, in proportion to such present, so much less in proportion of the 4 parts will the supernatant layer be than 50 per cent. or 2 parts.

If dementholated oil be mixed with a due proportion of supermentholated oil, *i.e.*, dementholated oil + free menthol added, and subjected to above test, the quantities can be made so in proportion to each other that an equal separation occurs as in the pure natural oil.

So many tests, as above, were made in as many and varied forms as possible (considering the time at disposal for this work) that when the mixtures were all united, 420 c.c. were found to be the total volumes; of this 25 per cent. or 105 c.c. was the oil operated on, and consisted of dementholated, natural and supermentholated oil as well as adulterants (purposely added), etc., 25 per cent. water or 105 c.c., and 50 per cent. alcoholic potash solution or 210 c.c.

Deeming this a good hint towards finding a test, it was thought well to examine those layers separately. Having used the above said mixed oils, some below and others above, as well as some of natural or normal menthol-containing oils, the layers balanced each other as they do when pure oil alone was used, *i.e.*, the layers were equal in value (210 c.c. each).

By very careful distillation the alcohol was nearly all separated from the lower layer; this deducted from the full quantity of both layers gave the quantity from the supernatant layer.

The lower layer would contain all the potassic hydroxide and was estimated as potassic bitartrate in 47 per cent. alcohol, with excess of tartaric acid; it contained but *about* 2 per cent. of oil, thick, dark, and somewhat resinous, probably through being acted on somewhat by heat, water and potassic hydroxide, also possibly through the presence of resin in the oils forming resin soaps with the alkali.

The upper layer would contain no potassic hydroxide nor any salt of that base, confirmed by tartaric acid and much better by the colourless Bunsen's gas flame test, as it imparted no colour to any part of the flame whatever; this confirms the statement above as to potassic hydroxide.

Upper layer contained a little less than 105 c.c. of the oils or nearly all in both layers. The following is a concise statement of found substances:—

Each layer contained .	210 c.c.	
Lower „ „ .	70 c.c.	94 per cent. alcohol.
Upper „ „ .	140 c.c.	94 „ „
Both together equalled	210 c.c.	or half (50 per cent.) of the whole mixture.

Lower layer contained all the KOH.
Upper „ „ nearly all the oils.

By this will be seen that peppermint oil or its menthol has a stronger affinity for alcohol than it has for potassic hydrate, showing that it gives this base up to water, when added in those proportions, and even when twice to four times the volume of the original quantity of water is added it seems to seize upon and hold on to a certain proportion of that alcohol. The potassic hydroxide totally separates from it, as it does from phenol potassium when it is thrown into water.

This suggests the thought that the test could be made more inexpensive, less troublesome and much simpler by far, by dropping the use of alkali altogether and using 94 per cent. alcohol alone, after which, water in its proportion could be added as before.

It has been, no doubt, noticed before by a great many persons who handle oil of peppermint in a pharmaceutical way that the oil will mix perfectly clear with a certain amount of alcohol, and that if the quantity of alcohol be further augmented, it becomes cloudy up to very milky. Some years ago (1871–1872), it was noticed by the writer, and in those days those associated with him as fellow clerks as well as himself, that oil peppermint was capable of *dissolving* a certain percentage of alcohol, and for alcohol to dissolve the oil it required a much larger quantity of the alcohol. This would seem to be another analogy of menthol to phenolpotassium, as far as the miscibility of the latter with water is concerned, or for that matter it may be likewise said of phenol alone.

The following is the mode of performing the experiments as per the table, and lead to those results tabulated when exact conditions are observed.

Into a graduated cylinder, divided into cubic centimetres and holding 40 to 5 c.c., place 10 c.c. of the oil, and add 20 c.c. 94 per cent. alcohol; shake well, then add 10 c.c. of water, which should be below 60° F. (ice water if at hand in summer); shake well and give time to fully allow of separation.

It might be well to suggest, on account of this affinity of oil of peppermint to seize upon alcohol, and hold it in the presence of water *in due proportion*, to call the test the "*mentholalcoholate test*," believing this name to be as justly applicable to this mixture as the name chloral alcoholate is to the mixture of hydrate of chloral in alcohol with presence of water.

In studying the table, note the following numbers (to show the affinity of oil of peppermint to alcohol in presence of even 2 to 4 parts of water).

Nos. 1, 2, 3, and 4, also particularly No. 25, then Nos. 26, 27, 28 and 29.

And as opposed to this the following numbers showing no alcohol absorption, Nos. 6, 7, 8, 9, 10, 16, (17), 41, 42, 43.

When two or more separate mixtures containing oils of great variances in their properties were mixed in the regular proportions, and their behaviour resulted alike, there was more water added in multiple proportion till the different effect was produced. Again when 2, 3, 4, or more volumes (1 vol. = 10 c.c.) of water were added to pure oil mixtures, or supermentholated mixtures, it was intended to show how tenaciously the alcohol was held by the said oil till water predominated so much as to act as solvent on the oil, thereby disrupting the mentholalcoholate combination.

Tabulated List of Separations, using Water in different Multiple Proportions and in all cases 20 c.c. Alcohol and 10 c.c. of the Variously Mixed Oils, Pure and Otherwise.

No.	Oils, 10 c.c.	Amt. water.	Upper separation.	Lower separation.
1	Pure ol. menth. pip.	10	14 c.c. clear oily	26 c.c. slightly milky.
2	„ „ „	20	14 „ „	36 „ more „
3	„ „ „	30	14 „ „	46 „ „ „ still.
4	„ „ „	40	14 „ „	56 „ „ „ „
				The supernatant layer was slower in forming, and the line of separation just barely observable.
5	„ „ „	50	2 c.c. oily layer	Very milky.
6	Oil camphor vol. alone	10	35·5 c.c. very milky	8·5 c.c. clear oily.
7	„ „ „	20	32 „ „	8 „ „
8	„ „ „	30	Large globules oil floating on top, with smaller globules suspended about equally throughout	
9	Oil hedeoma alone	10	10·5 c.c. oily layer	29·5 c.c slightly milky.
10	„ „	20	10·5 „ „	39·5 „ more „
11	2·5 c.c. hedeoma 7·5 c.c. m. pip. opt.	10	13 „ „	27 „ slightly „
12	1 „ erigeron 9 „ „	10	13 „ „	27 „ „ opalescent.
13	1 „ „ 9 „ „	20	12·5 „ „	37·5 „ „ „
14	2·5 „ camph. oil 7·5 c.c. „	10	12·33 „ „	27·67 „ „ milky.
15	2·5 „ „ „ „	20	12 „ „	38 „ „ „
16	5 „ „ 5 c.c. „	10	10 „ „	30 „ „ „
17	Dementholated „	10	12 „ „	28 „ more „
18	„ „	20	12·5 „ „	27·5 „ slightly „
19	2·5 c.c. dementholated 7·5 c.c. „	10	13 „ „	27 „ „ „
20	2·5 „ „ 7·5 „	20	13 „ „	27 „ „ „
21	5 „ „ 5 „	10	12 „ „	28 „ „ „
22	5 „ „ 5 „	20	12·5 „ „	27·5 „ „ „
23	7·5 „ „ 2·5 „	10	13·5 „ „	26·5 „ „ „
24	7·5 „ „ 2·5 „	20	13 „ „	27 „ more „
25	Pure oil, with 50 p.c. added menthol	10	Perfectly clear mixture	No separation.
26	„ „ 50 „ „	20	Somewhat milky mixture	„ „
27	„ „ 50 „ „	30	14 c.c. clear oily	46 c.c. slightly milky.
28	„ „ 50 „ „	40	14 „ „	56 „ more „
29	„ „ 25 „ „	10	14 „ „	26 „ separation of white (menthol)
30	„ „ 25 „ „	20	13·5 „ „	26·5 „ same as above.
31	5 c.c. dementhol, 5 c.c. pure, with 50 per cent. menthol	10	13·5 „ „	26·5 „ slightly milky.
32	5 c.c. dementhol, 5 c.c. pure, with 50 per cent. menthol	20	12·5 „ „	37·5 „ „ „
33	7·5 c.c. dementhol, 2·5 c.c. pure, with 50 per cent. menthol	10	11·33 c.c. oily layer	28·67 „ „ „
34	7·5 c.c. dementhol, 2·5 c.c. pure, with 50 per cent, menthol	20	12·33 „ „	37·67 „ „ „
35	2·5 c.c. dementhol, 7·5 c.c. pure, with 50 per cent. menthol	10	17·5 „ „	22·5 „ „ „
36	2·5 c.c. dementhol, 7·5 c.c. pure, with 50 per cent. menthol	20	14·5 „ „	35·5 „ more „
37	2·5 c.c. dementhol, 7·5 c.c. pure, with 50 per cent. menthol	30	14·5 „ „	45·5 „ „ „
38	2·5 c.c. dementhol, 7·5 c.c. pure, with 50 per cent. menthol	40	13·5 „ „	56·5 „ slightly „
39	6 c.c. dementhol, 4 c.c. pure, with 50 per cent. menthol	10	14 c c. separates very slow	26 „ „ „
40	6 c.c. dementhol, 4 c.c. pure, with 50 per cent. menthol	20	14 „ „ „ „	36 „ more „
41	Ol. menth. vir., pure, alone	10	Very milky all through, with a few globules of oil floating.	
42	5 c.c. menth. vir., 5 c c. menth. pip. opt.	10	11 c.c. separates clear	29 c.c. slightly milky.
43	25 c.c. menth. vir., 75 c.c. menth. pip. opt.	10	12·5 „ „	27·5 „ „ „
44	10 c.c. menth. vir., 90 c.c. menth. pip. opt.	10	12 „ „	28 „ „ „
45	10 c c. menth. vir., 90 c.c. menth. pip. opt.	20	12·5 „ „	37·5 „ „ „

The Pharmaceutical Journal.

SATURDAY, APRIL 2, 1887.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

INSTITUTE OF CHEMISTRY.

IT is now little short of two years ago that a Royal Charter of incorporation was granted to the Institute of Chemistry, and the circumstance was mentioned in this Journal as one of importance, not only for those more especially engaged in the pursuit of chemistry as a profession, but also in regard to those industrial occupations which involve a knowledge of chemical science. In pursuance of the power conferred by the Charter of incorporation it became the business of the Institute to frame bye-laws for regulating the conduct of its affairs, which were to be approved by the Privy Council. The execution of this work has occupied a considerable time, and it was only at the end of February last that the formal approval of the Privy Council was accorded to the bye-laws made by the Institute in general meeting. The time that has been taken up in the consideration of various suggestions and requirements put forward by the Privy Council before arriving at this result cannot be regarded as unprofitably employed, since the careful criticism to which the bye-laws have been subjected has resulted in their greater consistency and fitness for the objects in view. In the address delivered on the 14th of this month by Dr. ODLING, the President of the Institute, this view of the matter was put forward by him as compensating for the delay that occurred, and in a general way he stated that while the representations and requirements of the Privy Council were on most points advantageous and called for, the counter representations on other points were eventually acceded to by the department in a spirit of consideration demanding thankful and hearty acknowledgment. We are pleased to be able to congratulate the members of the Institute upon this satisfactory settlement of a somewhat arduous negotiation, and to join in the anticipation of the President, that from this time forward, favoured by its Royal Charter, acting now for the first time under its own bye-laws, with a smoother course before it, its new career may have more hopeful prospects than ever yet lay before it.

In the course of the presidential address, Dr. ODLING said, that though the provisions of the Charter and the bye-laws conferred upon the Council of the Institute considerable powers, the Council constituted only the chosen executive of the entire body, and that in reality the members at large were, in fact, responsible for the general policy of the Institute, and the regulation of its affairs. Hence he urged that it was the duty of all engaged as professional chemists to interest themselves in the welfare of the Institute, and make its now completed organization serviceable to good ends. That opportunity was afforded for active participation in such work was shown by reference to the constitution of the Institute, and the provisions for electing the executive body. While continuity in any course of action pursued by the Council is provided for by the circumstance of two-thirds of its members being eligible for re-appointment at each successive general meeting, desirable renovation of the Council is provided for by the circumstance of the whole of its members vacating office every year, by one third of the old members being ineligible for re-appointment, and by the official nomination of one-third of the new members being left in the hands of the general body. But with all these provisions for adequate and efficient representation no satisfactory result can be looked for without the hearty and continuous co-operation of the members at large. That will always be essential in order to make the Council for the time being of such power as the executive of a representative body that it will be able to carry out the work requisite for advancing the general interests of that body. More especially will such co-operation be needed in the earlier days of the Institute, and though it is the future of the profession that will be chiefly benefited, the claim of the Institute to support should be recognized by those already in practice, out of regard for the profession of which they are members. In any case, though it may happen that the action of the Council may not have the approval of individual members of the Institute, it will be clearly the fault of the general body if the course of action of the Council is not in accordance with prevailing wishes.

The concluding portion of Dr. ODLING'S address was devoted to a reply to the objection which has been raised to the combination of professorial work with that of professional chemistry. This objection has been put forward under the influence of an exaggerated admiration for "original research," as being the only pursuit worthy of the consideration of "all true men of science." This is a claptrap sentiment that is apt to be too readily accepted by a public having little appreciation, or even comprehension, of what scientific work really is, and probably no little mischief has been done by dilettante philosophers who propagate this notion; but the Institute of Che-

mistry may be looked to as calculated to establish a more rational estimate of chemical work, and be a means of proving that there is as wide a scope for the useful application of the knowledge we possess as there is for adding to what we already know by fresh discoveries. Dr. Odling ably advocates the association of professional occupation with professorial work, and most of the arguments he makes use of are sound. According to him professorial teaching, and even investigation, gain from occasional engagements of the professoriate in various branches of professional work, and it would be a disadvantage to the large interests confided to professional chemists if they were precluded from obtaining the services of eminent professors, while at the same time it would be a hardship on professional chemists to be prevented from such co-operation. But Dr. Odling, like a skilful advocate, confines his argument to those points which admit of being safely maintained, and he omits to deal with some objectionable features of the association of the professorial and professional occupations of chemists, for the reform of which it may be hoped there is now some prospect through the intervention of the Institute of Chemistry.

PRESENTATION TO MR. STEPHENSON.

We have much pleasure in recording the presentation to Mr. J. B. Stephenson, which is reported on a subsequent page of this Journal, as having been made by his friends and colleagues in acknowledgment of his services to pharmacy in Scotland. Such a manifestation of esteem appears but natural, when it is remembered that Mr. Stephenson has not only been active in promoting the interests of pharmacy during a period of nearly thirty years, but that on the death of Mr. John Mackay he came forward and undertook to fill the difficult and perplexing position of acting as his successor. The value of his services in this and other capacities was acknowledged in a highly complimentary manner on the occasion of the presentation last week, and it is especially satisfactory to notice, in regard to recent arrangements for the conduct of the Society's business in Scotland, they are so far approved of by Mr. Stephenson, that he is clearly of opinion it would have been unwise not to have accepted the settlement offered by the Council of the Society.

The scheme for the Colonial and Indian Exhibition included provision for the preparation of reports on the exhibits, and in accordance with the request of Sir P. Cunliffe Owen, the Council of the Society of Arts having undertaken to superintend the preparation and issue of those reports, the names of persons qualified to prepare them were submitted to H.R.H. the Prince of Wales for appointment by him to carry out the work. These reports have now been published in the form of an octavo volume of about 500 pages. The subjects of them are mining industries; minerals and gems; meat and dairy products; grain, fruits, tea, coffee, cocoa, sugar; wines, spirits, beer, etc.; tobacco; drugs, chemical and pharmaceutical products; oils and fats; gums, resins, etc.; cotton; wool; silk; fibres; leather, fur, hides and tanning materials; timber; machinery; musical instruments. These reports comprise a vast amount of information relating to Colonial produce and manufactures that will be especially useful in the compact form it is presented, and the volume will be a convenient record of the exhibition. It is published by Messrs. Clowes and Sons at the price of 10*s.* 6*d.*

* * *

On Monday evening the Pharmacy Acts Amendment Bill was introduced in the House of Commons and read a first time. The second reading was set down for Thursday, but meantime Dr. Tanner gave notice of his intention to move that the second reading be postponed for six months.

* * *

Another instalment of the useful series of reports on injurious insects, prepared for the Agricultural Department of the Privy Council by Mr. C. Whitehead, has just been issued from the Stationery Office. It contains verbal and pictorial descriptions of twenty-two insects that are considered to be the chief offenders in respect to root crops and the food vegetables that are usually grown on a large scale by market gardeners.

* * *

According to the *Pharmaceutische Zeitung*, picrate of ammonium is now being recommended in Germany, as it was a few years ago in this country, in the treatment of malaria, it being alleged to be even more efficacious than quinine. The pill form is preferred for its administration, one gram being usually ordered to be divided into 30 pills. In view of the possibility of such prescriptions making their appearance in pharmacies, a timely reminder is offered that picric acid and the picrates, especially picrate of ammonium, are readily and violently explosive, and it is recommended that before proceeding to mix the picrate of ammonium with the other ingredients of the pills, it should be moistened with a little water.

* * *

In a recently issued consular report on the finances of Japan it is stated that the tax on druggists in that country produces an annual revenue equal to £59,271.

* * *

Mr. Arthur Pearson Luff has been appointed to the Chair of Medical Jurisprudence and Toxicology in St. Mary's Hospital Medical School.

* * *

At the meeting of the Chemical Society on Thursday next, the 7th inst., a paper is to be read entitled "Researches on the Constitution of Azo- and Diazo-derivatives; Diazo-amido Compounds." Part II. By R. Meldola, F.R.S., and F. W. Streatfield.

* * *

A meeting of the Chemists' Assistants' Association will be held on Wednesday, April 6, when a paper on "The Analysis of Urine," by Mr. J. E. Saul, will be read.

Presentation to Mr. J. B. Stephenson.

A few of the friends and colleagues of Mr. J. B. Stephenson, Edinburgh, having thought the present time a suitable opportunity for presenting him with some acknowledgment for his services to pharmacy in Scotland, met for that purpose at a cake and wine banquet in the House of the Pharmaceutical Society, 36, York Place, Edinburgh, on Wednesday, March 23, at 4 p.m.

The chair was occupied by Mr. H. Bellyse Baildon, and Mr. William Ainslie acted as croupier.

Letters of apology for absence were received from Messrs. Buchanan; Borland, Kilmarnock; Dott; Finlay; Frazer, Glasgow; Gibson, Leven; Hardie, Dundee; Henry; Heron; Kinninmont, Glasgow; Maben, Hawick; MacDonald; MacEwan, London; Paton; Seath, Dunfermline; Smith; Storrar, Kirkcaldy; Strachan, Aberdeen; Symington; and Thompson.

The Chairman on rising to make the presentation said: I have had to preside on various occasions, but on none have I done so with such confidence in the goodness of my cause, as when I am asked to perform the duty of requesting Mr. Stephenson to accept this presentation from his admiring friends in Scotland. It requires no words of mine to make known to you his eminent services to pharmacy in Scotland. As early as the year 1859, we find him taking a prominent part in the evening scientific meetings of the Pharmaceutical Society in Edinburgh, and from that time to this, with a short interval, the Pharmaceutical Society has been indebted to him for his able support. In the year 1861 he became a member of the Council of the North British Branch, and, in company with Messrs. Ainslie and Young, rendered valuable services as a member of the Library and Museum Committee. In the year 1863 he was elected a member of the Board of Examiners, a position which he occupied for two years, and again he was proposed in 1876 to fill the vacancy caused by the retirement of Mr. Buchanan. In the spring of 1877 he was chosen President of the North British Branch. This office he held till the year 1882, a tenure of which there is no similar record in the history of the Society in Edinburgh. I need hardly remind you that he was the man to whom we all looked at that crisis in our affairs on the death of the lamented Mr. John Mackay. I can well remember that almost dramatic meeting on the very day of our departed friend's death, when at our unanimous request Mr. Stephenson consented to come forward and occupy the difficult and perplexing position which our great loss had brought about. The diligence and efficiency with which Mr. Stephenson has discharged the duties of the office of Honorary Treasurer, which he has held from that time till now, are well known to us all. In accordance with the recent arrangement for the management of the Society's business in Scotland, it has happened that I have in a sense been called upon to fill his shoes, and I cannot refrain from acknowledging the great courtesy and kindness which Mr. Stephenson has shown to me in a somewhat difficult position. You are also well aware of the important services Mr. Stephenson has rendered as a member of the Board of Examiners, in which he has filled the office of Chairman since 1877 with signal ability. We have another important testimony to his pre-eminence as a Scottish pharmacist, in his selection for the honourable position of President of the British Pharmaceutical Conference at Aberdeen in 1885. I need not detain you further. Knowing as I do, the untiring devotion and assiduity with which Mr. Stephenson has striven to promote the interests of pharmacy in Scotland, it gives me great pleasure to act as your mouthpiece on this occasion in asking him to accept, from his personal friends, this tangible expression of their appreciation of his services, and of their admira- for him as a model pharmacist.

Mr. Ainslie said he could add little to the very appropriate remarks of the Chairman, but as one of the oldest friends of Mr. Stephenson, he would like to say a few words on the present occasion. He was very pleased to see the cordial way in which the friends and colleagues of Mr. Stephenson had responded to the suggestion of which he might say he was the originator. There was one important service rendered by Mr. Stephenson which the Chairman had not referred to. That was the framing of the Edinburgh price list, which had been of great service to the whole trade for many years. He felt deeply indebted, also, to Mr. Stephenson for the splendid service he did in coming forward and keeping them moving, when, by the death of their lamented friend, Mr. Mackay, they were brought almost to a standstill. He trusted Mr. Stephenson would long be spared to wear this present, and that it would be handed down to his successors as an heirloom and a memorial of the highest respect of his brother pharmacists.

Mr. Gilmour said he had no intention of speaking, but as a member of the Board of Examiners in Scotland he would like to state in a sentence his cordial concurrence with every word of respect and esteem which had been expressed.

The Chairman then handed to Mr. Stephenson a handsome gold watch and appendages, the watch bearing the following inscription :—"Presented to J. B. Stephenson, Esq., by a few friends, in recognition of his valuable services to Pharmacy in Scotland, March 1887;" and also a gold bracelet set with pearls for Mrs. Stephenson.

In returning thanks Mr. Stephenson said: I am sure you will believe me when I say that I find it no light task to respond to the many things that have been said, and to this mark of your generous appreciation. I confess I can find no terms adequate to express myself, but I am deeply sensible of the great honour you have conferred upon me. I can faithfully promise to wear this gift very near my heart, both figuratively and literally. I have found that from the fact of my declining to be put in nomination for the recently elected Executive of the North British Branch, some of my friends have had some idea that I was inclined to play the part of Achilles sulking in his tent. That is really not so, and I am clearly of opinion that it would have been highly unwise not to have accepted the settlement offered by the Council of the Society. I am prepared to admit that through force of circumstances I have been called to take a prominent place in Scottish pharmaceutical affairs. That, I believe, has been largely due to my dear friend. the late Mr. Mackay, whose inspiration prompted me to labour with all my might for the advancement of the interests of pharmacy. Of any success I may have had

it is not for me to speak. All I can say is that I have honestly done my best. In this handsome gift, with which you now present me, I recognize an expression of your esteem, such as I never could have hoped for.

Mr. Watt, Haddington, said he had much pleasure, in the name of provincial pharmacists, in expressing their cordial concurrence in the presentation of this small mark of respect. In his intercourse with Mr. Stephenson, he had found him to possess many qualities which made him a wise and excellent councillor. He thought their doings that day would tend to bind them one to another, and there were many reasons at the present time why they should be united as one man. He proposed a hearty vote of thanks to Messrs. Ainslie, Baildon, Buchanan, Gilmour, and Kinnimont, who had kindly performed the duties of a Committee for the subscribers.

The vote was acknowledged by Mr. Baildon, who said their work had been a labour of love.

Mr. Nesbit, Portobello, said it gave him much pleasure to have this opportunity of showing his appreciation of the valuable services rendered by Mr. Stephenson. He had to propose a vote of thanks to Mr. Hill for the ready assistance he had given the Committee in carrying out their arrangements.

Mr. Hill acknowledged the vote.

Mr. Stephenson said he had the best reasons for proposing a hearty vote of thanks to Mr. Baildon for the able way in which he had discharged the duties of the chair on the present occasion.

Mr. Baildon, in acknowledging the vote, said it was one of the most agreeable duties he had ever been called upon to perform.

The meeting then closed.

Proceedings of Societies in London.

ROYAL INSTITUTION.

Colours of Thin Plates.

On Friday, the 25th ult., the Right Hon. Lord Rayleigh delivered a lecture at the Royal Institution upon "The Colours of Thin Plates," a term which he explained was applied to thin films of substances, such as oily films on the surface of water, or the equally familiar soap-bubble. Although the reflection of colours from the surface of a soap-bubble is probably the most noticeable, yet the "plate" which lends itself most readily for experiment is a film of air confined between two sheets of glass If a ray of white light be reflected from the surface of the film upon a screen, the so-called Newton's rings, a series of coloured concentric rings, are obtained. If, instead of reflected light, the ray of light transmitted through the film of air be allowed to fall upon the screen the same phenomenon is observable, but the effect is very considerably minimized, owing to the great preponderance of white light, which overlays as it were the coloured rings. Even in the first instance, as the lecturer was able to show later on, the colours are not nearly so intense as they may be obtained, owing to some white light being reflected from the surfaces of the two sheets of glass. With regard to the appearance of the phenomenon it is observed that the part which corresponds to the thinnest part of the film is considerably darker than the rest of the spectrum; around this is a bright ring of white, succeeded by constantly increasing concentric rings of different colours apparently repeating themselves. Lord Rayleigh also obtained the same results with a film of a solution of soap and glycerine, but in this case the dark portion was observed at the top of the spectrum, the other colours arranging themselves in order in the soap film thinned by the force of gravitation, thus showing that the colours vary according to the thickness of the film. Another form of the experiment called forth a considerable amount of applause from the audience. Lord Rayleigh caused a gentle stream of air to play obliquely upon a soap film, so that the part struck was moved forward and the whole film rotated. Then with the alteration of the force of the current of air, which of course regulated the centrifugal force, alternating thicknesses of film were obtained, causing a varying display of beautiful colours and combinations of colours. This last experiment also tended to prove that the bands of colour are not arranged in a certain order, but vary according to the thickness of the film, a conclusion arrived at by Brewster, who observed that if a film reflecting certain colours be carefully inverted so as not to disturb the gravity, the colours reflected are also inverted. Lord Rayleigh explained the phenomenon by referring to Young's wave theory of light. He regarded the film as having two surfaces from which light is reflected, an anterior exterior surface and a posterior interior surface. If a ray of light be thrown upon the film, a part of the light is reflected from the first surface, but the greater part is transmitted, and some of this is reflected from the second surface, passes back through the film, and is combined with the light reflected from the first surface. If then the light reflected from the second surface be in the same state of vibration as that reflected from the first surface, the effect of their combination will be to increase the amount of light reflected from the first surface, but if otherwise, the effect will be a partial neutralization of the light reflected from the first surface. That is to say, if the retardation of the light which is reflected from the second surface, owing to its twice traversing the thickness of the film, be equivalent to a wave length of the vibration of the light, it will increase the intensity of the light reflected from the first surface. If, however, the retardation be only equivalent to half a wave length, the intensity of the light will be decreased. Thus, then, with a ray of monochromatic light it will be seen that the effect of difference in the thickness of the film will be to alter the intensity of the reflected ray, but with a white light composed of several colours the result will be more complicated. As each colour has a different wave length in vibration it will be seen that each colour will act independently of the others, and a certain thickness of film which, upon the combination of the two reflected rays, will cause one particular colour to be intensified, will at the same time cause the other colours to be more or less obscured. Thus as the thickness of the film is altered different colours preponderate, causing the appearance of rings or bands, according to the nature of the experiment. The dark appearance on the screen corresponding to the thinnest part of the film is probably due to refraction of the ray of light reflected from the second surface, consequent in its passing from a rare into a denser medium, and again from the denser medium into the rare, which refraction Lord Rayleigh considers to effect a retardation equivalent to half a wave length. Lord Rayleigh supported this theory of the formation of Newton's rings by several interesting experiments. A beam of light was intercepted by two of Nicol's prisms, one of which acted as a polarizer and the other as an analyser of the light, so that no light was able to pass through both on to the screen. Between the two prisms a double refractive lens was now placed, in this case a double concave lens of selenite, when the same series of concentric rings observed with the film of air was obtained on the screen, only much more intense, whilst a wedge of selenite gave the bands of colour in the same order as with the soap bubble. But perhaps the most striking proof of the dependence of the colours upon the thickness of the film was shown by the reflection of a beam of light from a piece of mica, composed of twenty-four very

attenuated plates overlapping each other. With each layer a marked gradation in colour was visible. The remainder of the lecture was devoted to an explanation of the determination of the chromatic relations of the colours of the spectrum. Lord Rayleigh at this point made a rather startling statement that any colour can be produced by two other colours. As an example of such a formation a ray of white light was passed separately through a solution of yellow chromate of potash and an alkaline litmus solution, throwing respectively a yellow and violet-blue colour upon the screen. When the ray was made to pass through the two solutions successively, an orange-yellow colour was obtained upon the screen, which colour Lord Rayleigh asserted to be made up of red and green rays. To prove this the ray of white light was decomposed by means of a prism, and the decomposed rays passed through the two solutions. The one solution was found to exclude all the yellow and orange rays from the spectrum, whilst the other excluded all the blue and violet rays, so that when the ray had passed through both solutions only the red and green rays were left. If instead of allowing the decomposed ray of light to pass through a slit and thus obtain definite bands in the spectrum, the ray was passed through a circular hole, the red and green colours overlapped each other on the screen, forming by their combination the identical orange-yellow colour obtained with the primary white light. It was then stated that if three definite positions be taken in a spectrum in the red, green, and violet bands respectively, and these positions be represented by the corners of an equilateral triangle (Clerk Maxwell's triangle), it has been mathematically determined in what position within this triangle the colours of Newton's rings would fall. Lord Rayleigh, by means of a diagram and the selenite wedge, showed that the relations to the three standard colours in practice were identical with the position assigned them by theory. In conclusion, the lecturer showed a piece of glass, the surface of which had been decomposed, a ray of light transmitted through which showed upon the screen patches of very pure colour. These he considered to be due to the glass consisting of a number of thin plates, some of which had been removed by the decomposition.

CHEMISTS' ASSISTANTS' ASSOCIATION.

At a meeting of the Association on Wednesday, March 23, the President, Mr. H. H. Millhouse, in the chair, Mr. W. Baxter, jun., read some "Notes on a Tour in Scotland," illustrated by lantern slides, which gave a very interesting account of a tour in Scotland, finishing up with a detailed account of Ben Nevis. In the course of the paper the author gave his personal experience as to the results of experiments with coca and its preparations during several mountain-climbing expeditions. The following are the passages in which this subject was referred to :—

Experiments with Coca.

BY W. BAXTER, JUN.

"The mountains climbed were the following : Ben Nevis, 4406 feet; Ben Lawers, 3986; Ben Cruachan, 3650 (approximately) ; Ben Lomond, 3192 ; Ben Ledi, 2875 ; Ben Vrackie, 2757. The preparations of coca that I took with me were (1) the leaves; (2) the liquid extract (made from green leaves), Christy ; (3) Solid extract (made in Bolivia) ; (4) A pill containing 2·5 gr. of Bolivian green extract in each ; (5) Solution of the hydrochlorate, 1 gr. in $\bar{3}$ss.; (6) A lozenge containing $\frac{1}{16}$ gr. of cocaine hydrochlorate.

"The accounts travellers have given from time to time of the wonderful effects of coca, have only been treated as a myth up to a year or two ago. The so-called hunger and thirst appeasing effects, as well as the relief of oppressive respiration during mountain ascents : all these were thought as unworthy and superstitious. When, however, the alkaloid was isolated, and its valuable anæsthetic properties were made known, then we began to think there was something in these travellers' tales concerning the South American Indians, and now we are constantly having fresh evidence of its value. Personally, I now believe in its extraordinary power in staving off hunger, etc. The leaf is the best ; next to that comes the liquid extract, which, if good, does almost as well ; but an equivalent of cocaine fails, so it would appear that there is some active volatile component which is interfered with in isolating the alkaloid. What this is, and how to isolate and preserve it, is something for us to work upon as pharmacists.

"Ben Cruachan is one of the grandest and most conspicuous of Scotch mountains. It is really the toughest piece of work in the British Isles with the exception of Scuir-ne-Gillear in Skye. The first part is very steep, but good footing ; the latter part is a stony wilderness, over which no two successive steps admit of the same muscular tension. On starting I took a coca pill, but my respiration after three-quarters of an hour's work or so became burdensome, and I began to feel fagged out by the steep climb through a wood which commences the ascent. I sat down by the side of the mountain torrent and patiently chewed about 60 grs. of coca, adding a little sodæ carb. I then made another start following the course of the Cruachan Burn until the corrie under the summit was reached. From here begins the sharpest of ascents over the roughest of boulders; a stick is here a nuisance as you constantly have to go in for hand and knee work. I thought here is a good test for the coca, for I am sure I should have been exhausted more than once under ordinary circumstances, but I felt no fatigue, my respirations were easy and no sense of hunger or thirst was experienced. Perspiration, however, was not diminished in the slightest, as after this toilsome bit my flannels were saturated. I have not time to describe the view to you; the thing that pleased me most was the grand peak of Schiehallion, like a huge sugar-cone, to the north, and to the south the curious contour of Ben Arthur the Cobbler. Now whether it be due to the delightful change from the hard "collar" work of the ascent, or to the vast horizon commanding the eye "skinned," to use an expressive Americanism, by the exercise in the "caller" air, or to the sense of momentary superiority to all my neighbours, or to the absolute freedom from all sublunary cares, or to the exhilarating influence of the rarefied air charged with ozone, or to the coca, or finally, as is most likely, due to the whole of these causes combined, I will not attempt to decide, but certain it is that I felt most happy and calm in mind, sitting on a mountain-top in clear weather with the world at my feet, and on this occasion I felt very loth to descend. I started to walk along the ridge which dips 300 feet to the other peak, and here I found nonconformity still the creed of the earth's crust; the arrangement of the huge granitic boulders can only be described as chaotic. The view from the east peak was very fine. Thence I descended along the ridge to eastwards to Loch Awe Hotel again. Having dined I had a headache for about one and a half hours. It is a rarity for me to have a headache at all, and as I felt no fatigue I could not willingly put it down to the day's exertions. It was a very mild attack, but I subsequently noticed that this always took place after the first full meal after taking coca, but when it went it left my intellect wonderfully clear and active. I should be glad to know whether any present have felt this on experimenting. Another thing I noticed was it made me rather costive.

"In a quick ascent up Ben Lomond, I took ℥iij. liq. extract on leaving the steamer and got to the top in fifty minutes, the view from which is very superior, being a border height, Lochs Ard and Lomond being the two striking features. Again there was no feeling of fatigue. I descended in fifty minutes. The ascent of Ben Lawers was made from Lawers on Loch Tay. I took ℥ij. of solution of cocaine. I took about two and a half hours going up, as I did a good deal of botanizing on my way across a huge moorland where there were hundreds

of sheep, cattle and ponies grazing. The last twenty minutes' work is stiffish, and I knew the cocaine had failed as my breath troubled me here and I was tired on reaching the summit.

"Ben Ledi is an easy climb, so I took no coca, the view is very remunerative, as it is another of the border heights.

"Ben Vrackie is ascended from Pitlochry, on the east side of Scotland. It is quite a ladies' excursion, but I determined to descend to Blair Athole and walk back to Pitlochry through the Killicrankie Pass, visiting the falls of the Tummel on my way; this made about a twenty-one-mile walk of it. After a fair breakfast I started and consumed in the first two hours 90 gr. of coca leaves. View from the top is very lovely. I arrived back at four o'clock, having walked from the Tummel to Pitlochry, a distance of three miles in thirty-five minutes in a pelting rain, the first wet I had had. I was not at all fatigued nor distressed for food, but I had my headache shortly after partaking of a good dinner."

The author also mentioned several cases in which he had administered solution of cocaine or cocaine lozenges to persons suffering from sea-sickness, with beneficial effect, and he quite confirmed the experience of Mr. Sumner as to the value of the alkaloid as a remedy (see *Pharm. Journ.*, [3], xvi., 712).

In consequence of the lateness of the hour the author had to postpone until the next meeting reference to a number of botanical, geological and other specimens collected during the trip.

A meeting of the Association was held on Wednesday, March 30, when Mr. T. S. Dymond, Vice-President, took the chair. The first paper read was a—

Note on Vinum Ipecacuanhæ.

BY F. C. J. BIRD.

In the discussion which followed the reading of Mr. J. C. Shenstone's paper on Vinum Ipecacuanhæ at the 1886 meeting of the British Pharmaceutical Conference, Mr. Conroy stated that he considered it was a great mistake to order the powdered root in the B.P. formula, and that a much better result was to be obtained by the substitution for it of the whole root.

Seeing that the chief objection which has been urged against the use of the powdered root has been its tendency to block in the percolator, if the whole and powdered roots can be exhausted by an acetic menstruum with equal facility, the advantage evidently lies on the side of the employment of the uncrushed root, not only on account of the saving of labour, but also by reason of the percolation being under perfect control. To test the two processes, therefore, the following experiments were made.

One pound of a selected sample of good dry ipecacuanha root was taken, mixed thoroughly, and divided into two equal portions. One of those (C.) was very lightly broken up, so as to obtain small pieces which would pack together well in a percolator. The other (F.), was carefully powdered and passed through a No. 20 sieve, care being taken to produce as little powder as possible of a higher degree of fineness. Eight fluid ounces of B.P. acetic acid having been poured on each sample, both were allowed to macerate for twenty-four hours. and were then packed to the same height in two similar percolators, covered with water, and allowed to undergo further maceration. Percolation was then proceeded with, all subsequent operations being conducted simultaneously, so as to make the results obtained as comparative as possible. The percolate was collected in thirty-two fractions of 5 fluid ounces each, and as to a certain extent the colour of the percolate may be assumed to correspond to its alkaloidal content the comparative colour value of the fractions was estimated in order to show at what rate and to what extent exhaustion was taking place. Taking as a standard the fraction F. 7, which was of a medium and easily imitable

Percolate. No. of fraction.	Colour value.		Reaction with Meyer's reagent.	
	C.	F.	C.	F.
1	170	240	—	—
2	240	226	—	—
3	130	144	—	—
4	90	110	—	—
5	48	48	Copious precipitate	Copious precipitate.
6	22	17	,,	,,
		Standard		
7	12	10	,,	,,
8	8·33	5	Quite opaque	Strong opalescence.
9	6·66	3·8	,,	,,
10	5·26	3·2	,,	Moderate opalescence
11	4·54	2·8	,,	,,
12	3·94	2·5	Strong opalescence	,,
13	3·44	2·3	,,	Moderately faint opalescence.
14	2·68	2·0	Moderate opalescence	Faint opalescence.
15	2·5	1·8	,,	Very faint opalescence
16	2·38	1·55	,,	,,
17	2·27	1·3	Moderately faint opalescence	,,
18	2·05	—	,,	,,
19	1·73	—	,,	,,
20	1·61	—	Faint opalescence	,,
21	—	—	,,	,,
22	—	—	Very faint opalescence	,,
23	—	—	,,	,,
24	—	—	,,	,,
25	—	—	,,	,,
26	—	—	,,	,,
27	—	—	,,	,
28	—	—	,,	,,
29	—	—	,,	,,
30		—	,,	,,
31	—	—	,,	,,
32		—	,,	— ,,

colour, 10 c.c. of that fraction were placed in a tube standing on a white surface, and distilled water was added to 10 c.c. of the fraction to be compared, until the same quantity placed in a similar tube gave a colour equal to that of the standard. The number of c.c. required to effect this being noted, the comparative colour strength was calculated in terms of F. 7, taken as 10. Weaker percolates were compared by dilution of 10 c.c. of the standard to their colour.

Mayer's reagent produces a copious precipitate in vinum ipecacuanhæ, notwithstanding the alcohol which it contains. As soon, therefore, as a percolate gave only a faint, barely visible opalescence with a drop of the test the root was assumed at that stage to be practically exhausted.

When the acetic acid was poured on the two samples of root, in the case of the coarse powder it was at once absorbed and a damp mass produced; but the broken root required twenty-four hours and frequent stirring before the whole of the acid was taken up. The first percolate from the broken root was much lighter in colour than that from the powdered root, this being due to the fact that the water displaced the strong liquid from the coarsely powdered sample, but when poured on the other, no displacement took place, the strong liquor merely diffusing from the root into the water and so becoming diluted. The exhaustion of the powdered root seems to finish much more abruptly than that of the broken root, the gradual decrease in the colour of the percolates from the other being very marked. After C. 20, and F. 17, the colour became so faint that it was not possible to imitate it with any degree of accuracy.

Fractions F. 32, and C. 32, gave a very faint opalescence with Mayer's reagent, and slightly reddened litmus solution. In testing the fractions, equal volumes were measured in a graduated pipette, and equal quantities of Mayer's reagent added to each.

From the above results it would seem that by careful percolation ipecacuanha in coarse powder may be practically exhausted with less than half (40·6 per cent.) of the menstruum ordered in the B.P., and as the employment of the root when even lightly bruised increases the quantity of liquid required to nearly half as much again (59·3 per cent. of the B.P. quantity), it is a question whether the gain in convenience would compensate for the damage done to the emetine by the increased time of evaporation and consequent exposure to heat. In order to ensure the easy percolation of ipecacuanha root of the B.P. degree of fineness, the operation of powdering it must be very carefully conducted. In the ordinary course of powdering the root, unless special care be taken, the powder which has passed through, say a 20 sieve, will be found to contain a considerable proportion which will pass through a 60, or even an 80 sieve, and unless this dust be excluded percolation is almost certain to come to a standstill. If, however, the ipecacuanha be not too dry, and very lightly powdered and frequently sifted at first until the cortical portion has disappeared, no difficulty will be found in producing a powder from which a 30 sieve will remove very little, and which so far as my experience goes may be percolated with ease.

A certain quantity from each of the C. percolates was accurately measured and the whole mixed together, the F. percolates being treated in the same manner. Of the resulting liquids that from the F. percolates was considerably the darker of the two.

In conclusion, I think the editors of the British Pharmacopœia were correct in directing, in the formula for vinum ipecacuanhæ, that the root be coarsely powdered; but the quantity of liquor to be collected seems very large, and might with advantage be considerably reduced.

In a discussion upon this paper Mr. E. Taylor said that he had never found percolation retarded by the root being finely divided, but suggested that if such were the case, sand or pumice-stone might be employed with advantage.

The Chairman, referring to Mr. Bird's statement that the amount of menstruum ordered by the British Pharmacopœia was in excess of the quantity required, said he thought that although so large a quantity might not be needed in a carefully conducted laboratory experiment, yet when made on a larger scale the larger quantity of menstruum would be an advantage in obtaining a more average product.

Mr. Bird, in reply, suggested the use of some simple test to ascertain when the extraction had been sufficiently complete, so that a careful manipulator would have an advantage over a more unskilful one.

Mr. Bird then read a "Note on a Modified Form of Filter Tube for Use in the Estimation of Alkaloids by Mayer's Reagent." The paper will be printed in a future number.

The next paper read was a—

Note on Water Softeners.

BY J. T. MILLARD.

The method for softening water that has been most extensively employed is that proposed by Professor Clark, and consists in the addition of lime to the water in sufficient amount to neutralize the free dissolved carbonic anhydride. The result of this is to cause a precipitate of calcic carbonate, previously retained in solution by the excess of carbonic anhydride, with the added lime.

A minute amount of calcic carbonate still remains in solution, the salt not being absolutely insoluble. But the most important point to notice is that the temporary hardness alone is practically affected, the permanent hardness remaining almost exactly as it was before.

Within the last few years, several powders under fanciful names have been introduced for the purpose of softening water. The number, however, is very small, and they all make use of Clark's suggestion, and consist either entirely or partly of slaked lime. One of these, which is protected by a patent, is composed of lime, alum and carbonate of sodium, and gives excellent results with some samples of water.

The use of sodic carbonate as a water softener is by no means new, having been often employed either with or subsequent to, the action of lime, to reduce the permanent hardness. Borax and baric carbonate have been used for a similar purpose, to the latter, however, there is the fatal objection of its injurious nature if taken internally. It was with the idea of ascertaining the relative utility of these agents as water softeners that the following comparative experiments were made.

Equal weights of slaked lime, dried carbonate of sodium, borax and a mixture of equal parts of soda and lime were each tried on the same amount of water, of which the total and permanent hardness had previously been ascertained.

The usual directions of the proprietary powders are that as much of the powder as will cover a shilling be placed in the ewer over night, the water stirred well, and poured off from the sediment in the morning. This amount was found to be about equal to 2 grains to the pint, so 2 grains (0·1295 gram) of each of the above were mixed with one pint of the water, the whole stirred well, allowed to stand over night, and the hardness estimated in the usual way the next morning. The hardness is given in degrees of Clark's scale, each degree being equal to 1 grain of $CaCO_3$ per gallon.

	Water alone.	Ca2OH	Na_2CO_3	$Na_2B_4O_7$	Equal parts Ca2OH and Na_2CO_3.
Total hardness	11·5°	4·02°	4·3°	8·4°	3·5°
Permanent ,,	4·2°	3·85°	1·92°	2·1°	1·75

It is evident from the above table that the mixture of equal parts of dried carbonate of sodium and lime gives extremely good results, and it is noteworthy that in each case the supernatant liquid yielded no trace of alkaline reaction either with litmus or phenol-phthalein. The chief objection to preparations of this kind is that the amount and proportions of the mixture required must vary according to the hardness of the water. Thus the same amount of the mixture tried on a water that had a total hardness of 44°, only reduced this to 31° and the water would still remain excessively hard. Nor will the simple plan of adding a larger quantity of the powder answer, as the result gave an alkaline liquid that was still hard, but upon increasing the proportion of lime and reducing the soda a soft and neutral water resulted.

This only points to what should be the practical outcome of this paper, namely, that these water softeners should be prepared by chemists themselves, who could easily estimate the hardness of the water in their neighbourhood, and so proportionate the amount of ingredients with the hardness. For this purpose the above table may be useful, or calculation may be made directly, using 1 grain of Ca2OH per gallon for every degree of temporary, and 2 grains of Na_2CO_3 per gallon for every degree of permanent hardness.

I might add that the powder should be as fine as possible, and should be put up and kept in a tin having a well-fitting lid, or the lime is soon converted into carbonate.

In the discussion that followed the reading of this paper, Mr. Baxter corroborated the statements made by the author, and expressed surprise at these preparations not being more universally employed, as he considered that the peculiar greasy suds formed with a hard water, such as that supplied by the Kent Water Company, must be detrimental to health by stopping the pores of the skin. At the same time he thought it was the business of the water companies to soften the water, as the work would not then be left in the hands of ignorant persons.

The Chairman said that some companies did treat the water with this object, but he pointed out the undesirability of freeing water from all its mineral impurities, and stated that with soft waters, such as that supplied to Glasgow or Manchester, it was almost necessary to add lime in order to harden them.

Messrs. Bird, Botham, and Worsley also joined in the discussion, and it was agreed that the preparation of these "water softeners," suitable for the water of the vicinity, was a desirable extension of a chemist's business.

The rest of the evening was taken up by the concluding remarks by Mr. Baxter, jun., on his tour through Scotland, in which he referred to a number of herbarium specimens, amongst which were a fine collection of gentians. He also exhibited a number of geological specimens, principally from Ben Nevis and Ben Lawers, commenting upon the extraordinary strata of porphyry occurring upon the top of Ben Nevis.

In the discussion which followed, Mr. Dymond asked what means Mr. Baxter had employed for mounting his botanical specimens.

Mr. MacEwan stated that he had found equal parts of tragacanth and acacia gums, 1 oz. of each in 1 pint of water, to which a little mercuric chloride and oil of cloves were added, to be best for this purpose, and also suggested that if chemists would make public any meteorological observations they might take, it would be an attraction to their business.

Messrs. Bird and Worsley also took part in the discussion.

Mr Baxter, in reply, stated that he used a thin mucilage of rice starch, to which a little carbolic acid had been added, for the mounting of botanical specimens, and otherwise than mounting quickly took no special steps to preserve the colours of the flowers.

Provincial Transactions.

MANCHESTER PHARMACY STUDENTS' ASSOCIATION.

The third annual meeting of the above Association was held in the Pharmaceutical Laboratory, Owens College, on Thursday evening, March 24th inst. (Mr. William Elborne in the chair), to receive the Treasurer's and Secretary's reports for the session 1886-87, and to elect officers for the ensuing one.

The Annual Report of the Committee stated that the number of members was thirty-six, and the attendance throughout the session had been good. The financial position of the Association was also satisfactory. The Committee again desired to acknowledge its indebtedness to the Council of the Owens College for granting the Association the free use of the Pharmaceutical Laboratory and Materia Medica Museum for the purpose of holding meetings. On October 28, an introductory address had been given by the President, Mr. William Elborne, and at that and subsequent meetings, various papers and communications had been read.

The report having been received and adopted, the officers were elected for the session 1887-8, as follows:—President, William Elborne; Vice-Presidents, W. Lane, W. Spencer Turner; Hon. Treasurer, W. Gibbons; Hon. Secretary, H. Wilson; Committee: J. Clayton, E. D. Mitchell, A. Wilkinson, A. B. Rhodes, J. Redhead; Reporters: Pharmacy, J. C. Husband, F.C.S.; Botany, W. S. Turner; Materia Medica, W. Elborne; Chemistry and Physics. A. W. Duncan, F.C.S.

The Hon. Secretary, E. D. Mitchell, upon retiring from re-election, received a hearty vote of thanks for the services he had rendered to the Association for the past two years.

TORQUAY CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting was held on the 23rd inst., Mr. W. Smith in the chair.

Mr. Milne gave an interesting and instructive lecture on "The Mouth and Digestive Organs," which referred to the functions of the different teeth glands, etc., and traced the processes to which food is subjected before assimilation by the system.

After some discussion, a vote of thanks was accorded to the lecturer.

Parliamentary and Law Proceedings.

The Sale of Laudanum.

An inquiry was held March 29, at the Leeds Town Hall, by Mr. J. C. Malcolm, the Borough Coroner, respecting the death of Samuel Smith, sixty-one, joiner, of 37, St. Mark Street, Woodhouse. On Saturday evening Smith came home drunk, and was subsequently found lying on his bed with an empty bottle by his side, which was found to have contained laudanum. Assistance was procured and he was taken to the Infirmary in an unconscious state, where he died on Sunday morning. He had been in the habit of taking laudanum when drunk, and about eight o'clock on Saturday evening he went into the shop of Mr. A. P. Dyson, wholesale chemist, 178, Woodhouse Lane,* and asked for sixpennyworth of that article. Not knowing who he was, Mr. Dyson asked him what he wanted it for, and he said he had got toothache, and not suspecting anything, Mr. Dyson allowed him to have the laudanum. A written white label was put on the bottle, Mr. Dyson not having any of the proper red ones in stock. The medical evidence showed that death had been caused by syncope.

* There is no entry corresponding to this name and address on the Register of Chemists and Druggists.

The dose he was supposed to have taken was said to have been quite sufficient to destroy life.

The Jury returned a verdict to the effect that the deceased had committed "suicide by taking an overdose of laudanum." They also wished to censure the druggist for not having a proper label and for not being more careful as to whom he sold laudanum.

Obituary.

Notice has been received of the death of the following :—

On the 18th of March, Mr. Septimus Frederick Leete, Chemist and Druggist, Thrapston, Northamptonshire. Aged 72 years.

On the 18th of March, Mr. Thomas Townson, Chemist and Druggist, Bridgwater. Aged 76 years.

Review.

THOMSON'S CONSPECTUS, ADAPTED TO THE BRITISH PHARMACOPŒIA OF 1885. Edited by NESTOR TIRARD, M.D., L.R.C.P., etc. New edition.*

Nearly eighty years have now elapsed since the late Dr. Anthony Todd Thomson published the 'Conspectus of the Pharmacopœias of London, Edinburgh, and Dublin,' of which the book under notice is put forward as the lineal descendant and representative. Certainly it is very suggestive of the value of the traditional reputation of a successful book that it should be still worth while to prefix Dr. Thomson's name to a work that has at the hands of successive editors undergone such fundamental alterations in every respect except plan. In the preface to this new edition the present editor states that he "has endeavoured to bring the book into accordance with the British Pharmacopœia of 1885 and has made such other corrections and alterations as were found necessary from the progress of science." Probably in the therapeutical portion the editor's special qualifications have enabled him to attain this end, and as the work is essentially one for medical students this is of primary importance; but turning to the parts that can be more appropriately criticized in these pages blemishes may be found that are rather significant as to the superficial way in which chemistry and pharmacy are taught in the medical schools. For instance, on p. xi. the reader is still told that "the salts most commonly adulterated are potassii carbonas and sodii carbonas!" Four pages further on he is told in reference to the halogen compounds that when the compound consists of one equivalent of each compound the prefix *prot*, *proto*, or *sub* is used without any suggestion that this applies only to a limited class, and not to such salts as sodium chloride; after which he is further informed that "when it contains two equivalents of the base [*sic*] the syllable *bin*, *bi*, or *per* is added." Take as another example of "how not to do it," the information vouchsafed as to the process for the preparation of potassium iodide. "Liquoris potassæ cong. j.; iodi unc. xxj. vel q. s.; carbonis ligni unc. iij; aquæ destillatæ ferventis q. s. The iodate of potassium is first formed and converted into the iodide of potassium." Sodium iodide is said to be prepared similarly. Now it is difficult to conceive what useful purpose will have been served when a student has assimilated this information, which might excuse him for supposing that the two operations were comparable to the making of infusions. Some of the pharmaceutical operations are hardly more fortunate. For instance, in respect to the standardized preparations that have now been made official information is given as to the percentage of alkaloid they should contain, but the directions as to their manufacture include no suggestion as to the manner in which the agreement of the product with the standard is to be ensured. Again under "Syrupus Ferri Iodidi," in the directions for its preparation the instruction to boil a portion of the syrup with the solution of the iodide is omitted. In other places the official work has been followed with a loyalty that might have been spared, as where cocaine hydrochlorate is said to be "soluble in water, alcohol and ether." But enough has been said to indicate that there is still room for further revision in a future edition.

The official section is followed by several appendices, including notices of the more important non-official medicines and preparations, a short treatise on poisons, examples of prescriptions, etc.

* London: Longmans, Green and Co. 1887. Small 12mo. Pp. i.–xxiv., 1–251. 6*s*.

BOOKS RECEIVED.

THE MEDICAL ANNUAL AND PRACTITIONER'S INDEX. Edited by PERCY WILDE, M.D. 1887. Bristol: J. Wright and Co.

THE ORGANIC MATERIA MEDICA OF THE BRITISH PHARMACOPŒIA. By WILLIAM SOUTHALL. Fourth Edition. London: J. and A. Churchill. 1887.

GRIFFITHS' MATERIA MEDICA AND PHARMACY. Third Edition. Edited and in Part Written by ALFRED S. GUBB, L.R.C.P., M.R.C.S., etc. London: Baillière, Tindall and Cox. 1887.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE FUTURE OF PHARMACY.

Sir,—If I may be allowed I should like to comment upon a letter signed "Pro Bono Professionis."

As the writer is evidently unacquainted with the exigencies of the trade (we can hardly in these cases call it a profession) as it exists in most small country towns, perhaps he will permit me to point out to him that in such places the art of dispensing a prescription is only of occasional use, and that frequently the profit derivable from this source will not suffice to pay the gas bill. Again prescribing is sure to bring down severe condemnation from all the medical fraternity in the neighbourhood, inevitably followed by loss of prestige. Further, the sale of drugs and chemicals is necessarily limited, besides which most of the principal inhabitants are either members of a co-operative store, or have access to their price lists, which results in obliging the dealer to trade on small profits; therefore it is found that in order to make a living a wider field must be cultivated.

The manufacture of horse balls, mixing of paints, and handling of oils forms an integral part of the education of a country apprentice; not perhaps so much that he shall in after life do these things personally, as that he may be able intelligently to direct the raw lad who officiates as porter, and who with the apprentice performs these duties.

The idea of having one's teeth extracted by an individual reeking with paint, and soiling everything with which he comes into contact, is comical, but it suggests to one's mind a man so deficient in manipulative skill that no thinking person would ever trust him to perform a surgical operation. It may interest "Pro Bono Professionis" to know that I have personally handled many tons of paint, in quantities of from half a pound to over a hundredweight, without any protection and without damage; that I have known others do similar work equally cleanly, and that I should consider any person who after a few weeks' practice cannot do likewise would be too careless to be entrusted with pharmaceutical work at all.

As to its being our duty to wish our brother pharmacist success with his branch shops, I beg most emphatically to assert the exact contrary, this practice seems to me most injurious to the trade at large, because it directly tends to keep the majority of assistants indefinitely in a subservient position, and to do away with the constant personal supervision necessary in all professions.

I am quite at one with "Pro Bono Professionis" as to the desirability of raising the profession of pharmacy above this sort of mixed trading; but I must remind him that when it is a question of slow starvation with professional status against a comfortable living on a slightly lower basis (and bear in mind that the general public do not appreciate the sacrifice, but rather exalt the man who makes the most money), no one possessing any common sense will hesitate to adopt the course which is most to his general social and pecuniary advantage and to the comfort and well-being of his family.

London. AN EX-COUNTRY CHEMIST.

SIR JOHN LUBBOCK'S BILL.

Sir,—Your space is too valuable for me to waste a column in wordy explanations, so I will be very brief. If I erred in saying that Mr. Hart "undertook" to introduce the subject to the meeting, I apologize, though it was certainly impossible to infer anything else from the circular convening the meeting.

Even admitting that the duty was "put upon him," one would naturally think that such a burning question would have had more attraction for him than such a quiet affair as a committee meeting of local microscopists.

The "excessive innate bashfulness" attributed to me will not prevent me stating that Mr. Hart's remarks regarding "the chiefest among ten thousand" are simply his "chaff." They might otherwise be taken seriously.

254, *Stretford Road, Manchester.* H. KEMP.

SOUTH AUSTRALIA.

Sir,—Your correspondent, "R. G.," may be interested in the following extract from a letter written from Melbourne last July from a former apprentice of mine. To begin:—"City businesses of the first class are, as you may suppose, seldom in the market, but every month there are several suburban ones for disposal. I enclose a list taken from a price list for June. That there are fortunes to be made in this line is an undeniable fact: but circumstances alter cases. The usual way is to begin in a small way in a new place; work up the business to £200 or £300 a year, then exchange or sell out and get a better. All that is necessary at the start is a little money and unlimited cheek. Of course, for a single or not much-married man, many things are easy and possible that could not be attained by a man with a large family without waste of time and perhaps loss of capital. As I said before, money is needed, and if one has that and can afford to wait about town for some time he can make a good selection. Some country businesses are good, especially if the proprietor is well up in prescribing; the only thing against that is the absence of agreeable society. The fact of the matter is, that money is worshipped here as well as elsewhere, and the upper ten living in Toorak and South Yarra will not mix with trade, although they, only a few years since, were driving sheep, or bolting with them, as their fathers did before them. They, however, are now 'squatters.' When they get into Parliament these things are sometimes raked up and then they see themselves as others see them; bushmen have thick skins. New Zealand and Tasmania are sleepy and behind the times, especially the latter. South Australia is experiencing the result of a financial depression following drought and bad seasons. New South Wales is at present dull and lacking in energy; perhaps being a little too conservative. She has, however, natural advantages of a superior kind—the climate is against it, being too relaxing. Queensland is fit for salamanders and niggers. Victoria at present is the most flourishing. Western Australia is, I believe, the coming colony, and if I could manage I should go there. Buildings are running up very fast at Perth, Freemantle and Albany; outside the immediate neighbourhood of the towns very little is known at present, but reports come in from time to time of a most favourable description. The lack of water in the Kimberley district seems to be the only drawback, as there is grass six or seven feet high and plenty of gold, and the land seems particularly fertile along the course of the rivers. Of course there is a deep-felt affection for 'home' and things pertaining thereto, but I believe marriage to be the panacea for many of both sexes, causing them to feel to be more settled.

Cromer. EDWD. RAVEN PRIEST.

LIME WATER.

Sir,—In the discussion on Mr. Fraser's paper as reported last week, I am made to say that there was no difficulty in having lime water of "full B.P. strength," and also that we found our own "sometimes above and sometimes below the official standard," this indicating, if my remarks are correctly condensed, a confession of great carelessness on my part in the preparation of lime water. What I intended to say, and what I think I did say, was that for some time past I had required the assistants to make weekly or fortnightly estimations of the lime water, and while it was usually above half a grain per ounce, it was sometimes a shade below that standard. For example on a recent occasion the quantity estimated was neutralized by 88 gr. measures in place of 90, but as the B.P. gives "about" 5 grs per oz., I think I am quite safe in saying that this is B.P. lime water.

I would further add that the condition of affairs represented by some of Mr. Fraser's samples is simply a disgrace to pharmacy.

Hawick. THOS. MABEN.

DISPENSING OF TEREBENE AND TOLU.

Sir,—On reading the correspondence on the above subject I was curious to know if it were really possible to make an emulsion of terebene with mucilage of tragacanth as Mr. Bisset describes in his note. Proceeding after his method I obtained an emulsion, which after standing forty-eight hours did not show any globules, but separated into two layers, the upper to all appearance being made up of the insoluble portion of the gum with the terebene thoroughly incorporated. The two layers were easily assimilated by a slight shake, forming an emulsion certainly equal if not superior to the one made with gum arabic. The only conditions essential to success are, I think, perseverance with careful manipulation.

Regarding the mixture containing terebene and tolu, I find it is quite unnecessary to emulsify them separately as Mr. Sewell suggests. It may be done more quickly and with less trouble by rubbing them together in a mortar with the mucilage, or, better still, pour the mucilage into the bottle, add the tolu and terebene, shake thoroughly, then add the other ingredients. A beautiful emulsion is formed either way. The tolu appears to accelerate the process, probably owing to the fact of its being more easily assimilated. After emulsification it seems to act as an emulsifying agent.

63, *Inverleith Row, Edinburgh.* GEO. ROBERTSON.

Provincial (Dungarvon).—We think the publication of the letter is hardly desirable without such support as would be afforded by the name and address of the writer.

Oxonian.—There was probably nothing remarkable in the glycerine, except that it might have been a little purer than usual. If the containing vessel had been placed in hot water the necessity for the use of a chisel would have been dispensed with. See a paper in the *Pharmaceutical Journal*, [3], vi., p. 1030.

Nux Vomica.—Tinct. Rhei aquosa, P.G.—Rad. rhei, 100; boracis, 10; kalii carb., 10; aquæ, 900; aq. cinnam., 150; spiritus (sp. ·834), 90. Radicem Rhei non nimis subtiliter concisam et cribrando pulvere liberatam, Boracem, Kalium carbonicum, Aqua ebulliente superfusa, in vase clauso per horae quadrantem ad extrahendum sepone, tum Spiritum admisce. Jam una hora circumacta, panno laneo cola, portionem non solutam leniter exprimens. Denique *partibus octingenis quinquagenis* colaturae *centenas quinquagenas* Aquae Cinnamomi admisce.

J. T. Coats.—We quite agree with you that it is desirable there should be such a library, but you fail to suggest from what fund the books are to be provided.

Felix.—The question is a medical one and should be addressed to a medical authority.

S. F.—Cornus mas.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Elborne, Flückiger, Alcock, Grierson, Furness, Remington, Sec. Brit. and Col. Agency, Ph. Chemist, Junior Apprentice.

CHEMICAL NOTES ON COFFEE.

BY DR. B. H. PAUL AND A. J. COWNLEY.

1. INFLUENCE OF ROASTING UPON THE AMOUNT OF CAFFEINE.—In our paper on the amount of caffeine in various kinds of coffee,* we referred incidentally to certain statements that have been made as to the influence of roasting, and we expressed the opinion that under ordinary conditions, very little, if any of the caffeine is lost by volatilization in the roasting of coffee. This opinion was, at the time, only based upon the comparison of the amounts of caffeine found in raw and roasted coffee with the rough estimates of the gross loss of weight in roasting that we had been able to obtain as being the result of working operations. We found the amount of caffeine in roasted coffee was generally about 1·3 per cent., while raw coffee contained from 1·1 to 1·18 per cent., or in the dried state almost uniformly 1·2 per cent., the difference being due to the varying amount of moisture present in raw coffee, as it is met with in the market, which was found to range between 6·2 and 10 per cent., the average amount being 8·1 per cent. So far as we were able to ascertain, the actual loss of weight in roasting varies from 15 to 20 per cent. of the raw coffee, and, according to our determination of the caffeine in raw and roasted coffee, there could not therefore be more than a very small portion of the caffeine lost in the roasting operation. But, in order to determine this point more precisely, we have since made a series of experiments with several kinds of coffee, so as to ascertain the exact loss of weight in roasting to different degrees, and also the amount of caffeine in the roasted coffee.

In one experiment the roasting was carried to an extreme degree, and the loss of weight amounted to 31·7 per cent. The roasted product contained only 1·25 per cent. of caffeine, while the amount that it should have contained, according to calculation, if there had not been any volatilization, was 1·61 per cent. In this case, therefore, there was a loss of 0·36 per cent. of caffeine, or just about one-third of the amount present in the raw coffee. The product of the roasting was, however, much more highly torrefied than is usually the case. The berries were very dark brown throughout, and they had lost almost entirely the fine aroma of roasted coffee. In another experiment the roasting was carried just far enough to give the berries a fine chestnut-brown colour, and the loss of weight was only 16 per cent. On determining the amount of caffeine contained in the roasted product the result obtained was 1·36 per cent., or rather more than the quantity indicated by calculation, so that in this case there was no loss of caffeine by volatilization. In a third experiment the roasting was only carried so far that the loss of weight amounted to 13·7 per cent., and the berries had acquired a pale brown colour. This roasted product was found on analysis to contain 1·3 per cent. of caffeine, while the quantity calculated from the loss of weight and the amount of caffeine in the raw coffee was 1·28 per cent. The slight excess apparent from these results is to be ascribed to a trace of colouring matter from which it is very difficult to obtain the caffeine quite free. The amount is, however, too small to be of practical importance. The following table gives the data of the several experiments.

	Loss of weight in roasting coffee per cent.	Caffeine.		
		In raw coffee. per cent.	In roasted coffee.	
			Found per cent.	Calculated per cent.
Low roasted .	13·7	1·10	1·30	1·28
Medium do. .	16·0	1·10	1·36	1·31
Over roasted .	31·7	1·10	1·25	1·61

Of the loss of weight in roasting 8·22 per cent. was water that could be expelled by drying the coffee at 100° C.

The first two experiments may, we think, be taken as corresponding tolerably well with ordinary practice, and if it were not for the necessity of making provision for the production of a highly-coloured infusion to satisfy popular taste, we consider that a low degree of roasting would be preferable, if sufficient for the full development of the aroma. One hundredweight of coffee roasted as in the first experiment would yield a produce of 96½ pounds, while in roasting to a chestnut-brown colour, as in the second experiment, the produce would be only 94 pounds, but it appeared, so far as our experiments went, to have more aroma than when the roasting was not carried so far.

In the last-mentioned experiment, where there was a loss of caffeine, the temperature to which the berries were heated was probably sufficient to cause a partial volatilization of the caffeine and part of the ascertained deficiency may have been caused in this way. By roasting to this extent the produce from one hundredweight of raw coffee would be only 76½ pounds, and the too highly roasted product would also be deficient in aroma.

In the experiments made by Bernheimer* the roasting was carried so far that the loss of weight amounted to about 25 per cent. of the raw coffee, but the caffein found by him in the condensed product did not amount to more than 0·28 per cent., or somewhat less than we found the loss caused by over roasting.

We have not yet been able to make any minute examination of the products given off in roasting coffee. It may, however, be stated that by far the greater part consists of water which has a slight acid reaction owing to the presence of a minute quantity of an acid, probably acetic acid. There is also a very small quantity of an empyreumatic oily substance which increases in proportion as the roasting is carried to a greater degree. In an experiment made so as to condense and collect the volatile products given off, the roasting was continued until the loss of weight amounted to 21·2 per cent. of the raw coffee, and it was found that out of this 18·8 per cent. was obtained in the state of a condensed liquid. The remaining 2·4 per cent. was not condensed.

In roasting coffee on the large scale in revolving iron cylinders, the volatilized material is carried off by a kind of flue or chimney, the mouth of which is situated at the centre of one end of the cylinder. In the cooler part of the flue some condensation takes place, and from the lower extremity of it a watery liquid drops down, together with a quantity of the thin membranes which are detached from the berries, in the form of chaff or "flight," as they swell up in the process of roasting. This condensed

* *Pharmaceutical Journal*, Jan. 15, 1887, p. 565.

* *Monatshefte für Chemie, etc. Der Kaiserl. Akad.* Vienna, 1881, p. 457.

liquid often contains some caffeine, and a further quantity can be extracted from the damp mass of membranes collecting at the lower end of the flue. This circumstance would at first sight appear to favour the idea that caffeine is volatilized even in the ordinary roasting of coffee in a moderate degree; but a consideration of the conditions obtaining in a coffee-roasting cylinder shows that the presence of caffeine in these flue products may be otherwise accounted for. When the heat is first applied to a charge of raw coffee the hygroscopic moisture driven off from the berries in contact with the heated sides of the cylinder is again condensed to some extent in passing over the cooler portions of the charge, and while the water thus brought into contact with the berries dissolves some caffeine, this solution is absorbed by the thin membranes detached from the berries as the roasting progresses and carried away into the flue by the escaping vapour. This appears to be a much more probable explanation of the presence of caffeine in the flue products above the amount naturally present in the "flights," since the temperature in a roasting operation is not raised sufficiently to volatilize caffeine unless the roasting is carried to an excessive degree, as in our last experiment, where the loss of weight amounted to upwards of 31 per cent. of the raw coffee.

The experiments above described appear to corroborate the opinion already expressed in our previous paper (*ante*, p. 565) that there is no appreciable loss of caffeine by volatilization in the roasting operation, when it is carefully carried out, and from a number of trials of different samples the amount of caffeine in moderately roasted coffee may be fixed at 1·3 per cent.

2. Coffee Infusion.—The presence of caffeine in the infusion of coffee used as a beverage is undoubtedly an important factor to be considered in regard to the dietetic value of the preparation, and as the published statements on this point are discordant we thought it worth further inquiry. In making coffee with the simplest form of percolator, as commonly used in France, we found that employing fresh-ground coffee in the proportion of half an ounce to three fluid ounces of boiling water the extraction of the coffee was tolerably complete, and that in this way an infusion was obtained which contained greater part of the caffeine present in the coffee operated upon. Thus, for instance, in one experiment we obtained the following results :—

Roasted coffee taken	690 gr. contained	8·97 gr. caffeine.
Grounds after percolation with 10 fl. oz. water . .	537 gr. contained	1·09 gr. caffeine.
Extracted by water .	153 gr. or 22 p.c.	7·88 gr. caffeine.

In this case there was about 88 per cent. of the caffeine extracted, and the infusion was in other respects sufficiently strong for ordinary use, either as black coffee or for mixing with milk in equal proportions. The cup of 3 fluid ounces would contain rather more than 45 grains of extractive material, including nearly 2·36 grains of caffeine. This is a larger amount than is stated by Parkes in his quotation of Aubert's observations, acording to which the quantity of caffeine in a cup of coffee made from rather more than half an ounce of coffee is stated to be from 1·5 to 1·9 grain. As the medicinal dose of caffeine is from 1 to 5 grains, a cup of coffee made in the way above described may be expected to have a marked effect as a stimulant.

THE STINGING PROPERTY OF THE NILGIRI NETTLE.

BY DAVID HOOPER.

The hypothesis of Dr. Haberlandt regarding the property of the stinging hairs of nettles, given in a note by Mr. Bennett in the *Pharmaceutical Journal* of February 5, has both chemical and physiological interest. Last December I examined the stings of a tropical species of nettle, and obtained results which bear upon the subject, although they do not accord with the new theory of stings. A well-marked urticaceous plant grows on these hills called the Nilgiri nettle (*Girardinia palmata*, Weddl.) which is clothed with glandular hairs of from one-eighth to one-sixth inch long; the size of these hairs being larger than those of the urtica, and the previous remark of Mr. Bennett that the fluid of the latter had an alkaline reaction, prompted me to investigate the nature of the secretion. By separating several of the hairs, and breaking them up in a mortar with water, a solution was obtained which did not give definite enough reactions with reagents, on account of the interference of the juices of the plant contained in the epidermal cells. Several of the hairs were therefore taken separately and squeezed on to watch glasses, giving drops of liquid uncontaminated with any foreign matters. Working on these small quantities, and assisted by a microscope, I was enabled to gain an insight into the chemical property of the irritating liquid.

It was distinctly acid, having a sour taste, reddening litmus paper, and effervescing with carbonates. It was a volatile acid, dissipated rapidly when slightly warmed, giving off a pungent odour, and disappearing more slowly at a low temperature. It had a reducing effect upon silver and mercurous salts, converting them into their respective metals, instantly decolorized permanganate, and formed a salt of lead soluble in water, but insoluble in alcohol. The evidence of formic acid being present is sufficiently satisfactory, and Dr. Haberlandt does not deny its presence in the hairs of other stinging plants which he examined.

The liquid contents of the stings was perfectly transparent, and on gentle evaporation left an opaque residue, which was insoluble both in water and in alcohol. It was probably albuminous matter, as it gave off an unpleasant animal odour when burnt, resembling the casein of milk. After complete ignition, a trace of white ash was left partially soluble in water.

The action of the sting of the Nilgiri nettle may thus be described. About one minute after the sharp point has entered the skin and ejected the fluid the effect is experienced. A white swelling is made, accompanied with a peculiar tingling sensation. The irritation lasts for five minutes, and the swelling subsides in about an hour afterwards, leaving no distinct abrasure the day following. It should be noticed that if some of the fluid, after the minute wounded top is broken off, be placed on the skin, it will remain without producing any tingling or swelling; and if some of the liquid be placed actually on the tongue, nothing unpleasant is noticed. It is only by the contents of the hair being injected under the skin that the painful effect is shown. That the irritating property is due to a volatile substance and not to a fixed body may be proved by the energetic action of the stings taken from fresh plants as compared with the innocuous character of the same cells after

being bruised or taken from the plant a few hours after removal from the ground.

Of the three principles found in this nettle, formic acid in solution, albuminous matter and salts, there is a strong argument in favour of formic acid being the source of the irritation. Besides the tests employed, I lay great stress on its physiological action. Pure formic acid is well known to be a powerful corrosive, so that "a single drop placed upon a soft part of the skin produces intolerable pain, causing the part to swell and turn white, afterwards drawing the skin together and producing a painful ulcer" (Liebig). The pain, the swelling and the whitening of the skin were observed as the result of the sting, so that it might be inferred, if the action of a strong acid upon the skin be similar to the action of a small quantity of diluted acid beneath the epidermis, the acids are of the same nature.

In these notes I have refrained from using the word "poison" in speaking of the stinging property of nettles. My examination points to the presence of a dilute solution of formic acid in the sting, and its action as that of a temporary irritant. Unless a more toxic property is discovered in these plants, and until the "unformed ferment" of Dr. Haberlandt approaches the virus of the cobra, I think the term is inapplicable. Of course my remarks on this point refer only to the sting of the *Girardinia palmata*.

Ootacamund, Nilgiris, March 1, 1887.

CALIFORNIAN BUCKTHORNS USED IN MEDICINE.

In an article on "The Buckthorns of California," that appears in the *Pharmaceutical Record* for February 1, Mr. J. G. Steele describes four species of *Rhamnus* that are indigenous to the State of California. One of these, *Rhamnus alnifolia*, does not appear to be used in medicine. Another is *Rhamnus Purshiana*, the source of the "cascara sagrada" now official in the B.P., which plant is said to flourish in the northern part of California, Oregon, Washington Territory, and northward into British Columbia. The other two species, *R. crocea* and *R. californica*, are referred to in the following paragraphs:—

Rhamnus crocea.—Crocea, or California Mountain Holly Tree.—Much branched, 3 to 5 feet high (in some favourable positions, 8 to 10 feet), the young branches pubescent; leaves evergreen, coriaceous, oblong or obovate to orbicular, obtuse or retuse or acute, equally variable at base, 3 to 18 lines long, acutely and often glandularly denticulate, glabrous, usually more or less yellowish-brown or copper-coloured beneath; petioles, a line long or less; flowers, tetramerous, apetalous; fruit, about 3 lines long, obovoid, 2 to 4-lobed and $\frac{2}{4}$-seeded, bright red. Seeds and nutlets convex on the back, the raphe lateral; cotyledons fleshy, flat; flowers mostly perfect in pedunculate cymes. This variety of the Rhamnus family inhabits the hillsides and mountains of California from San Diego northward to Clear Lake, including the Yosemite Valley and the upper Sacramento Valley, and extends eastward into Arizona.

The wood of this variety is yellow or dark coloured, very fine grained and unusually heavy. Much difficulty is found when chopping to clear away land for cultivation, as the axes and like sharp cutting instruments were invariably found to be dulled. Subsequent investigation discovered the fact of the presence in the wood of a large amount of oxalate of lime, whereby this extraordinary fact was accounted for. It has even been used as "hones" for the sharpening of razors, knives, etc. The lustrous green colour of the upper surfaces of the leaves of this plant, together with their denticulations, caused it to be named "mountain holly." The ripe berries, possessing an agreeable acidulous taste, were much used by the native Indians for food, and their veins were not unfrequently tinged by the deposition of the red colouring matter contained therein. The bark of this variety of the Rhamnus is the part of the plant used in medicine, and is generally found in pieces of 1 to $2\frac{1}{2}$ inches in length, by about $\frac{1}{2}$ inch in breadth, slightly curved or quilled; externally of a dark brown colour, and internally of a characteristic red, delicately and numerously veined or streaked with white, and of a pleasant, somewhat aromatic smell. When the bark of *R. crocea* is chewed, it generates an unusual flow of saliva, which becomes deeply tinged with the red colouring matter inherent to the bark. It excites a feeling of warmth in the mouth, which extends to the epigastrium when the juice is swallowed. The sense of warmth in the mouth is retained some time and followed by a peculiar, not unpleasant, bitter taste, with a sense of acridity which remains after the other sensations have passed away. The bark of this variety of the Rhamnus family is tonic and mildly laxative, and, in large doses, cathartic, but without that tendency to violent action frequently noted in the bark of the other varieties. Crocea bark, from its mild action, is particularly indicated for women and children of delicate taste and enfeebled condition, whose systems reject, as it were, the more violent acting purges and hydragogue cathartics. Water or alcohol extract the virtues of this bark, and a fluid extract made of the usual strength (16 troy ounces to the pint) can be given in adult doses of 1 to 3 fluid drachms once or twice a day.

Rhamnus Californica.—California Buckthorn. Wild Coffee Tree.—A spreading shrub, not infrequently small trees, from 4 to 18 feet high; young branches somewhat tomentose; leaves ovate-oblong to elliptical, 1 to 4 inches long, $\frac{1}{2}$ to $1\frac{1}{2}$ wide, acuto-obtuse, mostly rounded at base, denticular or nearly, entire evergreen; peduncles, with numerous mostly abortive flowers in subumbellate fascicles; calyx usually 5-cleft; petals very small, broadly ovate, emarginate; fruit, blackish-purple, with thin pulp, three or four lines in diameter, 2-3-lobed and 2-3-seeded. Habitat, California, from the northern or upper Sacramento Valley and the Klamath Lake to Santa Barbara and Fort Tejon. This variety extends to the southern boundary of the State and eastward through Arizona into New Mexico.

This variety of the Rhamnus family occurs mostly in California. While it often is found growing as a thickly foliaged shrub from 6 to 10 feet in height it is often met with, particularly on the banks of streams and around water courses, as a small tree 18 to 20 feet high, growing in clumps or clusters of eight to twelve trees, the ordinary diameter of the stem being 2 to 4 inches. The bark has a peculiar greyish white, changing in drying (after having been removed from the tree) to a dark brownish colour. The foliage is dense, and of a darker green than the surrounding vegetation. It is best felled in the spring when the sap is running, and when the bark is easily peeled from the trunks and branches. The fruit contains two or three coffee shaped seeds, hence the misnomer "wild coffee tree," by which it is known among the country people. The bark of the *R. Californica*, the part used in medicine, is found in pieces of varying size, depending on the size of the tree or branches from which it was obtained. It is of a dark brown or blue colour externally, and of a bright yellow internally—that is, when properly cured. It is of an intensely bitter taste, leaving a very persistent after-taste somewhat nauseous, of little or no odour, thereby differing from its near relative the "cascara sagrada" (*Rhamnus Purshiana*). This bark has been long held in repute among the ranchmen and cultivators of California as a specific in all troubles arising from constipation and dyspepsia, a cold aqueous infusion being made and one or two wine-glassfuls drunk for a dose, repeated when necessary once or twice in the

twenty-four hours. In the form of a fluid extract, some considerable attention has been paid to this remedy by many California physicians. The medicine has been frequently prescribed in cases of constipation characterized by atony with the happiest results. Some objection is occasionally made, especially from women and children, to the decidedly bitter taste of this new therapeutic agent; but this is easily corrected by the use of well-known adjuvants, such as aromatic or simple elixir, syrup of fresh orange peel, the compound tincture of cardamon, essence of anise, etc. Several cases of paresis of the muscular coat of the bowels, induced by a catarrhal condition of the stomach and intestines, were brought under submission by the judicious use of this remedy. The result of the experience of many of our medical practitioners seems to be that this medicine is almost—say quite—specific in cases of obstinate and prolonged constipation accompanied by sympathetic derangement of the digestive tract. The fluid extract given in doses of 30 to 50 drops, one to three times a day, according to the case, generally gives painless evacuations and increases the appetite, thereby exerting its tonic effect. After bringing the system well under the effect of the medicine it has been found advisable to gradually diminish the dose. Many cases of constipation in women, where the colon had been allowed to distend, from neglect and inattention, came under the observation of the physician. The bark of the *R. Californica* judiciously administered always proves efficient, and much benefit has been derived in some cases (where there proved to be no pelvic or uterine difficulty) by combining the medicine with aloes, and thus operating on the whole bowel. The following was a favourite prescription of the late Dr. R. McMillan :—

℞	Fld. ext. rham. califor.	1½ oz.
	Fld. ext. yerba buena	½ oz.
	Fld. ext. aloes	⅛ oz.
	Tinct. cardam. comp.	2 oz.
	Simple elixir . . . . q.s. to make	8 oz.

S. One tablespoonful night and morning.

Many cases of "biliousness" present themselves—really cases of chronic constipation, and sometimes puzzle the physician. The following formula has been used with advantage :—

℞	Sodium phosphate	2 oz.
	Fl. ext. rhamnus cathart.	2 oz.
	Essence anise	¼ oz.
	Syrup orange peel	2 oz.
	Dist. water . . . . . .to make	8 oz.

Dose: One or two tablespoonfuls at bedtime. In cases of expected "sick headache," arising from above causes, a dose of this combination will invariably arrest it. Some claim that the action of this therapeutic agent is directly upon the nerve terminals, in this way reflectly stimulating muscular contractibility and glandular secretions. The exact points of difference or concord proximately considered between this bark and of its "cousin," that of the *R. Purshiana*, have yet to be demonstrated.

THE ECONOMIC RESOURCES OF INDIA.

A paper on the above subject was read recently before the Indian Section of the Society of Arts, by Dr. George Watt, C.I.E., containing several references to products more or less interesting to the readers of this Journal. The paper is printed *in extenso* in the *Journal of the Society of Arts*, from which the following paragraphs are quoted :—

The Imperfectly Known, or Minor Products of India.—It would be hopeless to attempt to enumerate, even by name, the multitude of natural or wild products in which trade might be done. Seeds which will yet have a commercial value as ornaments and buttons. Fibres which are likely to be used as useful and cheap substitutes for whalebone and bristles. Palm spathes, which may come into use as natural surgical splints, or be employed as simple mechanical filters. The fibrovascular frameworks of cucurbitaceous fruits, which constitute admirable bath-room sponges. Small pieces of *solah* pith to displace patent corn-plasters, or to be used in place of wax in the preparation of microscopic sections. The employment of pith instead of cork for many purposes, such as for floats to fishing nets. Fungi and pith utilized as substitutes for felt in the manufacture of at least certain parts of hats. The gums and resins, which have each their peculiar properties—properties far better known to the simple and primitive aboriginal inhabitants of the wild forest tracts than to the professional experts of Europe, who often value samples according to a crude standpoint, viz., the colour, appearance, and condition of package demanded by the trade. This standpoint is conservative to established brands, but precludes the possibility of the properties of new products being investigated. The practice of the simple *Santal* in mending his iron cooking pot by means of the *sal* resin (the resin of *Shorea robusta*) suggests a use for that, at present, valueless substance, as it indicates also a personal acquaintance with its properties. It is not at all improbable that the properties of this and many other little-known gums and resins will commend themselves in the future to persons who may be in search of substances with properties we have not as yet been educated to require. The useless hog-gum (the gum of *Cochlospermum Gossypium*), consigned falsely as tragacanth, has been accidentally discovered by the bookbinder to be invaluable for marbling purposes, and the gum of *Sterculia urens* has been found to restore to tasar silk the lustre removed from it during an improved process of reeling that fibre. Practically, the one requirement for gum in Europe is a strong and useful adhesive mucilage, and although, with care in selection and packing, India might easily come to play a much more important part in this trade than it has done in the past, India has, at the same time, gums and resins which possess distinctive properties, each one of which finds in India a market in meeting the demands of some indigenous industry.

Pulses.—A small amount of Indian peas, beans and pulses are regularly exported to Europe, but it would seem that the properties of one or two of the best Indian sorts are not understood, otherwise a much greater trade would be done in them. It is a common error to say that rice is the staple food of the people of India. It is the staple of perhaps 80,000,000 or 90,000,000 out of the 253,000,000 of people of India. Millets and pulses, with a little rice, wheat or maize as luxuries, are the food stuffs of the great bulk of the inhabitants of India. Even the rice-eating people rarely eat rice alone. The muscle-forming ingredient in their diet is the pigeon-pea, or *dhal* (*Cajanus indicus*), one of the best and most nourishing of Indian pulses. This is eaten in various ways, but a sort of thick pea-soup poured over boiled rice is perhaps the most frequent preparation. The pigeon-pea is, however, by no means the best pea in India, although from its abundance and cheapness it is the one of which the greatest hope may be entertained for a future export trade. The soy-bean (*Glycine Soja*) is more expensive than *dhal*, but it is much more nutritious. Indeed it is entitled to the highest place amongst all known pulse, its nutrient value being 105, as compared to 80 to 87 for the nutrient values of peas and lentils. At the present day both *dhal* and *soya* are only imported into this country in small quantities, being employed almost entirely in the preparation of patent foods for infants and invalids. They are as ordinary articles of diet brought into competition with English, American and Egyptian peas and lentils, but it is highly probable that were their claims for consideration only urged a little more freely a large trade might spring up in these useful food substances. Perhaps no other Indian pulse deserves, however, greater attention than the chicken pea, or *gram* (*Cicer arietinum*). Horses in India are universally and in many instances exclusively, feed upon this seed. The allowance is soaked in water

for an hour or so before being given to the horse. This has the effect of both softening the seed and freeing it from mud. About eight to ten pounds a day is considered an abundant supply along with grass or hay. A more rational diet is, however, to crush the *gram* along with about an equal quantity of corn. This diet, from a scientific point of view, ought to prove more wholesome than gram alone. It must be admitted that horses in, perhaps, no other part of the world are in better condition than the Indian gram-fed carriage horses, and sheep reared upon gram are proverbial as affording admirable mutton. Within recent years an immense trade in Indian corn has come into existence in England for the purpose of feeding horses, crushed Indian corn being mixed with oats. Chemically, a horse diet which consists exclusively of cereals cannot be so good for the animal, nor so likely to produce muscular strength, as a diet with a liberal admixture of some kind of peas. Husked gram contains of albuminoids 21·7 per cent., and of starch 59·0 per cent. Indian corn contains of albuminoids only 9·5 per cent. to 70·7 per cent. of starch. When it is recollected that the albuminoids are the muscle-forming constituents of diet, it becomes apparent that a diet which would contain oats and gram, or Indian corn and gram, would be far more nutritious and strength-giving than the modern English food for horses of oats and Indian corn. To obtain the indispensably necessary amount of albuminoids from an English diet the animal has to eat a greatly excessive and injurious amount of starch. From these considerations it would appear that the food given to horses in India is a much more rational one than that which prevails in England, and it is therefore possible that a large trade may spring up in Indian gram when once these facts are brought home to the attention of persons interested in feeding large quantities of horses, such as our omnibus and tramway companies.

Fruits and Nuts.—There are so many other food substances of which one might speak, that it is difficult to restrict one's observations to one thing more than another. The trade in *mahua* flowers (the flowers of *Bassia latifolia*) has received a sudden check from the action of the French Government. In addition to being invaluable for the purpose of feeding pigs it was early discovered that these flowers might, and were being used in distillation. Fiscal restrictions have thus injured the trade in an article which, but for this difficulty, promised to come into extensive use. Both the oil from the seeds and the sweet nutritious flowers are articles of the greatest importance to the inhabitants of the central table-land of India. The oil bids fair to come into European commerce for the candle and soap trade. Many of the preserved fruits of India seem hopeful articles of future export trade. The sun-dried apricots of Afghanistan are particularly deserving of attention. Of the nuts, the Singara (*Trapa bispinosa*) is, perhaps, one of those novelties that one cannot help feeling surprised at its not having found its way to Europe. In Kashmir alone it is stated that 30,000 persons are dependent upon this wild aquatic plant. The pistachio-nut (the seed of *Pistachia vera*) is another equally deserving nut, which would seem likely to be run upon were it once introduced into Europe. But one might enumerate a long wearisome list of fruits, for the tamarind, the Bokhara plum, the Indian date, the edible pine, and a host of other nuts and fruits have still to be introduced into European trade. Even arrowroot, which is now manufactured all over India, has not as yet attained to a commercial position.

Drugs, etc.—Under the heading of drugs, allusion may be made to cinchona only in passing. A few years ago, after much trouble, Government succeeded in introducing a few live cinchona plants into India. The late Dr. F. Royle, in 1852, first recommended that an effort should be made to cultivate cinchona in India, but nothing was done in that direction until 1859. Cinchona has not only been successfully introduced into India, but has been so overgrown that the bark has fallen to an almost ruinous extent. The benefit to India of her cinchona plantations cannot, however, be over-estimated, but it is much to be regretted, in the interests of the fever-stricken millions, that the tremendous fall in the price realized by the bark has not been accompanied by a corresponding fall in the price of the alkaloid. With the exception of opium, no other drug of any importance is cultivated in India; but it cannot be too strongly urged that the people of India are made to pay too dearly for their drugs, since most of the drugs which might easily be grown in India are entirely imported from Europe. Even aconite, a wild plant in Nepal, seems to be first exported to England, and then re-imported to India. While little reliance can be put in the bulk of the drugs collected in the jungles by the people of India, a distinct percentage of them, if more carefully investigated, might fairly come to take the place of the expensive imported medicines, and thus for the same money admit of dispensary aid being extended to a much larger community than is the case at present. A few of the more important drugs of India have been sufficiently brought to the attention of the medical authorities of Europe to require little more than to be here mentioned by name, such as *chaulmugra* oil; *bael* fruit; ditaine, from the bark of *Alstonia scholaris*; the bark of *Caloptris gigantea*; the bitter roots of the *Mishmee teeta*; the bark and seeds of *Holarrhena antidysenterica*; the bark of *Hymenodictyon excelsum*; the *kamela* powder (a useful anthelmintic and vermifuge); the flowers and leaves of the *gao-zabân*; the tonic roots of the *Picrorhiza Kurrooa*; the *ispaghul*, a useful and simple drug in the treatment of dysentery; the healing oil from the seeds of *Pongamia glabra*; the astringent bark of *Soymida febrifuga*. These and a few other indigenous drugs, if they are never likely to become articles of export trade, might at least be more generally used in dispensary practice, so as to lessen the charges on imported drugs. The subject of Indian hemp may here deserve a passing consideration. The narcotic from this plant is extensively used by the people of India. The extract secreted on the female flowers constitutes the *ganja*, which is smoked; the dried leaves constitute *bhang*, the substance employed in preparing the intoxicating beverage known as *haschisch*, and the intoxicating sweetmeats *majun*. *Charas* is a special resinous substance, prepared in Northern India, and is more expensive and more intoxicating than either *ganja* or *bhang*. The European medicinal preparation—the extract—is reputed to have recently fallen off in strength, so much so, that it is far less used than in former years. This may be accounted for by the fact that in Bengal, where the best qualities of *ganja* and *bhang* are grown, a duty which amounts to as much as £30 to £40 on each maund is realized by Government, whereas in Madras no duty whatever is collected, and only a nominal duty in Bombay. This has doubtless led to the better and more expensive forms ceasing to be exported to Europe. There is little doubt, however, that if this were to be corrected by Bengal *ganja* being procured, the extract of its former quality might easily enough be produced. It is customary to see in the returns of Bombay mention of exports of Bengal *ganja*, but as the price quoted is only about 2*s.* a pound, and no *ganja* can leave the Government stores in Bengal until it has paid a duty which, together with the charge for cultivation, brings every 16 ounces of the article up to a price close upon £1 sterling, the so-called Bengal *ganja* exported from Bombay cannot possibly have come from Bengal, a fact which is worthy of careful consideration by persons wishing to manufacture the liquid extract of Indian hemp.

JAPANESE TEA.

In the 'Proceedings of the German Naturalists' Society for Eastern Asia,' held at Yokohama, Messrs. Kellner, Makino and Ogasawara give some interesting details of the mode of preparation and composition of Japa-

nese tea. They state that the preparation differs from that of Chinese tea, chiefly in this; that the leaves are not intentionally allowed to ferment, but after moistening and cooling are at once placed in the oven; and also that the prepared tea is not flavoured with fragrant flowers. The amount of theine is from 2 to 4 per cent.; of tannin 17 to 20 per cent. The aqueous decoction contains chiefly tannin, theine and mineral substances.

As is the case with all alimentary substances which are chiefly valued for their taste and fragrance, chemical analysis gives but little indication of the value of tea for commercial purposes. It is of importance for detecting adulterations, and also serves to show whether the leaves are older or younger; from old leaves no tea of good quality can be obtained. The following are some of the points in which older and younger leaves differ from one another chemically.

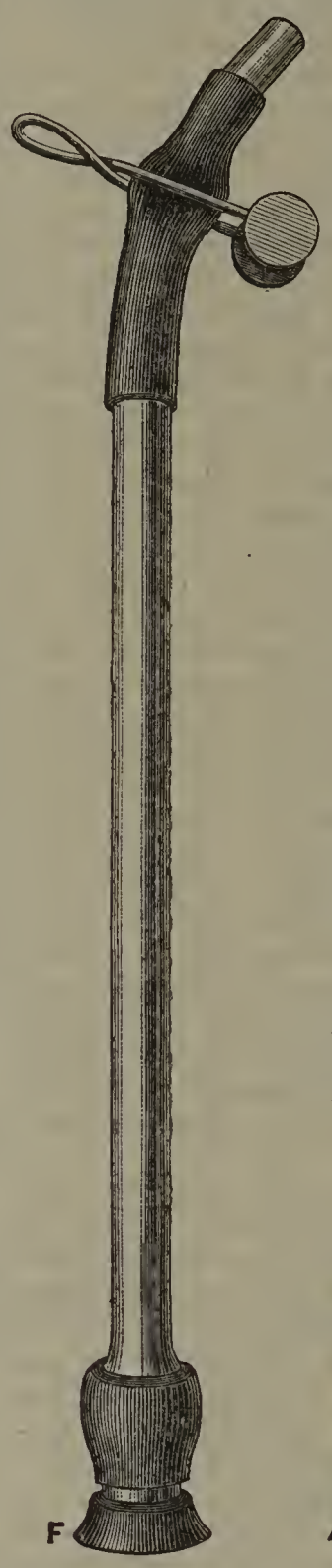
The evergreen organs of the tea-plant exhibit phenomena during their first period of growth, very similar to those which take place in the leaves of conifers; and, like them, they retain, even when old, a large quantity of proteinaceous substances and carbohydrates. It is true that, in consequence of the fresh formation of organic substance, the amount of nitrogenous constituents, including theine, diminishes slowly and regularly, as also the soluble non-nitrogenous substances, while the fatty constituents accumulate rapidly, and, to a remarkable extent, apparently in consequence of the formation of wax. The amount of woody fibre increases very rapidly during the first weeks, and after that remains nearly constant. The greatest changes are exhibited in the composition of the ash; the proportions of potash and phosphoric acid diminish very rapidly, while those of lime, magnesia and oxide of iron increase to a corresponding extent.

NOTE ON A MODIFIED FORM OF "FILTER-TUBE" FOR USE IN THE ESTIMATION OF ALKALOIDS BY MAYER'S REAGENT.*

BY F. C. J. BIRD.

Those who have had occasion to estimate alkaloids volumetrically by Mayer's reagent, must have been troubled by the extreme tediousness of the process. When the precipitant is added to the liquid containing the alkaloid to be estimated, a precipitate is formed of so fine a nature that a considerable time is required for it to subside sufficiently so as to leave a clear stratum of liquid for the further application of the test. This difficulty may be overcome in some cases perhaps by the use of the "filter-tube" designed by Mr. A. W. Blyth, M.R.C.S., and described by him in a communication read before the Society of Public Analysts, in June, 1881 (*Analyst*, vi., 162). Unfortunately, however, as there figured, the filter-tube is only applicable in those cases in which the precipitate readily aggregates into fairly large particles, for in the words of Mr. Blyth himself, "when 'Mayer' is added directly to quinine wine, tinctures, etc., the precipitate, instead of being flocculent and readily separating, is so excessively fine, that however lightly you pack the filter-tube, it is difficult to get a really clear drop, and the process though still accurate becomes tedious, consuming much time." Mr. Blyth's filter-tube consists of a short piece of glass tubing, one end of which has been enlarged to a funnel shape, forming a minute funnel which is packed with glass wool, and slipped on to the end of another piece of tubing about 8 or 10 inches long by means of a close fitting yet easy piece of rubber. By immersing the funnel end in the tincture or other liquid containing the Mayer precipitate, it is easy to suck up a clear drop of liquid, and by placing this clear drop in a watch glass standing on a black surface, the addition of a droplet of the reagent will show whether all the alkaloid has separated or not.

The modification of the above which I wish to bring under the notice of the Association is made in the following manner. A piece of glass tubing of about three-sixteenths in bore is heated and compressed near one end until its diameter is increased by about one half; the enlarged portion is then drawn out to a point like a pipette. The other end is fitted with a piece of stout rubber tubing, a burette clamp, and a short glass tube to serve as a mouthpiece. One end of another piece of glass tubing is then enlarged to the shape of a small funnel, and cut off at about three-quarters of an inch from the enlarged end. A circle of the filtering medium, consisting of thick filtering paper placed between two pieces of fine muslin, is placed over the mouth of the funnel, turned down all round, and secured in position by slipping over the whole a piece of stout rubber tubing three-eighths of an inch in length. To the stem of the funnel another piece of rubber tubing is cemented, leaving about three-quarters of an inch projecting, and the pipette portion having been inserted into this the instrument is complete.



Section of filter.

Before use the filtering medium must be prepared by mixing a little finely powdered French chalk with water, and having immersed in the mixture the end (F) of the filter-tube, sucking at the mouthpiece until the filtrate passes through perfectly clear. When, however, a liquid containing a Mayer's precipitate is being filtered, it will be found that considerable force is required to draw the liquor through, and the operation becomes very fatiguing. The clamp is intended to obviate this, for having sucked the air out of the tube as completely as possible, the clamp is closed, and the liquid gradually rises of its own accord into the vacuum existing inside the tube. The pipette may then be disconnected from the filter and by compressing the rubber tubing between the finger and thumb at the point between the clamp and the top of the long glass tube, a drop of the clear filtrate may be forced out into a watch glass, and tested with a drop of Mayer's reagent; then by opening the clamp, the remainder of the liquid flows back into the bulk which is being estimated.

It is always advisable that the liquid filter into the pipette to the height of 2 or 3 inches, so that all traces of the preceding filtrate may be washed through, and a representative sample obtained.

The volumetric estimation of alkaloids by Mayer's reagent is generally a very tedious operation, owing to the large amount of time which is consumed in waiting for the finely-divided precipitates to subside, but by the use of the filter tube an analysis can be performed with comparative rapidity; and it is probable that in other estimations involving a similar difficulty, such as the titration of lead salts with oxalic acid, etc., this simple instrument would be found of service.

* Read at a meeting of the Chemists' Assistants' Association, Wednesday, March 30.

The Pharmaceutical Journal.

SATURDAY, APRIL 9, 1887.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE GOVERNMENT VISITOR'S REPORTS ON THE SOCIETY'S EXAMINATIONS.

AT the late meeting of the Council the reports of the Government Visitor on the Pharmaceutical Examinations held in London for the years 1885 and 1886 were laid on the table, as having just been received from the Privy Council Office, and as usual they will be found to contain much suggestive matter that calls for careful consideration by all who take any interest in the future of pharmacy in this country. In the first place it may be useful, in the face of a somewhat vague idea that the examinations have been made more stringent, to call attention to the statement with which the report for 1885 commences, to the effect that the examinations had been conducted in the usual manner, and that there was nothing unusual in their management that required notice. In the report for 1886 the same opinion is expressed in reference to each of the examinations; thus, for instance, the questions set in the Preliminary examination were considered by Dr. GREENHOW to be fair, and not more difficult than was necessary in order to test the elementary education of the candidates in relation to their intended future calling as dispensers of medicine. In regard to the Minor examination, which is of the greatest importance from a public point of view, as being the test of qualification for exercising the business of chemist and druggist in conformity with the law, Dr. GREENHOW is also of opinion that it is conducted with fairness and impartiality. Then, in reference to the Major examination, which has for a section of the pharmaceutical community the chief interest, Dr. GREENHOW reports that there has been no change either in the mode of conducting it or in its strictness. This testimony of a perfectly impartial authority ought to be conclusive as an answer to the not infrequent assumption that there has been an increase in the stringency of any of the examinations and that the large proportion of failures among the candidates should be ascribed to such increased stringency. It is not in this direction that the cause of the failure of candidates to pass the examinations must be sought for, and it is especially usual at the present time that Dr. GREENHOW'S reports on the examinations of the past two years should furnish a clear indication of the causes to which those lamentable failures are really attributable.

Though this subject has already been frequently dealt with in these pages, it is of such vast importance that no apology is necessary for again reverting to it for the purpose of pointing out the circumstances which have led to the rejection of candidates. Taking the Minor examination first, as being of most practical importance, it appears that in 1885 as many as 489 out of 744 candidates were rejected, while in 1886 no less than 530 out of 824 were rejected, and Dr. GREENHOW gives the particulars of these failures as follows :—

Subjects.	1885.	1886.
Practical dispensing	171	205
Reading prescriptions . . .	43	57
Pharmacy	64	82
Materia medica	22	34
Chemistry	70	71
Botany	27	25

It is not to be wondered at that the attention of the Government Visitor should have been attracted by this large proportion of failures, amounting to from 63 to nearly 66 per cent. of the total number of candidates presenting themselves to obtain legal qualification as chemists and druggists, and it is natural that he should have applied himself to watch very closely in order to ascertain whether this circumstance might be accounted for in some degree by greater strictness on the part of some of the examiners. But, having done so, he states as the result of his observation, that he is bound to say he has been unable to find any ground for attributing these failures to any other cause than "the incompetence of the candidates." Here, then, is evidence of the existence of an evil of serious magnitude, one that threatens to exercise a most prejudicial influence in the future upon the interests of pharmacists. For it must be remembered that these candidates who fail to pass the qualifying examination have already been engaged for some years in the business as apprentices or assistants, and, from the time they have devoted to it, are in a great measure compelled to look upon it as the occupation upon which their future maintenance depends. If they are unable to obtain legal qualification there is a probability of their being induced to engage in irregular practices or to have recourse to any opportunities of avoiding the provisions of the Pharmacy Act. It cannot be otherwise than detrimental to the interests of qualified chemists and druggists that upwards of one-half of the young men engaged in the business should be thus forced to swell the ranks of abnormal competitors. Nor is such a state of things free from serious disadvantage from the point of view of the public interest. The nature of the subjects in which the candidates fail to such a large extent proves that they are deficient in knowledge which is essential for carrying on the business of a chemist and druggist with due care for the public safety, and though Dr. GREENHOW is still of opinion that those who

pass the examination are really qualified for their calling, the general experience gained as to the value of examinations as a test of qualification furnishes some ground for doubting whether the meshes of the examination room are always effective in preventing some from slipping through who ought not.

This view of the matter appears indeed to have presented itself to Dr. GREENHOW, if we may judge from his remark that he has found occasion to suggest modifications in the mode of conducting the examinations, with a view to increasing their practical efficiency. This has been the case chiefly in regard to the subjects of practical dispensing and pharmacy, and the Board of Examiners has resolved that such a change should be carried out as will afford candidates a wider range for exercising their abilities. But probably the most important feature of Dr. GREENHOW'S reports is that which points to the deficiency of practical training on the part of candidates. In both of the reports, this deficiency is spoken of as being in Dr. GREENHOW'S opinion the sole cause of the failures that occur among the candidates presenting themselves for the Minor examination. Imperfect early education has in some instances contributed to this result, since apprentices have occupied the time which should have been devoted to learning the practical part of the business with studying for the Preliminary examination, which is really a schoolboy's examination that ought to have been passed before entering upon apprenticeship. In this respect the existing regulations are eminently defective, and though Dr. GREENHOW has always insisted upon the necessity for the passing of the Preliminary examination being made a condition of apprenticeship, this important desideratum has still to be carried out.

At this as well as other stages of the career of a pharmaceutical student it is now a matter of accident whether his education and his technical training are adequate and sufficient to enable him eventually to satisfy the requirements of the law for obtaining qualification and to fulfil the duties connected with the occupation by which he expects to make his living. For want of a definite educational system the apprentice is unable to form an opinion of his fitness or even his inclination to undertake the necessary studies, and it is not until after he has wasted several of the most precious years of his life that he discovers he is entirely unsuited for the calling to which he has half unconsciously sought admission. Many who find themselves in this position must turn to other occupations, and probably at great disadvantage to themselves. Obviously, therefore, it would be much better, as Dr. GREENHOW remarks, that such men should be set free at an early period of life to look out, ere it is too late, for an occupation better suited to their capacity. It seems, indeed, scarcely possible to imagine a stronger argument in favour of the adoption of a pharmaceutical curriculum than that which is furnished by the facts referred to in these reports.

The last Evening Meeting of the Pharmaceutical Society in London for the present session will be held on Wednesday next, the 13th inst., at eight o'clock precisely. The papers to be read are "The Pharmaceutical Preparations of Atropa Belladonna, Part III.: Suggestions for Standardized Galenical Preparations," by Professor Dunstan and Mr. F. Ransom; "The Pharmaceutical Test for the Purity of Ether," by Professor Dunstan and Mr. T. S. Dymond; "Remarks on a Resin from the Ruins of Defeneh, in Egypt," by E. M. Holmes, F.L.S.; and a "Note on *Huechys sanguinea*," by J. Moss, F.I.C. Among the objects of interest that will be exhibited, and for the inspection of which the theatre will be opened an hour before the meeting, will be some models of the apparatus used in China for distilling peppermint oil and in expressing oil seeds.

* * *

In Edinburgh also, there will be an Evening Meeting of the Society held on Wednesday next, at 36, York Place, when the papers read will be—"Solubility of Gelatin as compared with other kinds of Pill Coating, with a note on Blaud's Pill Mass," by Mr. T. Thompson; and "Notes on Blaud's Pills," by Mr. P. Boa. The chair will be taken at half-past eight o'clock.

* * *

A correspondent has kindly brought under our notice a transcript from a leaf pasted into a copy of 'Gerarde's Herball,' edit. 1630, in which the words "clariss. Societ. pharmaceut. Lond." occur, and he asks for information bearing on the existence of a Pharmaceutical Society two hundred and fifty years ago. There can be little doubt that the leaf referred to originally belonged to the volume in which it was found, since the transcript is identical with the words used by Thomas Johnson in the dedication of his enlarged and amended edition of the 'Herball.' The dedication is as follows:—"Viris prudentia, virtute, arte, rerumque usu spectatissimis dignissimis Richardo Edwardo rectori, sive magistro; Edwardo Cooke, Leonardo Stone, guardianis ceterisque clariss. societ. pharmaceut. Lond. sociis hos suos in emaculando, augendoque hanc plantarum historiam labores studiorum botanicorum specimen, amores symbolum ex animo D. D. vestrae, publicaeque utilitatis studiosissimus Thom. Johnson." Of course, the "clarissima Societas Pharmaceutica Londinensis" here mentioned was the Society of Apothecaries, which had a few years previously separated from the Company of Grocers and had been constituted an independent corporation by royal charter. The duties of the Society of Apothecaries were then limited more closely to those now usually associated with the word "pharmaceutical," since the charter gave the new Society the right to prevent any person who had not served an apprenticeship of at least seven years to an apothecary, in the pharmaceutical sense of the word, and received the approval of the College of Physicians, from keeping a shop for the preparing, dispensing, commixing or compounding of medicines. The Society also had the power to search the shops of apothecaries and others for unwholesome drugs; but curiously enough the monopoly of the garbling of spices and drugs coming into London seems to have remained with the grocers for several years longer. The application of this title to the Society of Apothecaries is not at all singular, however, since it occurs in the title-pages of several other books in the Society's library. For

instance, "Index Plantarum Officinalium quæ ad Materiæ Medicæ Scientiam Promovendam in Horto Chelseiano, ali ac demonstrari curavit Societas Pharmaceutica Londinensis. Londini: Imprimebat J. W. MDCCXXX." Indeed the words "in horto Societatis Pharmaceuticæ Londinensis" occur in the title-page of an edition of the catalogue of plants in the Chelsea Gardens published so recently as the year 1830, or only twelve years previous to the incorporation of the Pharmaceutical Society.

* * *

The Committee engaged in preparing a seventh edition of the Austrian Pharmacopœia has so far progressed with its work as to issue a provisional list of the articles it is proposed to include. From this it appears that seventy-six new articles are proposed to be included for the first time, whilst seventy-two now official would be omitted. It is also proposed to have a section for surgical dressings.

* * *

A correspondent, who for some time occupied an official position at Lofoten, in Norway, has furnished the following particulars concerning the cod-fisheries there, which will probably be of interest. The fishing for cod begins about the 14th of January, and ends on or before the 14th of April. The first ten weeks of this year were stormy beyond precedent, and the official reports showed that the yield was only 6,500,000 fish and 1800 hectolitres of oil for medicinal purposes. The gloomy prospect which had prevailed up to that time was changed about the second week in March, and enormous quantities of fish were landed after that time, as will be seen from the following comparison with previous years.

			Catch of fish.	Livers.	Medicinal oil.
			Millions.	Hecto-litres.	Hecto-litres.
Season 1887 to March		26	25½	32,300	8044
„ 1886	„	27	25	34,700	9329
„ 1885	„	28	24 2/10	27,500	6270

Cod liver has been very cheap this year, especially in East Lofoten, where the great rush took place. Remembering that large quantities of 1886 and 1885 medicinal oil are still unsold, the probability is that this year's finest quality of oil will be obtainable at a moderate price.

* * *

The arrangements for the Friday Evening Meetings at the Royal Institution after Easter include discourses on "The Work of the Imperial Institute," by Sir F. Abel (April 22); "The Rolling Contact of Bodies," by Professor H. S. Hele Shaw (April 29); "Some Electrical Fishes," by Professor J. S. Burdon Sanderson (May 13); "Etiology of Scarlet Fever," by Dr. Klein (May 27); and "The Application of Photography to Astronomy," by Dr. Gill (June 3).

* * *

A meeting of the Midland Counties Chemists' Association will be held at the Grand Hotel, Birmingham, on Thursday evening, the 21st inst., at half-past eight o'clock, when papers will be read on "The Composition of the Ash of Ipecacuanha Root," by Mr. H. E. Munns; "A Note on Linimentum Terebinthinæ," by Mr. G. E. Perry; and "Tincture of Quinine and its Assay," by Mr. F. H. Alcock.

* * *

The Chemists' Assistants' Association will hold a Musical and Social Evening Meeting at the rooms in Great Russell Street on Thursday next, April 14.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, April 6, 1887.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT, IN THE CHAIR.

MR. T. P. GOSTLING, VICE PRESIDENT.

Messrs. Allen, Atkins, Baildon, Bottle, Butt, Cross, Greenish, Hills, Radley, Richardson, Robbins, Savage, Schacht, Southall, Symes, Williams and Woolley.

The minutes of the previous meeting were read and confirmed.

ELECTIONS.

MEMBERS.

Pharmaceutical Chemists.

The following, having passed the Major examination and tendered their subscriptions for the current year, were elected "Members" of the Society:—

Everard, Arthur George .....Brighton.
Wright, Herbert Cassin .....London.

Chemist and Druggist.

William Flower, of Beccles, who was registered as being in business on his own account before August 1, 1868, having tendered his subscription for the current year, was elected a "Member" of the Society

ASSOCIATES IN BUSINESS.

The following, having passed their respective examinations, being in business on their own account, and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society:—

Minor.

Bletsoe, Francis Ferriman .....London.
Brighouse, Charles Davidson ...Hull.
Clague, Thomas Maltby .....Newcastle-on-Tyne
Crompton, Alfred, jun. .....Bury.
Davies, Henry Morgan .....Blaenavon.
Deakin, John William .....Northwich.
Gardner, Edward.....Salford.
Harrison, John Paul .....Hale.
Holl, Edmund .....Lewisham.
Hucklebridge, Philip .....London.
Jackson, William Moses.....Ayr.
Jones, Nathaniel Stevens .....London.
Lodge, Arthur William .....London.
McMurtrie, John.....Macduff.
McNay, David.....Thornhill.
Martin, John Bennet .....Helston.
Peacock, George .....Kirby Moorside.
Pegg, James Alfred.....Mansfield.
Price, John .....Sunbury-on-Thames.
Radcliffe, John Collister.....Douglas (I. of M.).
Salter, Thomas.....Bradninch.
Widgery, John.....London.
Wright, William .....Lockerbie.

Modified.

Payne, John Buxton .....Newcastle-on-Tyne.

ASSOCIATES.

The following, having passed the Minor examination and tendered (or paid as "Apprentices or Students") their subscriptions for the current year, were elected "Associates" of the Society:—

Bisset, James .....Burntisland.
Calvert, Albert Matheson .....Belper.
Cole, John Frederick .....Worcester.
Collins, Alfred .....Bradford.
Day, Henry William .....Margate.
Felton, William .....Maidstone.
Flynn, William .....Lockerbie.

Forbes, Alexander .....Fraserburgh.
Gwillim, Walter Robert .....Abergavenny.
Hamer, Edward Sidebottom ...Pendleton.
Jenkins, John Lewis .....St. Clears.
Johnson, Charles Ernest .....London.
Lance, Henry .....Bow.
Palmer, Charles Joseph .....Wingham.
Pickering, Charles Edward ...Stockton-on-Tees.
Poll, William George .....Great Yarmouth.
Upson, Arthur .....Southampton.
Wright, Joseph Pretty .....Burton-on-Trent.
Young, Edward .....Sudbury.

APPRENTICES OR STUDENTS.

The following, having passed the Preliminary examination, and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Atkinson, Alfred .....Bishop Mills.
Beard, Albert Edward.....Haddenham.
Brampton, Isaac Arthur.....Birmingham.
Cooper, Reginald Edwin.....London.
Cowper, Joseph .....Penrith.
Crane, John Hammond .....London.
Cutmore, Frank .....Totnes.
Edwards, David Richard .....Carmarthen.
Ferryman, Herbert .....Rugby.
Franklin, John William.....Gloucester.
Gardner, John .....Bolton-le-Sands.
Grice, Joseph Edward Brindley Brighton.
Hall, James .....Leicester.
Heap, Alfred.....Kendal.
Hearne, Robert Moore .....Worksop.
Higgins, Charles Alfred .....Manchester.
Holmes, Fred .....Lincoln.
Hucklebridge, Wilfred .....London.
Jennings, John Atkinson .....Natland.
Jones, Thomas .....Swansea.
McKenzie, James .....Perth.
Morris, Henry Charles .....Tamworth.
Mundy, Alfred Jones .....London.
Penny, John .. ..Workington.
Poustie, James Henderson.....Alva.
Stewart, Thomes Henry.....Penzance.
Strick, John Richards.....Penzance.
Taubman, Frank Mowbray ...London.
Watt, James.....Haverfordwest.
Wilkinson, Charles Edward ...Bridgnorth.
Wood, William.....Scotswood-on-Tyne.

Several persons were restored to their former status in the Society upon payment of the current year's subscription and a fine.

ADDITIONS TO THE REGISTER.

The Registrar reported that—

George Spurr, 24, Lincoln Lane, Boston, Lincs, and Robert Munro, Jane Villa, Dunoon, N.B.,

having made statutory declarations that they were in business before the passing of the Pharmacy Act, 1868, and these declarations having been duly supported, their names had been placed on the Register.

NOMINATIONS FOR COUNCIL.

The Secretary reported that he had received *twenty-six* nominations to fill the fourteen vacant seats on the Council, and the following *nineteen* had declared their willingness to accept office if elected :—

Atkins, Samuel Ralph, Market Place, Salisbury.
Baildon, Henry Bellyse, 73, Princes Street, Edinburgh.
Butt, Edward Northway, 13, Curzon Street, London, W.
Carteighe, Michael, 180, New Bond Street, London, W.
Cross, William Gowen, Mardol, Shrewsbury.
Evans, Gwilym, 7, Stepney Street, Llanelly.
Hampson, Robert, 205, St. John Street Road, London, E.C.
Harrison, John, 33, Bridge Street, Sunderland.
Hills, Walter, 225, Oxford Street, London, W.
Martin, Nicholas Henry, 29, Mosley Street, Newcastle.
Neve, Francis Charles, 28, Norman Road West, St. Leonards.
Newsholme, G. T. Wilkinson, 74, Market Place, Sheffield.
Richardson, John G. F., Elmfield, Knighton, Leicester.
Robbins, John, 147, Oxford Street, London, W.
Savage, William Dawson, 23, Freshfield Road, Brighton.
Southall, Alfred, 17, Bull Street, Birmingham.
Symes, Charles, 14, Hardman Street, Liverpool.
Watt, James, High Street, Haddington.
Williams, John, 16, Cross Street, Hatton Garden, London, E.C.

The following *seven* nominees had declined to accept office if elected :—

Borland, John, 7, King Street, Kilmarnock.
Clark, Walter Beales, 15, Belvoir Street, Leicester.
Dymond, Thomas Southall, Sheltwood, Bycullah Park, Enfield.
Haydon, William Frederic, 23, Burlington Chambers, New Street, Birmingham.
Millhouse, Henry How, Heckington, Lincolnshire.
Winfrey, Richard, Long Sutton, Lincolnshire.
Young, James Robertson, 17, North Bridge, Edinburgh.

NOMINATION OF AUDITORS.

The Secretary also reported that he had received *five* nominations to fill the office of Auditor, and that all the nominees had declared their willingness to accept office if elected :—

Hodgkinson, William, 198, Upper Whitecross Street, London, E.C.
Hopkin, William King, 16, Cross Street, Hatton Garden, London, E.C.
Lescher, Frank Harwood, 60, Bartholomew Close, London, E.C.
Stacey, Samuel Lloyd, 300, High Holborn, London W.C.
Watts, William Manning, 32, Lower Whitecross Street, London, E C.

REPORTS OF COMMITTEES.

FINANCE.

The report of this Committee was received and adopted on the motion of the President, and various accounts were authorized to be paid ; including £750 on account of the new buildings, and a further amount of £1000 if required before the next meeting of the Council.

BENEVOLENT FUND.

The report of this Committee included a recommendation of the following grants :—

£10 to the widow (aged 28) of an associate and member, having two young children and her mother dependent on her. (Dublin.)

£10 to the widow of a registered chemist and druggist (aged 61), out of health and unable to obtain employment. (This case was referred back to the Committee last month). (Sussex.)

£15 to the widow (aged 71) of a member from 1841 to 1885, and an annuitant from 1885 to his death, which has recently occurred. (Kent.)

£10 to the widow (aged 59) of a registered chemist and druggist. Applicant had a similar grant last April. (Middlesex.)

£5 to a former member from 1844 to 1872 (aged 70). Applicant has been in business thirty-seven years, but is now without resources. (Sussex.)

£5 to a registered chemist and druggist (aged 62). In business for twenty-six years, but had to give it up last August; has no friends and suffers from deafness. (Derbyshire.)

£10 to the widow (aged 40) of a member from 1870 to 1879. Applicant's husband who had been in business thirty years died suddenly in February, leaving six children dependent on her. (Yorks.)

£10 to a former member (aged 57) out of employment from severe illness, from which he is just recovering (Middlesex.)

£10 to the widow of a registered chemist and druggist (aged 79). Applicant had a similar grant last year. (Wilts.)

£5 to a registered chemist and druggist (aged 62). Applicant has had two previous grants of £10. Has four children, none of whom are able to help him. (Middlesex.)

£5 to the widow (aged 63) of a registered chemist and druggist, who has had seven previous grants. (Middlesex.)

The VICE-PRESIDENT, in moving the adoption of the report and recommendation of the Committee, said the list of applicants was longer than usual, but every case had been very carefully considered, and he had no doubt the Council would gladly sanction the grants.

The Council went into committee to consider a special case of distress which one of the members wished to bring forward.

On resuming, the report and recommendations of the Committee were unanimously agreed to, with the addition of a grant of £25 to the Secretary's Casual Fund.

BENEVOLENT FUND DINNER.

The Committee appointed to make arrangements for this dinner recommended that it be held on the evening of Tuesday, May 17, at Freemasons' Tavern, and that the price of tickets should be one guinea. Also, that a circular be issued to all members, associates in business and subscribers to the Fund, inviting them to become Stewards.

The PRESIDENT, in moving the adoption of the report, expressed the hope that, notwithstanding various adverse circumstances, a good many subscriptions would be sent in in time to announce on the occasion of this dinner.

The report was unanimously adopted.

LIBRARY, MUSEUM, LABORATORY AND HOUSE COMMITTEE.

Library.

The report of the Librarian had been received, including the following particulars:—

	Attendance.	Total.	Highest.	Lowest.	Average.
February	Day . . .	485	28	14	20
	Evening .	166	18	4	8

Circulation of books.	Town.	Country.	Total.	Carriage paid.
February . .	136	165	301	£2 3 9

The undermentioned donations to the Library had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

To the Library in London—

School of Pharmacy Students' Association, Papers read session 1885–6. From the ASSOCIATION.

Woodward (C. J.), Arithmetical Physics, 2nd ed., 1886, parts 1A and 2A. From the AUTHOR.

Life and Works of Thomas Graham, by R. Angus Smith, edited by J. J. Coleman, 1884. From the EDITOR.

Monmoine (P.), Dosage Volumétrique par les Solutions Limites, 1887.

Mège (P.), La bière, altérations et falsifications, 1887.

Gautrand (T.), Éthérification de l'Acide Sulfurique dans l'Eau de Rabel, 1887. From Professor SOUBEIRAN.

Griffiths, Materia Medica and Pharmacy, 3rd ed., by A. S. Gubb, 1887. From Messrs. BAILLIÈRE, TINDALL and COX (Publishers).

Royal Society of New South Wales, Journal and Proceedings for 1885, vol. 19. From the SOCIETY.

Pharmaceutical Society of Ireland, Calendar, 1887. From the SOCIETY.

Victoria, Pharmaceutical Register for 1886. From the PHARMACY BOARD.

Geological and Natural History Survey of Canada, Annual Report, 1885, new series, vol. 1, and maps. From the SURVEY.

University College, London, Catalogue of the Medical and Biological Libraries, 1887. From the COLLEGE.

To the Library in Edinburgh—

Victoria, Pharmaceutical Register for 1886. From the PHARMACY BOARD.

Chicago College of Pharmacy, 23rd announcement, 1887 From the COLLEGE.

Scientific News, no. 1. From the PUBLISHERS.

The Committee recommended the purchase of the undermentioned works:—

For the Library in London—

Bentley, Manual of Botany, 5th ed., 1887.

Ayrton, Practical Electricity, 1887.

Shore, Elementary Practical Biology, Vegetable 1887.

For the Library in Edinburgh—

Bentley, Manual of Botany, 5th ed.

Tuson, Veterinary Pharmacopœia, 4th ed.

Museum.

The Curator's report had been received, and included the following particulars:—

	Attendance.	Total.	Highest.	Lowest.	Average.
February	Morning .	467	31	4	19
	Evening .	89	14	1	3

The following donations had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

Twelve slides of microscopic objects. From Mr. C. B. ALLEN.

Specimens of *Catha edulis* and of coffee seed husks. From Mr. J. REDHOUSE.

Specimens of the stem of *Bidara laut.* From Professor VAN EEDEN, Haarlem.

Specimen of the pod of *Strophanthus hispidus.* From Dr. EASMON, Gold Coast.

Specimens of the stems, leaves and roots of *Strychnos Ignatii*, of the stem and root of *Gelsemium elegans*, of the bark of *Evodia glauca*, and of a species of *Parameria*. From Mr. W. E CROW, Hong Kong.

Specimen of the young stems of *Humirium floribundum.* From Professor J. E. BOMMER, Brussels.

The following donations to the Museum of the North British Branch of the Society had been reported by the Assistant-Secretary, Mr. J. Rutherford Hill:—

Specimen of Strophanthus follicles. From Messrs. BURROUGHS, WELLCOME AND Co., London.

Specimen of Strophanthus follicles. From Professor T. R. FRASER, Edinburgh University.

Specimens of Adulterated Serpentary rhizome, and Adulterated Squill root. From Mr. C. A. MACPHERSON, Edinburgh.

A piece of Lead weighing 6¼ oz. found in a ball of Opium. From Messrs. T. and H. SMITH AND Co., Edinburgh.

The Professors had attended and reported on their respective classes.

The Committee had considered what steps it was desirable to take in reference to the letter from Sir F. Abel respecting the establishment of the Imperial Institute, and had recommended that a circular letter be sent to each member and associate in business of the Society.

The PRESIDENT in moving the adoption of the report, said there was nothing he need specially call attention to. The members had all probably seen the circular

referred to, in response to which he had already received certain sums amounting to about £120, which had been sent on to the Secretary of the Imperial Institute, and duly acknowledged in the daily papers.

The motion was unanimously agreed to.

BUILDING COMMITTEE.

This Committee had had a conference with the Solicitor and Surveyor on business connected with the new building. It was recommended that a porch be built at the Pied Bull Yard entrance if the permission of the Vestry could be obtained.

It was also recommended that the contractors be paid £750 on account on the certificate of the architect, and a further sum not exceeding £1000 in the course of next month, also on the architect's certificate.

The Council went into Committee to discuss the details of this report.

On resuming, the report was unanimously agreed to.

LAW AND PARLIAMENTARY.

At the meeting of this Committee the President had reported the steps he had taken to secure the entire exemption of chemists and druggists from the provisions of the Early Closing Bill, and his interview with Sir John Lubbock on the subject. He had also reported on the progress of the Pharmacy Acts Amendment Bill.

The Committee had considered a Medical Registration Ordinance of St. Vincent (1886), sent by order of the Secretary of State for the Colonies, for any observations on the provisions relating to druggists. The Committee had approved its general provisions with certain additions to the Poison Schedule which it considered desirable.

The Council went into Committee to consider this report. On resuming—

The PRESIDENT moved the adoption of the report. In reference to the St. Vincent Ordinance which had been sent to the Council for consideration, he might say that the Committee found it very satisfactory, much more so than the British Act; it was both a Poison Act and a Pharmacy Act, and the only defects appeared to be the omission from the schedule of poisons of those preparations which had been added on the suggestion of the Council since the Act of 1868 was passed, and which had probably not come under the notice of the draftsmen. The Committee recommended that these additions should be made, and from previous experience he had no doubt this would be done. The Council had been consulted on most Colonial Acts passed of late years on such matters, and in each case the Secretary of State accepted the suggestions before authorizing the proposed Act.

The report was unanimously agreed to.

GENERAL PURPOSES.

The report of this Committee included reports from the Professors on the examinations at the end of the first five months' course.

Botany and Materia Medica.

Professor Bentley had reported very favourably of this class with regard to regularity of attendance and general good conduct. Fifteen candidates had presented themselves, the first five of whom he considered worthy of a medal and certificates respectively.

Chemistry and Physics.

Professor Dunstan had reported that there were eight competitors in this class, and he had every reason to be satisfied with the answers given.

Acting on the above reports the Committee recommended the following awards :—

Botany and Materia Medica.

Bronze Medal		Edmund White.
Certificates of Merit	Equal	John Thomas.
		Edward James Woolley.
		Ernest Daintree.
		Weston Poole.

Chemistry and Physics.

Bronze Medal		Edmund White.
Certificates of Merit	Equal	John Thomas.
		Weston Poole.
		Ernest Daintree.
		Edward James Woolley.

The usual letter from the Solicitor was also included, stating the steps being taken in connection with various cases of alleged infringement of the Pharmacy Act.

T. W. Dyball, 27, St. Nicholas Street, Ipswich, had confessed judgment for a penalty prior to the day named for the hearing of the action against him for infringement of the provisions of the Pharmacy Act, 1868.

Several other cases had been considered by the Committee, and in four a prosecution was recommended.

Honorary Members.

After full consideration of the names entered in the book kept for the purpose, the Committee had decided to recommend a list of gentlemen for election in May next.

The Council, as usual, went into committee to consider the legal portion of this report.

On resuming, the report and recommendations were carried by a large majority, and a special resolution was also passed making the prize awards.

THE REDWOOD TESTIMONIAL.

The PRESIDENT reported that at a meeting of the Redwood Testimonial Committee it had been resolved that a legal trust deed should be drawn up, and that a sum of about £600 should be invested in Great India Peninsular Railway Stock, so as to produce an annual sum for a Redwood Scholarship. The instructions he was authorized to give the Solicitor with regard to the deed were that the Council of the Society for the time being should have charge of this capital sum, and should award it under such conditions as it thought fit; the examination to be in any or all of the subjects which now regulated the Bell Scholarships, or in any additional subjects, and that the Council should have power to alter the investment as it thought desirable. A deed had been prepared accordingly, and it would be necessary that the seal of the Society should be affixed to it.

Mr. SCHACHT said he supposed the exact conditions of the examination had not yet been settled.

The PRESIDENT said No; not yet.

Mr. WILLIAMS said the Library Committee would probably draw up a scheme, but it could not come into operation for some time.

Mr. SCHACHT hoped the proposed deed would not bind the Council too strictly.

The PRESIDENT said it left a very wide discretion to the Council. The name of the Scholarship, of course, could not be changed, but subject to that there was great latitude. The deed recited the meetings which had been held, gave the names of the whole of the Committee, and set out the resolutions which had been passed at its meetings: that about £600 should be invested to form a Redwood Scholarship, to be held in connection with the School of Pharmacy of the Pharmaceutical Society, the surplus to be expended in painting a portrait of Professor Redwood to be placed in the house of the Society.

Mr. GREENISH asked if £600 was enough to found a scholarship.

The PRESIDENT said it would produce about £20 to £24 a year; but the Council had no power to deal with that, it was the decision of the Testimonial Committee. He then read the principal portions of the deed.

Mr. BOTTLE asked in whose hands the property in the portrait would be vested.

The PRESIDENT said he apprehended when the Committee handed over the portrait it would be vested in the Society.

Mr. BOTTLE thought that ought to be expressed in the deed.

The PRESIDENT said that was not necessary; it would

not have been mentioned in the deed at all, but for the fact of its appearing in the resolution. He should be instructed in due time by the Committee to hand over the portrait to the Society under conditions which would be named; there would be no trust relating to the portrait. The Committee had already drawn up an inscription to be placed on a tablet which would be handed over with the picture, on which would appear something to the effect that the portrait was presented to the Society by the friends and former pupils of Professor Redwood.

Mr. ATKINS thought the picture would have been given to the Professor himself or his family, who would then hand it back to the Society for custodianship.

The PRESIDENT said the portrait was being painted by a distinguished artist, Mr. Hodges, and arrangements had been made for handing a replica of it to Professor Redwood as a personal gift.

Mr. WILLIAMS, as treasurer of the fund, said the only matter of regret was that the amount subscribed was not larger; but they must take it as it stood, and trust it would be of use to scholars in the future, and act as a stimulus to their education, whilst at the same time doing honour to the name of Professor Redwood.

A resolution for affixing the seal of the Society to the deed was then passed unanimously.

DR. GREENHOW'S REPORTS FOR 1885 AND 1886.

The Secretary laid on the table copies of the following Reports which he had recently received from the Privy Council Office:—

"*Report on the Examinations held by the London Board of Examiners of the Pharmaceutical Society during the year* 1885.

"These examinations were conducted in the usual manner during last year and there was nothing unusual either in their management or results that requires special comment.

"*First or Preliminary Examination.*—This examination was conducted as in former years by the College of Preceptors.

"A total number of 1278 candidates were examined, 690 of whom passed and 588, or 46·0 per cent., were rejected. The proportion of rejections was therefore rather less than usual.

"For the purpose of comparison with former years I append a table showing the proportion of rejections for each 100 candidates in each of the five years previous to 1885, and also the average rate for the whole of that period.

"*First or Preliminary Examination.*

	1880	1881	1882	1883	1884	Average for five years.
Number of rejections per 100 candidates ..	48·0	56·8	50·4	49·9	51·6	51·2

"Of the rejected candidates last year 20 failed on account of general weakness in the whole examination, although they had gained the minimum passing number of marks in each separate subject; 87 failed in all the subjects, namely English, Latin and Arithmetic; 209 in Arithmetic; 39 in Latin; 45 in English; and 186 in two of these subjects.

"Arithmetic continues to be the subject in which the candidates show the greatest weakness, for if the number of those who failed in it in conjunction with one or both the other subjects be added to the 209, the number that failed in Arithmetic is raised to 476. The total number of those who failed in Latin was 252, and in English 240.

"The Board of Examiners held 28 meetings during the year for conducting the technical examinations, at 13 which I was present.

"*Major Examination.*—During last year 87 candidates presented themselves for this examination, 47 of whom passed, and were registered as pharmaceutical chemists and 40, or 46·0 per cent., were rejected.

"The subjoined table shows the proportion of failures per 100 candidates, in this and the Minor examination, in each of the five years preceding 1885, and also the average proportion for the entire period:—

	1880	1881	1882	1883	1884	Average for five years.
Major examination....	54·3	49·0	61·7	50·0	48·1	52·6
Minor examination ..	54·6	50·6	57·7	62·8	66·0	58·3

"As regards the Major examination the number of candidates examined was too small to admit of any very certain conclusion being drawn from the diminished proportion of rejections last year. It is nevertheless satisfactory to observe that the proportion of failures has been smaller in each of the last two years.

"It is significant that 13 candidates failed last year because of general weakness in all the subjects, although they had obtained the minimum passing number of marks in each separate subject; 13 also failed in practical work; 5 failed in Chemistry (*vivâ voce*); 5 in Materia Medica, and 4 in Botany.

"*Minor Examination.*—During last year 744 candidates were examined for the Minor qualification, only 255 of whom passed and were registered as chemists and druggists, and 489, or 65·7 per cent., failed. It will be seen on reference to the table given in the last paragraph that the proportion of rejections has increased largely since 1881, until at length nearly two-thirds of the candidates have been rejected in each of the last two years.

"There have been an unusual number of changes in the constitution of the Board of Examiners in the last two years, a circumstance which, taken in conjunction with the increased number of rejected candidates, led me to watch the examinations very closely last year, with the view of discovering whether greater strictness on the part of some of the examiners might not in some degree account for the larger proportion of rejections; but I am bound to say that I was unable to find any ground for attributing the result to any other cause than the incompetency of the candidates.

"Of the rejected candidates last year 81 failed on account of general weakness in all the subjects; 171 failed in Practical Dispensing; 70 in Chemistry; 64 in Pharmacy; 43 in Reading Prescriptions; 22 in Materia Medica; 27 in Botany, and 11 in two or more of these subjects.

"I have in former reports expressed my opinion that the unsatisfactory results of these examinations are chiefly owing to the very imperfect early education of the candidates, and the want of sufficient practical training in the art of compounding medicines and dispensing prescriptions. Nevertheless, notwithstanding the large number who are found to be incompetent, I am of opinion that the examinations are conducted with care and due consideration for the candidates; and that those who pass are really qualified for their calling and may be safely placed on the Register of Chemists and Druggists.

(Signed) "E. HEADLAM GREENHOW."

"*Report on the Examinations held by the London Board of Examiners of the Pharmaceutical Society during the year* 1886.

"The first or Preliminary examination in English, Latin, and Arithmetic, was conducted, as usual, by the College of Preceptors; the number of candidates examined was 1305, of whom 632 passed and 673, or 51·57 per cent., were rejected.

"The proportion of rejections was therefore rather above the average of the six preceding years. I have seen the examination papers and consider them as fair

and not more difficult than was necessary in order to test the elementary education of the candidates in relation to their future calling as dispensers of medical prescriptions.

"The rejections were caused in 26 cases by failure to obtain the aggregate number of marks required for passing the whole examination; that is to say, these candidates were so weak that, although each of them had earned four-tenths of the number of marks allotted to each separate subject, he had failed to obtain an aggregate of half the number of marks on the whole examination.

"The regulation under which these persons were rejected appears fair and reasonable, and is intended to meet the case of any candidate who may be very well up in two of the subjects though rather weak in the third, and yet it excludes such as are weak in more than one subject.

"Of the remainder 138 failed in all the subjects; 238 in Arithmetic; 37 in Latin; 38 in English; and 201 in two subjects.

"As I have remarked in former reports, the candidates are weaker in Arithmetic than in either of the other subjects, for adding the 238 who failed in this subject to 323 who failed in Arithmetic and also in either one or both the other subjects, we have a total of 561 candidates who were rejected for Arithmetic. Competency in Arithmetic is necessary, not only as a test of a fair elementary education, but is also absolutely requisite in practice, for in dispensing it is frequently necessary to calculate fractional parts of the more active ingredients of a prescription.

"In like manner, an acquaintance with Latin is required for reading and dispensing prescriptions written in that language; and, as a proof that the standard of examination in Latin is not too high, I may mention that last year 57 candidates, who had passed the Preliminary examination in Latin, failed in translating prescriptions at the final examination for the Minor qualification.

"The large proportion of rejections, from year to year, in the Preliminary examination, seems to render it most desirable that it should be passed previous to the commencement of the technical education.

"According to the present regulations, a young man may pass this examination at any time before presenting himself for the Minor or qualifying examination. Hence, it not unfrequently happens that the time which should have been dévoted to learning the practical part of the business, and preparing for the technical examination, is taken up with studying for the Preliminary examination. The education acquired in this way is, in most cases, very imperfect, as is manifest from the large number of candidates who failed in so elementary a subject as Arithmetic. Many of the rejected candidates must eventually turn to some other occupation, after wasting two or three of the most precious years of life in endeavouring to obtain admission into a calling for which they are entirely unsuited. And, even of those who struggle through the Preliminary examination, many probably fail at the Minor examination, by reason of having given up the time during which they should have been occupied with technical training, to the endeavour to remedy the deficiencies of their early education. It is not at all rare for candidates to present themselves unsuccessfully four or five or six times, or even oftener, for the Minor examination.

"It would obviously, therefore, be much better that such imperfectly educated men should ascertain their incompetence at an early period of life and thus be set free to look out, ere it is too late, for an occupation better suited to their capacity.

"The Board of Examiners met on thirty days during last year for the examination of candidates in the technical subjects.

"*Major Examination.*—During last year 90 candidates were examined for the Major qualification, 51 of whom passed, and were registered as pharmaceutical chemists, and 39, or 43 3 per cent. were rejected.

"This is a large proportion of rejections considering that these candidates had already passed the Minor examination, and, being registered as chemists and druggists, were qualified under the Pharmacy Act 'to keep open shop for retailing, dispensing, or compounding of poisons.' It is nevertheless, satisfactory, that the smaller proportion of rejections in this examination, referred to in my report for 1885, is maintained, and that there has been a small decrease in each successive year since 1882. No change having been made either in the mode of conducting or in the strictness of the examination, it follows that the candidates have been better prepared.

"Of the candidates who failed to pass, 14 were rejected on account of general incompetence, and 16 in either Chemistry or practical work.

"*Minor Examination.*—The number of persons examined last year for the Minor qualification was 824, of whom 304 passed, and 530, or 63·1 per cent. were rejected.

"As I have said on former occasions, I cannot attribute this large proportion of rejections to any other cause than the unpreparedness of the candidates, and more particularly to their deficiency in practical knowledge and skill.

"Thus 205 candidates failed in Practical Dispensing, either alone or in conjunction with some other subject; 71 in Chemistry; and 57 in Reading Prescriptions, the three most important subjects, in each of which the examination is thoroughly practical.

"The number of rejections on the other subjects were 56 on account of general weakness, that is to say failure to earn the minimum passing number of marks on the whole examination; 82 in Pharmacy; 34 in Materia Medica; and 25 in Botany.

"My first duty in connection with these examinations is to report annually to the Privy Council as to their efficiency, as a qualifying test for registration under the Pharmacy Act, and their fairness towards the candidates. It is very satisfactory that I have always hitherto been able to report favourably in both these respects.

"The examinations are conducted with fairness and impartiality, and the successful candidates are fully entitled to their certificate of qualification to carry on business as chemists and druggists. It has, however, also been my desire and aim to co-operate with the Board of Examiners in improving the mode of conducting the examinations, with a view to increasing their practical efficiency; with this intention I have, from time to time, made various suggestions, which have always been courteously received and generally adopted. The Society has recently obtained additional space, and is about to erect new rooms, better adapted for the purpose of examination than those now in use.

"Considering the large number of candidates who are rejected for Practical Dispensing, I have thought it well to recommend that this part of the examination should be extended both as regards scope and duration. At present each candidate is required to dispense two articles from a written prescription, under the surveillance of the Examiner, who commonly has four candidates under observation at once.

"I think it would be fair to the candidates and it certainly would not lessen the value of the examination as a practical test of competency, if each candidate were required to dispense a larger number and greater variety of articles. I have also, for some time, thought that it would be desirable, when practicable, to extend the present examination in Pharmacy, which is almost entirely *vivâ voce*, by requiring each candidate to prepare some one or more of the officinal compounds ordered in the British Pharmacopœia.

"These suggestions would, if carried into effect, require an extension of the time now given to the examination, and would involve its division into two parts, to be held

on separate days, as is the case with the Major examination.

"This would, however, be favourable to the candidates by diminishing the pressure of undergoing examination on so many subjects on the same day.

"With these suggestions in view, I requested a conference with the Board of Examiners in April last, and recommended that a practical examination in Pharmacy should be added to the present *vivâ voce* examination in that subject, and that the amount of work done in Practical Dispensing should be increased. The Board at a subsequent meeting referred the subject to a committee of its members for consideration, which reported in favour of adopting both my recommendations.

"The report has been generally approved by the Board of Examiners, which has also unanimously resolved 'That an examination in Practical Pharmacy should be instituted and the amount of work in Practical Dispensing increased, allowing a corresponding increase of time, as soon as additional space is available,' and that 'the examination for the Minor qualification should be divided into two parts extending over two days at an early opportunity.' Certain details will require to be carefully considered and arranged, and, on account of the limited space in the present building, some time must elapse before these resolutions of the Board can be carried into effect. I understand that the new examination rooms will be completed and ready for use at the beginning of October, and hence I trust that the proposed amendments in the mode of conducting the examinations in practical pharmacy and dispensing may be effected early next year.

(Signed) "E. Headlam Greenhow."

Mr. Symes said he supposed it was not competent for the Council to criticize these reports in any way, but he might perhaps be allowed to say that he strongly endorsed one particular paragraph in which Dr. Greenhow said he thought it would be desirable to extend the examination in pharmacy, which was almost entirely *vivâ voce*, by requiring each candidate to prepare some one or more of the officinal compounds of the Pharmacopœia. Seeing that this recommendation had been submitted to the Boards of Examiners, and approved by them, he thought it as well to emphasize this opinion that the examination should be rendered more practical in this direction, and it rather supported the contention which might come forward at some future time, that the Society should teach what the candidates were required to know.

The Secretary read a letter from the Hull Chemists' Association, enclosing a resolution of thanks for the *Pharmaceutical Journal* during the past year.

The Auditors' Report.

The Auditors' Report was presented and laid on the table.

Proceedings of Societies in London.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting was held on Thursday, March 31. Mr. E. White in the chair.

The following paper was first read:—

Officinal Succi,

by arthur smith,

Bell Scholar.

Several prepared juices have been used in medicine for a considerable time, and of these, five are official in the present Pharmacopœia: succus belladonnæ and succus conii obtained from the leaves and young branches; succus hyoscyami, from the leaves, flowers, and branches; succus scoparii, from the tops; and succus taraxaci, from the root of the respective fresh plants. Succus digitalis, although unofficial, is also included in this paper, as it is frequently employed in medicine. Both the wild and cultivated plants of belladonna and hyoscyamus may be utilized for the preparation of the juices, but in the case of conium the wild plant only is official. These succi are all prepared in the same manner, namely, by crushing in a stone mortar, and, after expression, the addition of one volume of rectified spirit to every three volumes of juice. After standing for seven days, the liquid is filtered from the small amount of mucilaginous matter which has been deposited. This quantity of spirit is found to be sufficient to preserve the juice from decomposition.

Succus limonis and succus mori, being the natural juices of the fruits and not prepared by the addition of spirit, of course are not included with the ordinary succi, and I suppose it is on this account that they are classed separately in the Pharmacopœia.

The object of this paper is an endeavour to ascertain the quality and strength of the various succi, especially as hardly any information can be obtained from our text books and journals, and for this purpose nineteen samples were procured from well-known wholesale houses.

In all vegetable juices the proportion of active principle varies according to the succulency of the plant, and this is, of course, dependent on certain conditions, such as the locality and the amount of rainfall during the few months previous to collection.

Much of the succus conii of commerce is said to be obtained from the leaves and shoots before the flowering stem is developed, but this is far inferior to that yielded at the time prescribed in the Pharmacopœia (which, I need hardly mention, is when the fruit is commencing to form).

The method of procedure was as follows:—The specific gravity of the juice was first obtained, then the amount of rectified spirit was ascertained by diluting a given quantity of the juice with distilled water, and distilling, by means of a revenue still, into a specific gravity bottle. The specific gravity of the distillate thus obtained showed, on reference to Fownes's table, the amount by weight of real alcohol in the dilute spirit, and from this the amount, by volume, of rectified spirit in the original succus was ascertained by calculation. Another quantity of succus was now taken for the estimation of alkaloid; and, lastly, a small volume was evaporated by means of a water-bath until the residue ceased to lose weight.

Unfortunately, no standard samples can be prepared at this season of the year, and, therefore, the real amount of alkaloid which each juice should contain can only be roughly estimated by comparing the results obtained from analyses of commercial samples.

The following tables show the results of these experiments:—

Succus Belladonnæ.

No. of sample.	Specific gravity.	Amount in grams of alkaloid in 100 c.c.	Volume of S.V.R. in 100 c.c.	Dry residue grams in 100 c c.
1 . .	·9950	trace	23·860	2·360
2 . .	·9865	·05	24·157	2·665
3 . .	·9915	·0325	24·585	3·285

For the estimation of alkaloids 30 cubic centimetres of the succus were evaporated to a small bulk over a water-bath, mixed with more spirit to separate albuminous matter, filtered, and again evaporated to drive off the whole of the spirit; the residue was slightly diluted with distilled water, and rendered alkaline with solution of ammonia. After allowing excess of ammonia to evaporate, the liquid was well shaken with chloroform in a stoppered separator. When the chloroform had separated it was shaken with a little distilled water to dissolve out

any ammoniacal salt it may have contained, and on evaporation left the alkaloid in a practically pure state.

No. 1 (*a*), treated thus, failed to yield any alkaloid. Ten c.c. were therefore evaporated to drive off the spirit, the residue dissolved in water acidulated with sulphuric acid and solution of potassio-mercuric iodide added, which also failed to produce a precipitate. Two minims of the juice dropped into the eye did not cause any dilatation of the pupil. Five c.c. left, on evaporation over a water-bath, ·118 gram. In order to fully establish the above results, another sample of this juice was obtained from the same house with the following results:—

No. 1 (*b*). The clear chloroformic solution obtained as before left on evaporation a very thin film of a pale yellow colour, which on mixing with a little acidulated water gave only a very faint turbidity with solution of potassio-mercuric iodide. Ten c.c. after dissipation of the spirit also gave no precipitate with this reagent. Three minims dropped into the eye caused the pupil to dilate very slightly, causing a very irritating sensation, doubtless on account of the spirit which it contained. From these results it is quite evident that this sample contained only a trace of atropine. The determinations of the specific gravity, amount of spirit and of dry residue fully confirmed those of No. 1 (*a*).

No. 2. This sample yielded a very fair proportion of atropine. It contained a little more spirit than No. 1, and consequently had a lower specific gravity. Thirty c.c. gave on agitation with chloroform, by the process described above, ·015 gram, corresponding to ·05 gram in 100 c.c. This alkaloid formed a clear solution with acidulated water and gave an abundant precipitate with solution of potassio-mercuric iodide.

In order to check this, 10 c.c. of the succus were evaporated, the residue dissolved in a little acidulated water, and the alkaloid estimated gravimetrically with solution of potassio-mercuric iodide (1 in 200). The precipitate obtained in this manner contains 40 9 per cent. of atropine and has the formula $(C_{17}H_{24}NO_3I)_2 + HgI_2$ (Dragendorff). The precipitate in this case weighed, after drying, ·0155 equal to ·155 gram in 100 c.c. This is equal to ·063395 gram of atropine, thus giving a larger percentage than that obtained with chloroform. Atropine and hyoscyamine cannot be satisfactorily estimated by the drop test. It is noticeable that this sample, which gave the largest yield of alkaloid, had a paler colour and a decidedly weaker and more pleasant odour than the others.

No. 3. This sample contained more extractive matter than either of the others. The amount of alkaloid obtained by agitation with chloroform was considerably less than in the preceding specimen, being only ·0325 gram in 100 c.c.

All the samples of belladonna were of a clear reddish-brown colour. No. 1 had a strong unpleasant odour, No. 2 similar but somewhat weaker. Wild belladonna has been found to contain most alkaloid.

Succus Conii.

No. of sample.	Specific gravity.	Amount in grams of alkaloid in 100 c.c. as chloride.	Volume of S.V.R. in 100 c.c.	Residue from 100 c.c.
1 . .	·9878	·284	28·789	3 440
2 . .	·9915	·100	25·122	3 580
3 . .	·9935	·088	23 633	4 600

The assay was conducted as follows:—25 c.c. were evaporated to drive off the spirit, the residue slightly diluted and put into a separator with some petroleum ether, a little solution of carbonate of potassium added, and the mixture thoroughly well shaken together, and allowed to separate completely. The petroleum ether (containing the liberated alkaloid) was now shaken with dilute hydrochloric acid, which dissolved out the alkaloid and was allowed to separate completely; the ether was again shaken with the alkaline liquid, and after separation returned once more, with the same precautions, to the acid solution. This mixture was well shaken and after separation removed from the ether, and evaporated over a water-bath at a gentle heat. By this process No. 1 gave a very good proportion of a white crystalline salt, chloride of the alkaloid. Coniine being a liquid alkaloid volatile at the ordinary temperatures cannot be accurately estimated as such. Nos. 2 and 3 yielded less than half the amount obtained from No. 1. Samples 1 and 2 were dark reddish-brown; No. 3 was much lighter in colour, resembling succus hyoscyami. The odour of No. 2 was more powerful than either of the others. Dragendorff states that the chloride is volatile at the ordinary temperatures, but as this statement is contradicted by others, this method was accepted as the most trustworthy. An attempt was made to estimate succus conii with Mayer's reagent, but the results obtained were very unsatisfactory.

Succus Digitalis.

No. of sample.	Specific gravity.	Amount in grams of glucoside in 100 c.c.	Volume of S.V R. in 100 c.c.	Residue from 100 c.c.
1 . .	·9808	·1	28 686	2·50
2 . .	·9906	·055	25·053	2·76
3 . .	·9908	·075	26·663	4·00

The juice was evaporated, and the residue exhausted with water acidulated with acetic acid, which leaves some extractive matter behind. To the solution ammonia is added until nearly neutral, and then the glucoside is precipitated with solution of tannic acid. The precipitate is well washed with hot water, after which it is well rubbed and heated with litharge and spirit. The digitalin is set free, and dissolved by the spirit.

The digitalin obtained in this manner formed a clear solution with acidulated water, and gave a flocculent precipitate with solution of tannic acid.

Succus Hyoscyami.

No. of sample.	Specific gravity.	Amount in grams of alkaloid in 100 c c.	Volume of S.V.R. in 100 c.c.	Residue from 100 c.c.
1 . .	·9811	·0166	28·404	4·66
2 . .	·9892	·0233	23·533	2·69
3 . .	·9844	·02166	27·469	3·52

The colour of these was that of a bright sherry. Nos. 1 and 2 had a somewhat faint odour, but that of No. 3 was much stronger, and its taste more unpleasant.

Hyoscyamine being identical in composition with atropine the juice was estimated by the same process, and yielded results which were far more constant. It will be noticed that the first specimen contained more than 3 per cent. more spirit than is required by the Pharmacopœia, although 25 per cent. is said to be sufficient to prevent decomposition if kept in a cool place. The amount of solid residue varied from 2·6 to 4·6 grams in 100 c.c.

Succus Scoparii.

No. of sample.	Specific gravity.	Amount in grams of alkaloid in 100 c.c.	Volume of S.V R. in 100 c c.	Residue from 100 c.c.
1 . .	·9833	·0375	28·327	2·13
2 . .	·9859	·075	26·321	2·19
3 . .	·9932	·1530	25·220	4·56

Scoparium contains a liquid volatile alkaloid termed sparteine, and a bitter principle, scoparin.

In the absence of any definite authority as to which of these two substances the juice owes its activity, the alkaloid sparteine was alone isolated. Scoparin is said to be a yellowish powder. There is no recognized method of obtaining it; it is peculiar to note that No. 2 contained just twice as much alkaloid as No. 1, and No. 3 about twice as much as No. 2, so that the third sample was four times the strength of the first.

Each specimen had a fragrant, slightly aromatic odour, but rather unpleasant taste.

Nos. 1 and 2 were of a pale sherry colour, but No. 3 was dark reddish-brown, indistinguishable in appearance from succus belladonnæ, and was, in all respects, a very fine sample, as shown by the results tabulated above.

For the alkaloidal estimation 40 c.c. were evaporated on a water-bath to remove the whole of the alcohol, the residue dissolved in solution of tartaric acid, the solution filtered and made alkaline with carbonate of potassium and then shaken with ether. By this method ·015 gram was obtained from the 40 c.c., corresponding to ·0375 gram in 100 c.c. This was dissolved in distilled water, acidulated with sulphuric acid, and solution of potassio-mercuric iodide added, which gave a beautiful yellow precipitate. This precipitate was then suspended in acidulated water, and decomposed by passing a current of sulphuretted hydrogen gas through the liquid. The black precipitate of sulphide of mercury having been filtered out, the alkaloid was re-precipitated by solution of carbonate of potassium and again shaken with ether, leaving after evaporation of the ether, ·012 gram corresponding to ·03 gram in 100 c.c., thus proving, after allowing for slight loss during the process, that the residue obtained in the first place consisted of pure alkaloid.

When the solution of tartaric acid was added to the residue of the succus after the evaporation of the spirit during the above process, a considerable quantity of a crystalline salt was thrown down, which was at first thought to consist of tartrate of calcium, but on further examination proved to be acid tartrate of potassium.

Succus Taraxaci.

No. of sample.	Specific gravity.	Amount of S.V.R. by volume in 100 c.c.	Relative. bitterness.	Residue in 100 c.c.
1 . .	·9847	27·844	78	3·61
2 . .	·9889	28·855	91	5·86
3 . .	1·0136	24·903	100	10·01

No. 1 had a pale sherry colour, No. 2 dark sherry, and No. 3 deep reddish-brown. As these gave corresponding amounts of solid residue on evaporation over a water-bath, the colour in succus taraxaci appears to be a good test as to the amount of extractive matter present. No. 3 gave 10 per cent. of solid residue and therefore possessed a much greater density than any other juice.

As there is no practicable method of isolating taraxacine, one must judge the quality of these preparations by means of their flavour, appearance, density, and amount of residue left after evaporation, taste being the most reliable test.

The relative amount of bitterness was judged by noting the amount of water required to dilute the stronger juices until each appeared to the palate to possess the same amount of bitterness, the figure 100 being taken for convenience to represent the juice possessing the largest amount of bitterness.

Succus taraxaci is a great improvement upon the succus of the same name in the last Pharmacopœia, which allowed too wide a limit in the time of collection. It is stated to possess the largest amount of bitterness when prepared in the month of January, but it is frequently almost impossible to dig up the root then on account of the hardness of the ground.

The reason of the discrepancy that occurs in the quality of this excellent preparation of dandelion is explained when one thinks of the different localities in which the root is collected, and the different ways of growing it.

According to Mr. Smith (Edinburgh) who gave a very interesting account of his experiences in the preparation of this well-known medicine before the Pharmaceutical Conference a few years ago, the plant gave very gratifying results when cultivated. He stated, if I may be permitted to repeat a few of his remarks, "On one occasion we got a most remarkable result. The bitter principle was intense like aloes, and the root was collected immediately after flowering. The weather happened to be particularly calm, and the whole field was several inches deep with the most lovely snow-white carpet which could be conceived."

In conclusion, I would like to remark that the results of the examination of the several juices, as shown in the above tables, show the great desirability, if not the absolute necessity, of endeavouring to obtain greater uniformity in the strength of these preparations. As pharmacists we like to know what we are handling, but the first sample of succus belladonnæ, a juice which is usually labelled "poison" and is prescribed in small doses, shows the uselessness of that sample for all medicinal purposes. A great advance has been made by standardizing many of the official preparations, and it is to be hoped that soon some means will be devised of obtaining, as far as possible, uniformity in the strength of these juices; doubtless they would be far more valuable if the cultivated plants alone were official for their production. If uniformity of strength could be depended upon, they would be frequently prescribed instead of the extracts, because there is always considerable danger of injuring many of the alkaloids by the application of any great amount of heat.

The paper was followed by a discussion in which the Chairman, Messrs. Bird, Braithwaite, and the Secretary took part.

Mr. L. W. Hawkins then gave a report on "The Strength of some Official Preparations;" the following being the results obtained:—Six specimens of vinegar were found to contain from 3·86 to 5·64 per cent. of $HC_2H_3O_2$, and from ·023 to ·129 per cent. of H_2SO_4 as sulphates. Four samples of aqua laurocerasi, bought as B.P., contained respectively ·086, ·078, ·102 and ·098 per cent. of HCy. Six specimens of calx sulphurata varied from 31·57 per cent. to 62·33 per cent. of calcium sulphide, the lowest containing free carbon and evidently having been insufficiently heated. Six samples of ferrum redactum contained from 23·61 to 58·18 per cent. of metallic iron, and all contained traces of sulphide (apparently showing that the hydrate from which they were produced was derived from ferric sulphate, instead of ferric chloride as ordered). Six lots of vinum ferri varied in strength from 0·39 to 1·19 grain of metallic iron per fluid ounce.

After a discussion on this report and some miscellaneous business the meeting adjourned.

ROYAL INSTITUTION.

Light as an Analytic Agent.

On Friday, the 1st inst., in a lecture delivered at the Royal Institution upon "The Use of Light as an Analytic Agent," Professor Dewar very ably drew attention to the relation which optical science bears to chemistry, introducing at the same time the results of some researches recently made by Professor Liveing and himself. There are two conditions, he observed, which lend themselves most readily to analytical research by means of light: first, the effect produced when light is transmitted through or reflected from matter; secondly, the condition of matter when emitting light by the agency of either heat or electricity. Another condition is illustrated by

guaiacum, which, as was first shown by Wollaston, when exposed to atmospheric air in a strong light undergoes a change in composition, probably one of oxidation. This action of light was shown by Professor Dewar, who exposed a thin film of refined guaiacum spread over a white surface to a ray of electric light for a period of half a minute, when the gum was found to have acquired a deep greenish blue colour; the composition of the body that undergoes changes of colour in this case is still unknown. As an example of a similar action of light more recently discovered, Professor Dewar showed some experiments with a body of definite chemical composition, "tetramethylparaphenylenediamine." This body is so susceptible to the molecular contact of oxygen in the presence of light, that a solution of sulphate of copper first oxidizes it to a blue colour, and then deoxidizes it, when it assumes a brown colour. Antiseptics such as mercuric chloride also act upon it as oxidizing agents, whilst even the evaporation of ether from its surface in the presence of light has the same effect. With regard to the property possessed by some bodies of emitting light, termed phosphorescence, the lecturer said that two methods might be employed to stimulate these bodies, either by passing an electrical discharge through them whilst in vacuum, or else first exposing them to the action of light and then obtaining suitable conditions of temperature. By the first method, Professor Dewar showed the phosphorescence of several bodies, and drew attention to the fact that although the ruby and alum are of entirely different appearance under ordinary conditions, yet when an electrical discharge is passed through them, both give the red glow of alumina. Of bodies stimulated by exposure to light, sulphide of calcium, which has recently attracted so much notice, forms an excellent example of the influence of temperature upon phosphorescence. Thus, sulphide of calcium stimulated by exposing it to a ray of electric light, and then cooled to a temperature of $-80°$ F., shows no sign of phosphorescence; but upon the temperature being raised, light is emitted from it. This, as Professor Dewar explained, is probably due to a certain amount of potential energy being stored up by exposure to the light, this energy remaining latent except under suitable conditions of temperature. Digressing a few minutes from his subject, Professor Dewar exhibited a curiosity which has been recently forwarded to him by Dr. Koch, of Berlin. This was an example of the phosphorescence of organized matter, being the phosphorescent bacteria of sea-water, cultivated in gelatine, which Dr. Koch during a research on these bacteria has succeeded in separating. In a dark room, these bacteria show a brilliant phosphorescence. The lecturer then drew attention to the spectroscope and the value of spectrum analysis in chemistry. He regarded spectrum analysis as a refined analytical method, by which so great progression had been made in the study of the composition of bodies as to outstrip chemical analysis. Nevertheless, many results are obtained with the spectroscope which are at present misleading, owing to the method of analysis being still imperfectly understood. As an instance of this uncertainty having led to wrong conclusions being drawn, Professor Dewar mentioned that certain lines which had always been regarded as part of the solar spectrum have recently been discovered to be due to the atmospheric air through which the solar rays pass. Some of the discrepancies which arise are very interesting. Thus when an electric discharge is passed through bodies in a gaseous state, it is very frequently accompanied by an alteration of the molecular condition. With oxygen, ozone is formed, which retards some of the yellow and red rays, giving a preponderance of blue rays in the spectrum. If a current of electricity be passed through a tube containing the transparent vapour of phosphorus, a deposit of allotropic or amorphous phosphorus is formed on the side of the tube, imparting a ruddy glow to a ray of white light transmitted through it; but if the current be stopped and the tube strongly heated the phosphorus regains its original transparent gaseous condition. If such changes take place, the question arises as to what bodies may or may not be manufactured during the experiment. Professor Dewar mentioned, incidentally, an observation which he had recently made, and was at loss to account for. He found that if a current of electricity be discharged through tubes containing pure sulphur or phosphorus vapour or hydrogen gas by means of a carbon electrode, the lines identified with carbonic acid gas are always formed in their spectrum. If these lines are, in this instance, due to carbon dioxide, from whence has the oxygen been obtained? Professor Dewar also gave an interesting description of some difficulties met with and overcome by Professor Liveing and himself in obtaining the spectrum of mixtures of gas at the moment of their explosion. These mixtures were exploded in steel tubes provided with thick plates of mica at either end. A photograph of the spectrum was obtained by the discharge of an electric current through a piece of aluminium wire which caused its combustion at the moment of the explosion, giving an instantaneous illumination of the tube. At first the photographic plate gave a most complex spectrum, and then the precaution was taken to polish the inside of the tube, but with the same result. The interior of the tube was then electro-plated with various metals, when it was found that if metals of the nature of iron, nickel, or cobalt were exposed a complex spectrum was obtained; but when a volatile metal was used for electro-plating no emission of its spectrum occurred. The probable explanation of these results is that the force of the gas rushing along the tube picked off particles of non-volatile metals from the sides and these interfered with the spectrum. After showing the different spectra of the two bodies recently obtained from didymium by means of fractional precipitation, Professor Dewar referred to the spontaneous reversibility of some lines in the spectrum. In conclusion, the lecturer said he had recently received a communication from M. Stas, in which he stated that on repeating some experiments at the request of Dumas, he had obtained potassium in a state of purity never reached before. With the chloride prepared from this pure potassium a remarkable result has been obtained. When chloride of potassium had been employed in spectrum analysis, the distinguishing line of chlorine had previously always been obtained in the potassium spectrum, but with this pure salt no chlorine is visible. Stas also states that he has been examining the spectra of lithium, barium, calcium, strontium and magnesium and has endeavoured to decompose barium in order to see if he could obtain the distinguishing spectra of lithium, sodium or strontium from it. His results have been negative, however, and he has therefore come to the conclusion that these bodies, though possessing some similarities, can never have originated from the same source.

Parliamentary and Law Proceedings.

PHARMACY ACTS AMENDMENT BILL.

HOUSE OF COMMONS.

Tuesday, April 5.

In the House of Commons at an early hour on Tuesday morning, upon the order for the second reading of the Pharmacy Acts Amendment Bill,

Dr. Farquharson rose and said: I rise, Mr. Speaker, to move the second reading of this Bill. Of course at this time of the morning (ten minutes to two o'clock) I shall not go into any details, but I will merely state to the House that the measure is promoted by the Pharmaceutical Society in the public interest. It is very necessary that chemists and druggists who have to make up our medicines should receive a competent training before going up for examination. The general tenour of

the Bill is that the candidates for the diploma of the Pharmaceutical Society shall be obliged to attend lectures upon botany, chemistry, and materia medica, and be compelled to go through a practical training for three years. I submit that this Bill is distinctly in the public interest, and I hope that the second reading may be now agreed to.

The question was then put from the chair, whereupon

Dr. Clark said: Mr. Deputy Speaker, I regret very much that so important a Bill should be brought forward at ten minutes to two o'clock in the morning, and I trust my hon. friend, Dr. Farquharson, will not press the second reading. The object of the Bill is to give additional powers to the Pharmaceutical Society—to give the Society, in fact, powers and privileges with which such a body ought not to be vested. Up to the year 1868 any one could carry on the business of a chemist or druggist, but in that year a register of chemists and druggists was drawn up and an examination was appointed by the Pharmaceutical Society to give a qualification to all who practised as a chemist or druggist. Now the Society wishes to go further; it wishes to be empowered to create a curriculum, and to compel those who desire to trade as chemists and druggists to pass in chemistry, botany and materia medica. If the Society were so empowered the chemist and druggist trade would simply be made a very close corporation, because the chemists and druggists in small towns and poor neighbourhoods would be unable to qualify. In large places like London, Liverpool, Manchester, Glasgow and Edinburgh, where you have courses of lectures on botany, chemistry, and materia medica, it will be quite easy for students to attend the courses and qualify themselves. Up to the present time all you have asked for is that those who practise as chemists and druggists should know something of their business. To go beyond that and allow this body to determine a curriculum and compel persons to go through that curriculum will be to limit the trade to a small number of men who will make a monopoly of it. In the next place I am opposed to the principle of the Bill. I think that all we have to do for the benefit of the public is to see that men who practise as chemists and druggists should pass a proper examination. To allow the Pharmaceutical Society to lay down a curriculum is beyond the province of legislation. By passing this Bill we should be giving up the principle of free trade altogether, and we should be limiting the selling of drugs to a very small and select class. If we intended to grant any power of this kind to any body it ought to be to some public body, and not to a mere society of traders, who can make their own bye-laws, and whose bye-laws would have all the effect of an Act of Parliament. If my hon. friend, Dr. Farquharson, perseveres with this Bill I shall be compelled to endeavour to amend it so as to make the Pharmaceutical Society representative of the 12,000 persons engaged in the chemist and druggist trade, and not merely of the 2000 members of the Society. I beg to move that the Bill be read a second time this day six months. There is no necessity for any change in the present system. The Pharmaceutical Society has passed certain rules or Bye-laws which are practically illegal, and now it is asking this House to give it power which it ought to have possessed before making the Bye-laws.

Mr. H. J. Wilson: I beg to second the amendment.

Upon the amendment being put,

Mr. Chance said: I think we must support this Bill, and for the reason that it will assimilate the English and Scotch law to the law of Ireland. The law in Ireland has undoubtedly worked well. It is said that there is something very severe in compelling attendance at certain lectures before examination and certification. I think, on the contrary, it is very beneficial to the persons concerned. Every one knows that it is a very common practice for men who have to pass examinations to go to some crammer who fills their minds with bits of information, and that governing bodies, knowing that this dangerous practice has to be encountered, are often in the habit of making examinations unnecessarily severe. If, however, governing bodies know that those presenting themselves for examination must have gone through a preliminary course of study, they are more inclined to let the examination partake more of a common-sense examination than otherwise. I do not think the operation of this Bill will work hardly upon any individual. The rights of old practitioners as chemists and druggists are already safeguarded under the main Act, and it is only proper in the interest of the safety of the public that men who have no qualification whatever should not have the right to dispense the most powerful poisons.

Dr. Tanner: Mr. Deputy Speaker, I do not rise for the purpose of opposing this Bill; on the contrary, I mean to support the Bill as far as I possibly can. There are several points in connection with this Bill which have not obtained that amount of due consideration which they are entitled to. At the present time there is a great deal of discontent because the rights of many chemists and druggists have not been properly respected. From time to time I have received communications from chemists and druggists, in which the writers point out that if this Bill is passed without due deliberation and proper debate, they will be placed in a position which it is quite certain that the promoters of the Bill will admit is nothing else but regrettable. I sincerely hope that a compromise may be arrived at. Instead of pushing the second reading of this Bill through the House to-night, perhaps it would be better if it were postponed, say until next Tuesday, or if the House does not adjourn for Easter, until some day next week. When the second reading comes on again, clauses may be submitted which will enable a great number of people who are employed as chemists and druggists—but who might be deprived of the employment by which they now find the means of livelihood—to continue their trade. There are a great many points in connection with this Bill which I should like to bring under the notice of the House, but as the hour is now so very advanced I will not do so. I sincerely trust, however, that the second reading of the Bill will be deferred for some days.

The House divided, when there appeared—

For the amendment	22
Against	76

The second reading was then agreed to.

On Wednesday morning, on the motion for going into Committee on this Bill, at the instance of Dr. Farquharson,

Mr. Hermon Hodge moved the adjournment of the debate. He hoped in doing so that he was not taking any step that might be considered improper; if so, he must plead the excuse of being a new member, though he felt sure that it could not be in accordance with the spirit which regulated the conduct of public business in this country, that a matter of such considerable importance—of such vital importance to those who were affected by it—should be considered at that hour (a quarter past two o'clock) in the morning. He was ignorant of the block having been removed, not being quite familiar with the rules of the House, but he thought he was fully justified, under the circumstances, in moving the adjournment of the debate.

Dr. Farquharson said that the hon. member had anticipated the course he himself proposed to take, which was, upon getting into Committee, to move to report progress at once. He knew that several members interested in the Bill were not present at that hour, and wanted an opportunity of considering their amendments.

Dr. Tanner: After the remarks which have fallen from the hon. member for Accrington (Mr. Hodge), I feel called upon to explain the reason why I, in the first instance, opposed the Bill, and, in the second place, withdrew my block.

The Deputy Speaker: Order, order. The question is

that this debate be now adjourned, and it is to that hon. members must now address themselves.

Mr. Chance considered that the hon. gentleman who moved the adjournment of the debate gave forcible reasons for the course he proposed, but if the hon. member who was moving to go into Committee would move to report progress, and ask leave to sit again on Tuesday, the 19th, it would give an opportunity for any hon. members who wished to put down amendments, or to challenge the principle of the Bill later on. He, therefore, trusted Mr. Hodge would see his way to allow the motion to be negatived on that distinct understanding, so that they could formally go into Committee, and then report progress.

Mr. J. W. Lowther confessed that he did not quite understand the views of the hon. gentleman who spoke last, and trusted that the hon. member (Mr. Hodge) would press his motion to a division.

Dr. Tanner would support the motion for the adjournment. From what he understood of the measure, he was not at all satisfied with it.

Dr. Clark thought his hon. friend, the member for West Aberdeenshire (Dr. Farquharson), might accept this motion. The Bill was only brought forward in the early hours of the previous morning, and it was a very important measure, affecting thousands of people whose livelihood might be taken away altogether. It was most desirable, therefore, that adequate opportunity should be afforded for considering it.

Mr. Biggar was very strongly in favour of the adjournment on the particular Bill at that particular time, and, therefore, as a matter of Parliamentary tactics, would advise the hon. member to persist in his motion.

The House then divided, when there were—

For the adjournment of the debate . . .	93
Against	29
Majority for	64

The debate therefore stood adjourned, the Committee being fixed for Tuesday, the 19th inst.

Obituary.

Notice has been received of the death of the following :—

On the 19th of January, Mr. Richard William Spindelow, Chemist and Druggist, Horne Street, Liverpool. Aged 72 years.

On the 3rd of March, Mr. William Cartwright, Pharmaceutical Chemist, Ironmarket, Newcastle-under-Lyme. Aged 67 years. Mr. Cartwright became a Member of the Pharmaceutical Society in 1844, and for many years filled the office of Local Secretary to the Society.

On the 21st of March, Mr. John Price Jones, Chemist and Druggist, Aberayron, Cardiganshire. Aged 64 years.

On the 31st of March, Mr. William Kitchin, Chemist and Druggist, King Street, Whitehaven. Aged 80 years.

BOOKS RECEIVED.

Scalella Chemica. A Series of Aids for Beginners in Chemistry. By Huskisson Adrian, M.A. Part I.—Analysis of Simple Salts. London: H. K. Lewis 1887. From the Publisher.

Handbuch der Allgemeinen und Speciallen Arzneiverordnungslehre. Edited by Dr. C. A. Ewald. Eleventh Edition. Berlin: A. Hirschwold. 1887. From the Publishers.

Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures and Condition of the Institution, for the year 1884. Part II. Washington. From the Board.

Correspondence.

**** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

The Benevolent Fund.

Sir,—I am one of the multitude who do not contribute to the Benevolent Fund. I have no desire to air my reasons just now, but I think Mr. Snell's suggestion a very good one, and its adoption would certainly draw a subscription from me.

St. Anne's School, as taking both boys and girls, and the expenditure per head being about half that of Christ's Hospital, should have the preference.

The Pharmacy, Redhill. Thomas Padwick.

Australasia.

Sir,—I am always much interested in anything that appears in your columns on our colonies, and the extract from a letter sent you by Mr. Priest last week was no exception. There is one sentence, however, in his letter which I should like to qualify slightly. He says, "all that is necessary at the start is a little money," etc. Now my sincere advice to any young man (having money) who contemplates emigrating to the colonies is to leave it at home for a few years. Let him serve some time as an assistant, so as to accustom himself to the ways of the country and its people, and guard himself against the pitfalls and temptations which are systematically laid for "New Chums" who are known to have a little money. Some young men feel inclined to emigrate to Australia in order to avoid the examinations at home. This again is a great mistake. I believe chemists in the larger cities and towns of Australia and New Zealand will compare very favourably with their fellow-tradesmen at home, both as to business tact and technical knowledge. The proper place for young men of that class is the Western States of America. There, it is by no means an uncommon thing to find an unqualified doctor and an unqualified chemist "running" a successful business together. Indeed, I have seen many a young unqualified druggists' assistant from the old country taken in hand by some other tradesman in the town, who knows nothing of drugs, and in partnership run a drug store. In addition to the privilege of being a partner in the firm, he will be styled "Doc." by a part of his customers, and his Christian name by the remainder. He can also, if successful, do up his place in American style in white and gold and marble, and go in for the delight of the American druggist, a handsome soda water fountain in the centre of his store. One more suggestion. Let no man emigrate late in life, not after say thirty-five, certainly not after he is forty years old. I have met men in Australia, New Zealand, the United States, and Canada, and they all seem to me to be unanimously of this opinion. They say that once a man exceeds forty he makes a poor colonist, because he finds it very difficult to accommodate himself to the new conditions that surround him, and is consequently dissatisfied and unhappy. I would again repeat (1) Leave your money at home for a time, until you know the country. (2) If you are going to Australia, pass your examination before you go. (3) Do not emigrate late in life. For young men who are prepared to rough it for a few years, the prospects in our colonies are decidedly better than those at home, but before leaving they must prepare themselves for two important factors which they will have to contend with, "Less social comforts," and "The love of home."

Llanelly, South Wales. Gwilym Evans.

Erratum.—On p. 817, col. ii., the name of the author of the "Note on Water Softeners" should have been printed "E. J. Millard" instead of "J. T. Millard."

A. W. Forster—Vapor Acidi Benzoici, Throat Hospital.—Benzoic acid, 3 grains; kaolin, 12 grains. Rub together, and add water, ½ ounce; tincture of tolu, 18 minims. Shake and make up with water to 1 ounce.

Communications, Letters, etc., have been received from Messrs. Gibbs, Bell, Condy, Waldau, Hunter, Kirkby, Forster.

THE PHARMACOPŒIAL TEST FOR THE PURITY OF ETHER.*

BY PROFESSOR DUNSTAN AND THOMAS S. DYMOND.

In the recent edition of the British Pharmacopœia, under the heading of "Æther Purus," a new test of purity is described. "When shaken with a fourth of its bulk of solution of potassium iodide and a little starch paste, no blue colour is produced." In the reprint of the British Pharmacopœia which has lately been issued, the words "little or no" are inserted after the words "starch paste." The test doubtless takes its origin in a paper by Warden (*Pharm. Journ.*, [3], xv., 521), in which he states that commercial specimens of ether frequently liberate iodine from potassium iodide, and when digested with solid potash yield a yellow incrustation. From these facts he infers that aldehyde is present, which, if true, would be of considerable medical importance. Now although the action of potash might possibly afford grounds for the supposition that aldehyde exists in the ether, the fact of the liberation of iodine from potassium iodide cannot be held to do so, since aldehyde is without action on this salt. Nevertheless it appears that the test was introduced into the Pharmacopœia as a safeguard against the presence of aldehyde. On these grounds, E. Werner (*Pharm. Journ.*, [3], xvi., 660) has already justly criticized and condemned the Pharmacopœial test. He regards the liberation of iodine from potassium iodide as the result, not of an actual impurity in the ether, but of its decomposition under the influence of air and light, whereby ozone is formed. This hypothesis was propounded many years ago by Schönbein, but Werner does not adduce any further experimental evidence in its support. We find that the following are the principal statements that have been made with regard to the liberation by ether of iodine from potassium iodide.

E. Ferrière (*Journ. Pharm. Chim.*, [4], xvi., 107) alleges that ether at once liberates iodine from a strong solution of potassium iodide, and slowly liberates it from a dilute solution.

Buchner (*Chem. Zeit.*, ix., 69) states that ozone is rapidly formed when ether is exposed to light, and that this body is the cause of the liberation of iodine.

Kingzett has alluded to this action in several papers. We have not been able, however, to find that he has given any details of his experiments, which are said to prove that hydrogen peroxide is formed, as well as acetic ether, when air is passed through ether. The intermediate formation of acetyl peroxide is assumed to account for these results.

A consideration of these different statements convinced us that the reaction had not yet been fully investigated, and that there was a necessity for further experimental work. The investigation of the subject presents many practical difficulties, but we have obtained results sufficiently definite to enable us to draw some interesting conclusions.

At the commencement of the work we put before ourselves the following questions which appeared to us could be answered by a direct appeal to experiment:—

1. Does "pure ether," that is ether freshly prepared, having a specific gravity of 0·730 and a boiling point of 35° C., liberate iodine from potassium iodide?

2. Does such ether when exposed to light and air undergo a decomposition in which some substance capable of liberating iodine from potassium iodide is formed? and if so, what is the nature of the substance?

3. (In the event of these questions being answered in the negative). What is the nature of the impurity that exists in some specimens of ether which is able to liberate iodine from potassium iodide?

1. *The Action of Ether on Potassium Iodide.*—We find that "pure ether" does not immediately liberate iodine from a very dilute solution of potassium iodide. Ten cubic centimetres of ether mixed with 10 cubic centimetres of water containing two or three drops of a 10 per cent. solution of potassium iodide (the strength of the solution of the Pharmacopœia) causes no immediate liberation of iodine; that is, the mixture after being shaken will not become yellow after a few minutes, although after a longer time a faint yellow tinge will be observed. We prefer not to use starch as an indicator of the free iodine, for if the mixture is contained in a test-tube, any formation of yellow colour is quite perceptible. If diluted sulphuric acid is added to the mixture, the liberation of iodine takes place more rapidly. If stronger solutions of potassium iodide are used, the liberation of iodine also occurs more rapidly. In fact our experiments show that the amount of iodine liberated in a given time is dependent on the strength of the solution of potassium iodide which is used. A strong solution of hydriodic acid is rapidly attacked by ether and iodine is liberated. In these cases it seems probable that butane is formed, in accordance with the reaction discovered by Frankland during his investigation of the action of light on ethyl iodide. The reaction of ether with potassium iodide and hydriodic acid is much accelerated by light, and it is a matter of common knowledge that even a solution of pure potassium iodide is slowly decomposed, with liberation of iodine, when exposed to sunlight. It ought to be observed that the amount of iodine which is immediately liberated by ether from a solution of potassium iodide is small, but yet this quantity would be indicated by the Pharmacopœial test; at any rate, as that test was first given in the Pharmacopœia. The ether used in these experiments had been prepared in the usual way from alcohol and sulphuric acid, and in addition to the ordinary purification had several times been washed with water and redistilled.

2. *The Action of Oxygen and Light on Ether.*—A bottle half full of "pure ether" was exposed to direct light for two months; it did not after this exposure act on a dilute solution of potassium iodide. An experiment made with pure ether and water gave the same negative result. In order to fully investigate the action of oxygen on ether the following experiments were made. Through 200 c.c. of ether 8 litres of air were slowly passed. No iodine-liberating body was formed. The experiment was repeated using warm ether saturated with water, but still the ether did not react with potassium iodide, neither did it after the passage of air had been continued for some hours. In these experiments an india-rubber connection had been used in the apparatus, and since contact with india-rubber immediately destroys

* Read before the Pharmaceutical Society of Great Britain at an Evening Meeting in London, Wednesday, April 13.

ozone, an apparatus was constructed entirely of glass, and oxygen was used instead of air. The ether saturated with water was contained in a retort connected with a condenser. It was warmed to about 30° C. and oxygen was passed through it in a regular stream during two days, the ether which distilled being repeatedly returned to the retort. About 200 litres of oxygen were used. Now, if the ether had reacted with the gas at all under these conditions a considerable quantity of the iodine-liberating body would have been formed, but we found that it was unaffected by this treatment as regards its action on a dilute solution of potassium iodide. Although this experiment had been conducted in day-light, the ether was further exposed for one month, after which time no iodine-liberating substance had been formed. In other experiments ether acidified with dilute sulphuric acid was used, but these also gave negative results. Some commercial specimens of ether were slightly acid in reaction, and became more so when kept. In consequence of this, unless they were first neutralized they liberated a small quantity of iodine from the potassium iodide solution.

We have also examined a specimen of "pure" ether which had been exposed to light for about ten years in the Museum of the Pharmaceutical Society. This specimen acted slowly on strong potassium iodide solution, but did not contain a trace of hydrogen peroxide.

3. *The Nature of the Iodine-liberating Compound in certain Specimens of Ether.*—In the course of one experiment we observed that some specimens of commercial ether reacted at once with a dilute potassium iodide solution, and the mixture rapidly became dark yellow. The specimens which reacted most powerfully had been derived from methylated spirit. It was evident in these cases that some form of "active oxygen" was present, either ozone or hydrogen peroxide. It is highly improbable that ozone exists in ether, first, because conditions analogous to those under which it is known to be formed do not obtain here, and secondly, because Berthelot has shown that ozone powerfully attacks ether, forming a new compound, ethyl peroxide. Yet we thought that this was a convenient opportunity to settle once and for all whether ozone was actually present or not. There were three reactions of which we took advantage to determine this:—(α) Metallic mercury or silver instantly decomposes ozone, but these metals only slowly withdraw the active oxygen from hydrogen peroxide. A specimen of the impure ether was shaken for a few seconds with metallic mercury and then filtered, the filtrate liberated iodine to the same extent as the original ether. The ether was subsequently allowed to remain in contact with the mercury for some hours, during which the ether slowly lost its power of liberating iodine. (β) A dilute solution of hydrogen peroxide is rapidly decomposed when it is warmed or allowed to stand with an alkali. Ozone is unaffected by an alkali. This distinction is somewhat difficult to apply when ether is present, and in consequence is perhaps not wholly conclusive. Some of the impure ether was warmed with a solution of sodium carbonate, and the escaping gas was passed into a solution of potassium iodide without producing any effect. The ether which remained did not liberate iodine from dilute potassium iodide. These two results pointed to the absence of ozone, and to the presence of hydrogen peroxide. The existence of hydrogen peroxide was conclusively proved by its unique reaction with chromic acid. (γ) About 20 c.c. of the impure ether were added to about half the quantity of a very dilute solution of potassium chromate acidified with dilute sulphuric acid. After shaking the mixture the ether separated of a deep blue colour, owing to the formation of the so-called perchromic acid. It was then shown that the impurity in ether which liberates iodine from a dilute solution of potassium iodide is hydrogen peroxide. It is present, however, to a very small extent; 100 cubic centimetres of the specimen which gave the strongest indications with chromic acid, when mixed with dilute sulphuric acid, liberated an amount of iodine which corresponded with ·04 per cent. of H_2O_2. The specific gravity of this specimen was ·741, and its boiling point was 34° C. Ether prepared from methylated spirit, and purified by the process of the Pharmacopœia, did not at first contain any hydrogen peroxide, but after it had been kept for some days traces of this substance had formed. Light does not appear to be essential to the production of the peroxide, for in this case the specimen had been kept in a nearly dark cupboard. It is next to impossible to determine the nature of the substance produced during the preparation of ether which gives rise to the formation of this small quantity of hydrogen peroxide, on account of the many and unknown bye-products of the reaction of sulphuric acid and alcohol. Possibly it may be a minute quantity of the remarkable substance obtained by Legler (*Ann.*, ccxvii, 381; *Ber.*, xiv., 602), by imperfectly oxidizing ether at a low red heat, and which is capable of yielding hydrogen peroxide We have obtained from the specimen of impure ether, by spontaneous evaporation, a pungent residue containing hydrogen peroxide, which acted powerfully on potassium iodide.

This impurity, whatever may be its nature, can be removed from the freshly distilled ether during the process of manufacture by using more than sufficient lime to completely neutralize the acid distillate, and subsequently twice washing the purified ether with alkaline water. Ether carefully prepared in this way does not develop any hydrogen peroxide when it is kept.

The results recorded in this paper enable us to draw the following conclusions, namely:—

Ether prepared from sulphuric acid and alcohol liberates iodine from strong solutions of potassium iodide, and very slowly from dilute solutions. The reaction is accelerated by the presence of acid.

Neither ozone nor hydrogen peroxide is formed under ordinary atmospheric conditions by contact of pure ether with air even when exposed to light.

Some commercial specimens of ether contain an impurity which forms hydrogen peroxide after a short time. If it is thought desirable to guard against the presence of the minute quantity of this substance which is formed, the present Pharmacopœial test should be superseded by the application of the chromic acid reaction for hydrogen peroxide, and it should also be provided that the specimens do not leave any pungent or acid residue when spontaneously evaporated. Although such specimens of ether would act on potassium iodide, yet it is best not to specify this as a general test for impurity, since all ether prepared from sulphuric acid and alcohol, however carefully purified, is liable

to react in the same way, unless the solution of potassium iodide used is very dilute.

From these experiments it is clear that ether prepared from sulphuric acid and alcohol, and carefully purified by the Pharmacopœial process until it has the proper specific gravity and boiling point, is able to slowly act on potassium iodide. If this is due to a persistent impurity, its quantity must be exceedingly small, since it has no effect on the specific gravity or boiling point. It appeared, however, to be of interest to ascertain if ether prepared by an entirely different reaction also liberated iodine. Ether was prepared by the reaction of sodium ethoxide and ethyl iodide—

$$NaOC_2H_5 + C_2H_5I = (C_2H_5)_2O + NaI.$$

When shaken with a ten per cent. solution of potassium iodide it did not liberate iodine until it had stood for three hours, and then only traces were set free. Hydriodic acid at once caused the liberation of iodine. From this it seems that ether prepared from ethyl iodide does not act on potassium iodide. The action of hydriodic acid on this specimen suggests whether the action which occurs when ether prepared from sulphuric acid is used may not be due to the presence of a minute quantity of some substance which can form hydriodic acid from potassium iodide, possibly ethyl sulphate.

[*The discussion on this paper is printed on p.* 849.]

THE PHARMACEUTICAL PREPARATIONS OF ATROPA BELLADONNA.*

PART III. SUGGESTIONS FOR STANDARD GALENICAL PREPARATIONS.

BY PROFESSOR DUNSTAN AND FRANCIS RANSOM.

Before any proposal can be made to introduce into the British Pharmacopœia standard galenical preparations of potent drugs, that is preparations which contains a constant quantity of the active principle or principles, we require to know (i.) how to accurately estimate the quantity of the active principle in the crude drug from which the preparations are to be made; (ii.) what solvent ought to be used to extract the active constituents; (iii.) what part of the plant is best used; (iv.) what physical condition of the preparation is most compatible with the production of a standard preparation; and (v.) how to estimate the quantity of the active constituents in the preparations. Further, there remain several practical details to be considered and investigated. This work has already been carried out by one of us as far as *Strychnos Nux-vomica* is concerned, and standard galenical preparations are now included in the British Pharmacopœia. During the past three years we have been engaged in the investigation of *Atropa belladonna* and its preparations. We have devised methods for estimating the quantity of the isomeric alkaloids atropine and hyoscyamine in the root and leaves of the plant as well as in the galenical preparations derived from them. In the present paper we have to record the results obtained from further experiments, and to make some suggestions for standard galenical preparations.

Part of the Plant to be Used.—We propose to use the root for the production of the pharmaceutical preparations. The difference in the alkaloidal value of the root and leaves is not sufficiently great to be of any moment, while the experimental difficulties that arise when the leaves are used, owing to the large amount of colouring matter and fat which are present, completely prevent a preparation of the leaves being made of constant strength by any practicable method. The British Pharmacopœia has already introduced an extract prepared from the root for one prepared from the leaves, and we now suggest that the tincture should also be produced from the root. One advantage of this is that it brings all the pharmaceutical preparations into direct connection with one another.

The Solvent to be Used.—From the analyses of the commercial extract which we have already published it is clear that although the Pharmacopœia directs that rectified spirit should be used as the solvent, alcohol containing much more water than rectified spirit is largely employed. The question for investigation is whether rectified spirit is or is not the most effectual solvent for the alkaloidal salts of belladonna root. This question can only be settled by comparative experiments made with alcohol of different strengths in order to determine what quantity of the salts are extracted from a certain amount of powdered root by these different mixtures of alcohol and water. Our results are shown in the following table:—

No. of experiment.	Proportion of rectified spirit to water.	Per cent. of alkaloid in tincture.	Per cent. of dry residue.	P. c. of alkaloid in dry residue.	Per cent. of alkaloid in extract containing 18 per cent. of water.
I.	100 : 0	0·115	1·96	5·9	5·0
II.	100 : 25	0·172	4·76	3·6	3·0
III.	100 : 33	0·165	5·27	3·1	2·63
IV.	100 : 50	0·160	6·32	2·5	2·12
V.	100 : 60 (Proof spirit)	0·127	8·18	1·6	1·36
VI.	100 : 100	0·105	—	—	—

The finely powdered root (4 ounces) was macerated for forty-eight hours and then percolated with the solvent until 10 fluid ounces of tincture were obtained. Fifty cubic centimetres of the percolate were evaporated to dryness and the residue weighed; the atropine and hyoscyamine were then isolated by the process we have previously described (*Pharm. Journ.*, [3], xvi., 777). From these results it appears that rectified spirit mixed with one-fourth of its volume of water is the best solvent for the alkaloidal salts in belladonna root. It is shown to be a better solvent than rectified spirit alone, and a better solvent than alcohol, which contains more than this quantity of water; in fact as the amount of water is further increased the quantity of alkaloidal salts extracted diminishes, until when equal volumes of spirit and water are used the quantity extracted is less than that by the spirit alone.

Another instructive fact which is brought out by these results shows the fallacy of depending on the specific gravity or on the amount of dry extract yielded by a tincture as a test of its quality or strength. Those tinctures which were prepared with alcohol containing one-fourth of their volume of water would have the highest specific gravities and actually yield the largest quantities of dry extract, while they also would contain the smallest quantity of alkaloid. Column V. well illustrates a point to

* Read before the Pharmaceutical Society of Great Britain at an Evening Meeting in London, Wednesday, April 13.

which we have drawn attention before, namely, that one and the same specimens of belladonna root can be made to yield extract containing an amount f alkaloid varying from 1¼ to 5 per cent. by merely diluting the alcohol which is used for the percolation of the drug.

Preparation of the Standard Extract.—In deciding on the kind of extract which shall be taken as the standard, we have been largely guided by questions of practical convenience. There are two physical conditions of an extract in which it is feasible to standardize it, the semi-solid extract and the dry extract. In the case of nux vomica there is not sufficient difference in the alkaloidal content and in the ratio of alkaloidal salt to extractive matter, in good commercial specimens, to prevent the competent pharmacist from preparing and dispensing a reliable standard extract. With belladonna the case is different, since so far as we have been able to ascertain, the ratio of extractive to alkaloid is subject to considerable variation, and although in case of need it would no doubt be possible to standardize the conventional extract, yet we think on the whole that a dry extract will be more convenient for general adoption. Before such a proposal can be accepted, it must be shown that the alkaloidal salts of belladonna (principally malates) are not affected by the heat necessary for evaporation to dryness. Two specimens of the ordinary extract, which contains about 18 per cent. of water, were prepared, and the quantity of atropine and hyoscyamine estimated in each. They were then evaporated over a water-bath until they ceased to lose weight. From the dry extracts exactly the same amount of alkaloid was isolated as from the semi-solid extract, showing that the alkaloidal salts are not decomposed at 100° C. From a consideration of the average strength of the present extract, we propose that 2 per cent. of atropine and hyoscyamine shall be taken as the standard quantity. No good specimen of belladonna extract by the suggested solvent will ever yield a dry extract which contains less than 2 per cent. of alkaloid. Generally the strength of the dry extract prepared according to the method now proposed will be between 3 per cent. as a minimum, and 5 per cent. as a maximum. To reduce these extracts to the standard strength of 2 per cent. we suggest that a sufficient quantity of powdered milk-sugar should be added. The dry residue is always hygroscopic, but when thoroughly evaporated with powdered milk-sugar it may be kept in a properly closed bottle without any appreciable deterioration in strength. Since this extract is wholly soluble in water, or in the mixture of spirit and water with the aid of which it was prepared, all the preparations of belladonna might be produced from it as a starting point. Or, if it is thought that any advantage is to be gained, the tincture and liniment might be made by diluting the strong percolate which is obtained during the preparation of this extract, as one of us has before suggested for tincture of nux vomica, the other suggested alternative, namely the solution of a definite quantity of the standard extract being, however, we think with justice, adopted in the British Pharmacopœia. Any modification in detail might be adopted by manufacturers on the large scale, since the directions of the Pharmacopœia are mainly intended for the production of relatively small quantities. It is proposed that the tincture shall contain ·034 per cent. of alkaloid, that is, it will be sixty times weaker than the extract, or will contain almost exactly three-twentieths of a grain of alkaloid in one fluid ounce, and the liniment it is proposed shall contain ·2 per cent. of alkaloid. A standard plaster might also be prepared from the standard extract.

Standard Extract of Belladonna.

Take of—

Belladonna root in No. 20 powder	1 pound.
Rectified spirit	48 fluid ounces.
Distilled water	12 fluid ounces.

Mix the spirit with the water. Macerate the belladonna in 2 pints of this mixture for forty-eight hours, agitating occasionally; then transfer to a percolator, and when the fluid ceases to pass continue the percolation with the remainder of the diluted spirit. Afterwards subject the contents of the percolator to pressure, filter the product, mix the liquids, and measure the exact volume of the mixture (*a*). Estimate the alkaloidal nature of this solution by the following method.

Evaporate 50 cubic cemtimetres of the liquid over a water-bath with a gentle heat, until all the alcohol is dispelled. Dissolve the extract thus obtained in about 5 cubic cemtimetres of warm distilled water, acidulated with a few drops of diluted hydrochloric acid; filter, if necessary, through a small fragment of cotton wool; pour into a stoppered glass separator, and add ammonia until the solution is distinctly alkaline. Agitate for a few minutes with 5 cubic centimetres of chloroform, separate, and again wash the aqueous liquid with 3 cubic centimetres of chloroform. Agitate the mixed chloroformic solutions with 5 cubic centimetres of diluted hydrochloric acid, separate, again wash with 3 cubic centimetres of the diluted acid, mix the acid solutions, render alkaline with ammonia, and agitate with 5 cubic centimetres of chloroform. After separation wash the alkaline solution with 3 cubic centimetres of chloroform, mix the chloroformic solutions, evaporate in a dish of known weight and dry the residue, which should be nearly colourless at a temperature of 200° F. (93° C.). The weight of the residue thus obtained multiplied by two will give the parts by weight of the alkaloids in 100 fluid parts of the liquid. The exact volume of this liquid being known and the strength having been thus ascertained, calculate the total amount of alkaloid present therein.

Evaporate to dryness over a water-bath, and add sufficient sugar of milk to make the mixed product exactly fifty times the weight of the total alkaloid found to have been present in the liquid (*a*), allowing for that quantity which was used for the estimation. Mix intimately, powder as quickly as possible in a dry atmosphere, and transfer at once to a well-stoppered bottle. This extract will contain 2 per cent. of total alkaloid.

Liniment of Belladonna.

Take of—

Standard extract of belladonna	3 ounces.
Camphor	1 ounce.
Rectified spirit	24 fluid ounces.
Distilled water	6 fluid ounces.

Dissolve the camphor in the spirit and the extract in the slightly warmed water. When cold mix the two solutions, allow any undissolved sugar of milk present to subside, and pour off the clear liquor, which should measure 30 fluid ounces. One hundred

fluid grains of this liniment contain $\frac{1}{5}$ grain of total alkaloid, that is ·2 per cent. of atropine and hyoscyamine.

Tincture of Belladonna.

Take of—

Standard extract of belladonna	148 grains.
Distilled water	4 fluid ounces.
Rectified spirit, a sufficiency.	

Dissolve the extract in the warmed water and then add sufficient spirit to produce twenty fluid ounces. Allow any undissolved sugar of milk to subside and decant the clear solution. One fluid ounce of this tincture contains $\frac{3}{20}$ grain of total alkaloid. One hundred cubic centimetres evaporated to dryness in the water-bath will leave a residue containing ·034 grain of atropine and hyoscyamine, these alkaloids to be isolated by the process we have previously described.

[*The discussion on this paper is printed on p.* 849.]

HUECHYS SANGUINEA: DOES IT VESICATE?*

BY JOHN MOSS, F.I.C., F.C.S.

On January 13 of this year, there appeared in the London drug market a fly, which was catalogued as "Chinese Cantharides." Hong Kong was the port of shipment. The appearance of the fly was sufficiently remarkable, and it may be described briefly as a Coleopterous insect, from twelve to fifteen-sixteenths of an inch long (*Cantharis* is ten to fourteen-sixteenths) with a vermilion-red abdomen and dull blackish-brown thorax and wing cases. It has also very large and prominent eyes, two large vermilion cordate spots symmetrically placed behind the head, and a keel-like protuberance of the same colour between the eyes, but rather below them. It has the smell of cantharides.

It is *Huechys sanguinea*, and in an extract from Dr. Porter Smith's 'Chinese Materia Medica,' for which I am indebted to Mr. E. M. Holmes, it is thus referred to:—

"Red Lady Bug (*Hung-liang-tsze*).—This insect, found upon the ailanthus and several other trees at Hankow, is a sort of red cicada, making a grinding noise. It has a red body and dark wings, and is collected in large quantities by the country people for the druggists, who use them as blistering flies. They are much less powerful than the *Mylabris Cichorii*."

As we are practically dependent on *Cantharis* and *Mylabris* for blistering effects, any new agent by which similar effects may be produced is sure to excite interest. A small sample was obtained, and more than half of it (5·574 grams) was treated as for liq. epispasticus, B.P. When applied to the arm the liquor produced no blister and apparently no other effect. The powdered flies were then completely exhausted with acetic ether and the whole of the liquid evaporated and the residue dried till the weight was constant at 1·864 gram, or 24·61 per cent. The residue was heated with carbon bisulphide and 1·667 gram (22 per cent.) was obtained of a brown granular fat, having the consistency of dripping and melting at 80° F.

The part insoluble in carbon bisulphide, when collected with acetic ether, filtered, evaporated and weighed gave 0·189 gram (2·495 per cent.) of a yellowish oily looking body, of a non-crystalline character. This acted as a mild rubefacient when applied to the skin of the upper arm. It is sparingly soluble in ether, partly soluble in chloroform, and readily soluble in alcohol. It is neutral to litmus and melts at 79° F.

As it has happened ere now that the oil of cantharis when removed by carbon bisulphide has taken away with it a considerable amount of vesicating principle, the oil from *Huechys* was tested, but with a negative result. It is also on record that sometimes the cantharidin is so associated in Spanish flies that ordinary solvents fail to remove it, and it is very necessary to use an alkali in order to bring it into a tractable condition. To make assurance doubly sure therefore the treated *Huechys* was made into a paste with strong caustic potash solution and dried; after drying it was neutralized with dilute hydrochloric acid and again dried, powdered and exhausted with acetic ether. A yellow residue was obtained quite destitute of even rubefacient power.

Assuming then that the insects experimented upon were mature, as I believe them to have been, and the vesicating properties were fully developed, *Huechys sanguinea* will not be a useful addition to our materia medica.

* Read before the Pharmaceutical Society of Great Britain at an Evening Meeting in London, Wednesday, April 13.

NOTE ON HENNA LEAVES.

BY C. J. S. THOMPSON.

The leaves of the *Lawsonia alba*, known in the East as henna, rank amongst the oldest of the vegetable dyes used by the ancients. They have been employed as a dye for centuries in Egypt, and are still held in repute and extensively used by the Arabs. They are principally used by the women, who stain the palms of their hands, the tops of their fingers and nails, also by the men for dyeing their hair and beards a dark orange colour.

Still further East, in Persia, they are used to dye leather and the tails of the horses, which are often decorated in divers colours.

Henna was known and used by the Jews, and we find allusion made to it several times in the Old Testament.

The *Lawsonia alba*, or *L. inermis*, belongs to the natural order Lythraceæ, and is a shrub that grows abundantly in the countries of the East. It does not appear to possess many medicinal properties, beyond the leaves being astringent, owing to the amount of tannin and gum they contain. It is stated that the powdered leaves, formed into a paste with oil, and applied externally, give relief to headache. The leaves are small, and somewhat leathery in texture, are oval in form, with entire margins. The dried leaf when broken has a brittle fracture, and a section examined by the microscope exhibits the cells crowded with the brown colouring matter. This colouring matter may be very easily extracted, it being almost entirely soluble in hot water.

The leaves should first be reduced to a coarse powder, then macerated for two or three hours in boiling water, and strained. Boil the residue in two or three successive quantities of water till thoroughly exhausted, mix, and evaporate the strained liquors.

They will be found to yield from 12 to 15 per cent. of a dark brown gum.

This brown gum is readily soluble in hot water, glycerine, strong solutions of potash and ammonia and dilute acids, but very slightly in ether, chloroform or alcohol.

The colour of the watery solution is intensified by alkalies and diminished by strong acids. It turns black on addition of ferric salts. The leaves also yield 2 per cent. of an olive green resin that is soluble in ether and alcohol.

The following rough method is employed by the Arabs in preparing henna for their use.

The leaves and young twigs are dried and powdered, then allowed to stand for some days moistened with water. The mass is afterwards boiled with more water for some hours, and this decoction is diluted or not, according to the shade of colour it may be desired to produce.

THE CHARACTERS OF OLIVE OIL.

BY A. LEVALLOIS.

In a communication recently made to the Academy of Sciences* the author gives some of the results obtained in an investigation undertaken at the Agricultural Station, Nice, upon the products of different varieties of olive trees in the south-east of France and as to the modifications in the composition of the olives. The investigation lasted during the whole time of collection in the district, a period of seven months, and placed at the disposition of the author a certain number of samples of oils prepared from olives differing considerably in their maturity and origin. The indisputable authenticity and variety of these samples induced him to commence an examination of some of their properties, especially those that might serve as a guide to the analyst. The oils had been obtained by crushing the olives and pressing the paste, without the addition of water.

Intensity of Colour.—This was determined by means of Duboscq's colorimeter. It was found that an oil from one and the same variety might at the end of the harvest be seventeen times less coloured than at the commencement.

Density.—The density of all the oils varied only between 0·9167 and 0·9177 at the temperature of 13° C. The highest of these figures was given by "Blanquetier" oil, a variety appearing to deviate generally in its characters from other olive oils. The oils from any single variety, prepared at different times, presented only very slight differences. Constancy in density would therefore be a very valuable character that would assist considerably in distinguishing olive oils from other oils. Some of the most important of other commercial oils were also examined; it was not possible to prepare them in the laboratory, but the conditions under which they were obtained allow of their being considered pure. Whilst an olive oil showed a density of 0·911 at 24° C., the following figures were obtained for different oils at the same temperature:—

Sesame oil	0·917
Cotton-seed oil	0·9165
Arachis oil	0·912
Poppy-seed oil	0·9205
Colza oil	0·910
Camellia oil	0·920
Linseed oil	0·928

The density of arachis oil and that of colza oil are near that of olive oil; but in their other characters these oils differ so widely that it would be impossible to confound the three products.

Action of the Reagents of Cailletet and Audoynaud.—Cailletet's reagent (commercial nitric acid, containing nitrous fumes) gave with various samples of olive oil a green coloration, but this colour was not always pure. The "Blanquetier" oil, notably, gave a green charged with yellow. The reaction indicated by Audoynaud, that of nitrosulphuric acid and ether upon oil containing potassium bichromate, most frequently gave a free green coloration; in some cases the tint was mixed with yellow. An "Arabanier" olive oil, prepared on April 3, was coloured a yellow-green.

Action of Bromine.—The two methods for the determination of non-saturated fatty acids by the absorption of bromine by the unsaponified oil, which have recently found application in England, have yielded to their authors results that presented considerable divergencies and anomalies. In measuring the absorption of bromine by various oils M. Levallois adopted the following method of operating, which was found to be very rapid:—5 grams of oil was weighed into a test-tube about 15 cm. long and 15 mm. in diameter, and to this was added 10 c.c. of a 20 per cent. solution of potash in 93° alcohol. Upon agitation the oil dissolves; the tube is then closed imperfectly and heated in a water-bath to a temperature sufficient to produce a slight ebullition of the solution. At the end of a quarter of an hour the saponification is completed. In operating upon olive oil the volume of the liquid is brought up by means of alcohol to 50 c.c. Of this alcoholic solution 5 c.c. is placed in a glass-stoppered tube, acidified with hydrochloric acid, and then by means of a graduated burette, aqueous solution of bromine, as concentrated as possible, is poured into the tube. After each addition the mixture is briskly agitated, and the addition is stopped when the liquid takes a persistent light yellow tint. The correction necessary to obtain a distinctly perceptible tint is about 0·1 c.c. The action of bromine on the non-saturated acids thus set free has been found to be sensibly constant under the conditions indicated. The titration of the bromine solution is made with 10 c.c. of a 1 per cent. solution of arsenious acid in water acidulated with hydrochloric acid. In making a series of estimations it is necessary to repeat the titration from time to time, as loss of strength is continuous.

This method, applied to the determination of the non-saturated acids contained in seven samples of oil from the same variety of olives, prepared during a period extending from the 27th of November, 1885, to the 4th of June, 1886, showed only insignificant differences; the minimum absorption by one gram of oil having been 0·512 gram of bromine, and the maximum absorption 0·522 gram. Comparative experiments with oils from different varieties of olives from the Alpes-Maritimes, Var, and Vaucluse departments, gave absorptions varying between 0·500 gram and 0·544 gram. This latter figure was given by the "Blanquetier" oil, which in this, as in other respects, differed from other olive oils.

The quantity of bromine absorbed by one gram of oils from other sources was as follows:—

	Gram.
Cotton-seed oil	0·645
Sesame oil	0·695
Arachis oil	0·530
Poppy-seed oil	0·835
Colza oil	0·640
Camellia oil	0·817
Linseed oil	1·000

Excepting that which relates to arachis oil, these figures differ notably from those obtained with olive oil. But in these estimations arachis oil could not be confounded with olive oil, because the solution of its soap in the 50 c.c. of alcohol solidifies almost immediately at a temperature of 15° C., whilst that of the soap prepared from olive oil remains limpid.

It may be inferred from the foregoing that the most constant character of olive oil prepared in the laboratory is its density. The absorption of bromine by the fat acids of the sapouified oil, which is nearly constant for the same variety of olives gathered at widely separated periods, and presents a variation of about 9 per cent. in the kinds studied, can be utilized to distinguish varieties of olive oil (at least those of the south-east of France) from cotton-seed, sesame, poppy-seed, colza, camellia and linseed oils. Arachis oil is recognized easily by the solidification of its soap.

* *Comptes Rendus*, civ., 371.

The Pharmaceutical Journal.

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Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

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AN AMERICAN VIEW OF THE FUTURE OF PHARMACY.

THE opening of the various colleges of pharmacy in the United States last month has been celebrated, as is usual on such occasions, by the delivery of valedictory addresses, in which the graduates are congratulated on the successful termination of their studies, and offered some parting advice concerning their future conduct in the occupation they are entering upon. Several of these addresses have been published in the American pharmaceutical journals, and while they are generally well worth perusal, there is one, delivered by Professor C. O. CURTMAN, at the St. Louis College of Pharmacy, which is particularly worth referring to, because it deals with various matters of what may be called trade interest, which are also at the present time attracting considerable attention on this side of the Atlantic. It may be gathered from the tenour of this address that some of the difficulties and perplexities encountered here by those engaged in the drug trade have also made themselves sensible among our American brethren, and that the question how to make a living by the practice of pharmacy has there, as well as here, become one of urgency in the present, and of doubt as to the future. In a general way the practical conditions under which business is carried on in both cases do not appear to differ very materially, though there is one marked characteristic referred to by Professor CURTMAN, as applying to the future pharmaceutical practitioners in America, which does not obtain as yet with us, viz., systematic education. Hence, in addressing the graduates of the St. Louis College of Pharmacy, on entering the ranks of the profession they had chosen, he was enabled to speak of them as having been invested with all the rights and privileges a careful collegiate education could bestow, and as having had the seal set upon their proficiency after years of studious application and careful training. In other respects, however, the pinch of competition appears to have been felt as keenly in America as it has been here, and the decay of trade resources resulting from alteration of habits and opinions seems to have been no less pre-judicial. For this reason Professor CURTMAN was induced to abstain from the attempt to depict to the graduates in the rosiest hues the brilliant prospects of a pharmaceutical career, the high esteem and the great rewards in store for them in acknowledgment of their conscientious zeal, and in place of such encouragement to substitute as more advantageous a glimpse at less flattering realities and a warning against immoderate expectations or delusive hopes.

As to the condition of the business upon which the graduates were entering, the account given is that on all sides complaints, sometimes loud and bitter, are to be heard of dull times, falling off in the anticipated profits of legitimate business and energetic denunciations of the agencies supposed to be the cause of the widespread discontent. The results of the last few years appear to have been generally unsatisfactory. While all agree that the prescription business is considerably less than in former times, the main falling off has taken place in the sale of those articles which are neither drugs nor medicines, though they have for some time past formed no inconsiderable portion of the stock in trade of the druggist. Patent medicines, once in favour and commanding a ready sale, either cumber the shelves as out of date, or if still in demand have been brought down by competition to prices that render the profits insignificant. Articles of "elegant pharmacy," from which so much was expected, after the short-lived spurt following the visits of travellers to physicians, have in time given place to the last new thing and become almost absolutely unsaleable. Toilet articles, perfumery, and the manifold sundries which so long adorned the show cases of drug stores are no longer sought for there by purchasers, but have been almost entirely monopolized by the dry goods stores. The complaints thus formulated in reference to the state of the trade in America constitute almost an echo of what is constantly heard at home, and this fact gives especial interest to the expression of opinion as to any feasible means of providing a remedy for a state of things so discouraging. It is in this respect that the address we have referred to appears to have unusual importance. There is no indication in it that those who suffer more or less from the untoward influences of the present should fold their hands in listless inactivity to watch for the fulfilment of the gloomy prophecy that pharmacy is gradually but irrevocably doomed to extinction, and in examining the various and often conflicting counsels that are offered there is at the same time an evident recognition of the necessity for keeping in view the essential features and requirements of pharmaceutical work. Hence the proposal to extend the catalogue of an already almost endless array of "side shows" to the drug trade is condemned as incompatible with the duties of a pharmacist; more likely to damage his interests by provoking retaliation that may entail still greater loss in lines of trade still held by him

than to be of any permanent benefit. As little favour is shown for legislative enactments by which protective restrictions would be brought to bear, and the Government control by which the practice of pharmacy in some parts of Europe is beneficially regulated is held to be too little in accord with the spirit of American institutions to offer any hope of being applicable. But neither among the proposals that have been offered for improving the existing state of depression in the drug trade of America, nor on the part of the author of the address we are speaking of, is there any sort of suggestion that the educational training of the pharmacist is a qualification that should be dispensed with, or that the necessity of obtaining it is a hardship interfering with his prospects of success in business. On the contrary, it is in virtue of the possession of this advantage, and by the proper application of it, that a prospect is pointed out of effecting an improvement in the conditions of pharmaceutical practice in the future.

In speaking of the change produced in the aspects of pharmaceutical practice by the manufacture on a large scale of preparations that were formerly produced in the laboratory of the individual drug store, a decided opinion is expressed that this system has been carried too far. As regards certain chemicals, it may be justified on several grounds, but not as to galenical preparations used in dispensing physicians' prescriptions, still less for ready made pills, fluid mixtures, emulsions, and ointments, tending to substitute and supplant the extemporaneous prescription entirely, to render any knowledge of compounding superfluous and to reduce the occupation of the pharmacist to one of merely retailing ready made goods. It is in opposition to such tendencies that the skilful and competent pharmacist must bring to bear the knowledge that he possesses and takes advantage of the opportunity he has of convincing physicians that he is competent to manufacture extracts and similar articles of so satisfactory a quality that there is no need of specifying in prescriptions the goods of firms with whom the prescriber can, in most instances, be acquainted only through their general repute, or by the samples pressed on his notice by active canvassers. As for the ready made medicines of all kinds which are, in fact, the negation of pharmacy, the advice given is to avoid them altogether. In regard to this class of articles, it is the duty of the pharmacist to educate the public to the perception of the truth that for various reasons they are not to be trusted, and to urge physicians to discontinue their use. In this sense Professor CURTMAN appealed to the graduates he was addressing, that, educated as they were, and trained in the processes of the pharmaceutical laboratory, they should never for the sake of indolence or convenience encourage the use of such articles. As to the directions in which their energies might be directed for new applications of their scientific knowledge, many might be pointed out which, according to circumstances, would present themselves to the watchful eye of the well-educated pharmacist, and among these there is one field opened up by the change that has taken place in medical opinions and practice for the occupation of which the present time is especially favourable. This is the chemical examination or analysis of water, unwholesome or adulterated food, and other kinds of chemical inquiry connected with questions of sanitation The demand for such work is likely to increase and offer a prospect for remunerative occupation to pharmacists capable of carrying it out. The trade in special articles of food and drink whose absolute purity renders them necessary accompaniments of the treatment of the sick might, for that reason, be undertaken by the pharmacist, and also because his technical skill would enable him to guarantee their quality and purity. Such business would be much better suited to his acquirements than the trade in fancy soaps, perfumery, stationery, cigars, etc. No uneducated shopkeeper could compete with him here, or deprive him of the advantage of possessing the confidence of physicians and of the public. Once fully prepared and acknowledged to be trustworthy, many investigations, now reluctantly made by the busy physician, would be assigned to the pharmacist and bring him adequate remuneration. It is in this way that Professor CURTMAN suggests that the old title of pharmacist, rendered almost obsolete on account of evident inappropriateness, may be revived, and the designation—chemist and druggist—will have a meaning different from that of a mere labourer in chemicals and drugs. Under such conditions we may hope to see again, as in days of yore, rising from the ranks of pharmacists men whose discoveries in science will shed lustre on their profession, and who will prove to the world that pharmacy is neither dead nor going to die.

We have pleasure in calling attention to the First List of Stewards for the Dinner in aid of the Benevolent Fund to be held on the 17th of May, which appears in another part of this Journal. The list, as a preliminary one, is fairly large, but it may be hoped that the Secretary, Mr. Bremridge, will receive from many other gentleman an intimation of their willingness to become stewards, as it is desirable that the movement should be numerously, as well as influentially, supported, so as to ensure the success it so well deserves. It may be added that the liability of each steward is limited to payment for one dinner ticket.

* * *

The next meeting of the Chemists' Assistants' Association will be held on Wednesday, the 20th inst., when a paper on "The Substitutes for Quinine," by Mr. T. S. Dymond, will be read.

Transactions of the Pharmaceutical Society.

EVENING MEETING IN LONDON.

Wednesday, April 13, 1887.

MR. MICHAEL CARTEIGHE, PRESIDENT, IN THE CHAIR.

The last Evening Meeting in London of the session was held on Wednesday, the 13th inst., the chair being taken by the President of the Society at eight o'clock.

The first paper read was on—

The Pharmacopœial Test for the Purity of Ether.

BY PROFESSOR DUNSTAN AND T. S. DYMOND.

The paper is printed on p. 841, and gave rise to the following discussion:—

Mr. Thomas Tyrer expressed his thanks to Professor Dunstan for the explanation of some of the difficulties which manufacturers had encountered. No doubt the extreme care shown by modern pharmacists was to be commended, but it certainly gave manufacturers a great deal of trouble. One of his correspondents had imposed tests for the purity of ether which he (Mr. Tyrer) had from the first declared to be impossible of fulfilment, and he was, therefore, very grateful to Professor Dunstan for having demonstrated that pure ether did liberate traces of iodine when treated with potassium iodide. The further illustration of what might be called the condition of ether as ordinarily sold was also useful, and he had no objection to the imposition of any practicable test, though he protested against hypercriticism on the part of compilers, dispensers and others, and when a test was so delicate that the minutest possible traces of hydrogen peroxide might be developed by it, he thought it would be hardly wise to introduce it into the Pharmacopœia. At the same time, the Pharmacopœia test, particularly as originally described, was now shown to be not only crude, but unreliable. It was this subject which had attracted him that evening, and he might say that his own experience had been to find, after the most careful distillation, nothing which could flatter his scientific ability. He could, at any rate, confirm the first part of Professor Dunstan's statements. He should like him to mention again the precise delicacy of the chromic acid test.

Professor Dunstan said it would certainly show the presence of ·02 per cent. of peroxide of hydrogen. The Pharmacopœia test would show a liberation of iodine with the perfectly pure ether.

Dr. Paul said he made some experiments on this subject when Mr. Warden's paper was first published, owing to some doubts which he entertained as to the accuracy of the statement with regard to the liberation of iodine, having been in the habit of using ether very frequently, together with iodide of potassium, and not having noticed any liberation of iodine. On trying the experiment, even with a strong solution, and exposing it to light he found no liberation of iodine. Only the other day he came across a tube in which a sample of ether had been tested with iodide of potassium which had been standing ever since, and notwithstanding the lapse of time (about eighteen months), and its being exposed to the full sunlight, there had been no liberation of iodine. Following out the subject he had asked Mr. Williams to supply him with some samples of ether, and Mr. Williams sent him some twelve or eighteen different samples. Strange to say, when he came to test them, the highest priced, best, most highly rectified samples all yielded iodine under the test, but the commoner kinds, such as the ordinary methylated ether used for ice making, did not give the slightest trace, even with a strong solution of potassium iodide. It appeared, therefore, that the attempts made to purify ether by rectification or redistillation really developed this iodine-liberating substance.

The President, in proposing a vote of thanks to the authors of the paper, said he sympathized very cordially with manufacturers who were harassed by experimenters possessing a little knowledge, but who were not always so thoroughly versed in experimental work as to be able to follow out the indications of what they thought was an impurity. It was very easy by using many chemical tests, especially those mentioned in the Pharmacopœia and in manuals, to imagine that you had hit upon a great discovery, but it was necessary in the case of all organic bodies like ether, before making any statements as to their purity, that a further examination into the nature of their reactions and the nature of their supposed impurities should be carried out in the manner in which Professor Dunstan and Mr. Dymond had done their work. It was obvious that if the absolute purity of ether were required from manufacturers, it would increase the cost of an important remedial agent, and would be contrary to the interests of the public. Manufacturers were doing all they could to meet the demands for purification within reasonable limits, but to expect absolute purity in all things was about as reasonable as to pass an Act of Parliament that they should all drink distilled water.

The next paper read was on—

The Pharmaceutical Preparations of Atropa Belladonna. Part III.: Suggestions for Standardized Galenical Preparations.

BY PROFESSOR DUNSTAN AND F. RANSOM.

The paper is printed on p. 843, and gave rise to the following discussion:—

Mr. Martindale said the only preparation the authors had not made, the plaster, was one he should like to have their opinion upon, as it struck him that if they used an extractive which contained less percentage of alkaloid, and more of the extractive substances, it would make a less adhesive plaster. The amount of common gummy extractive which might be taken up with a weak spirit would make an extract which, as shown by the table, could be less rich in alkaloid, but would add to the bulk of the plaster without increasing its adhesiveness. Another point which occurred to him was whether, from an economical point of view, it would be wise to use the belladonna root for manufacturing; whether it was not a little extravagant to dig up the roots and use them rather than to allow them to grow a crop of leaves year after year.

Mr. Gerrard thought there might be an objection to the presence of sugar of milk when used for the preparation of belladonna plaster. It would be quite insoluble in the other ingredients, and he had little doubt but that the powdered sugar of milk, being of greater density than the plaster itself, would, in the act of spreading, fall to the bottom of the plaster-spreading machine, so that the first portion of the plaster would receive a coating containing a large quantity of sugar of milk whilst the end would contain the largest quantity of extractive. He did not speak positively, but that was an objection which he thought might occur. He was pleased to hear that Mr. Ransom had obtained a larger yield by using weaker alcohol than rectified spirit, and he knew from his own experience that it gave a much larger yield of extractive. From what he understood of the process, the authors employed two chloroformic extractions, and he should like to know if, by this means, they got the alkaloid in a nearly colourless state, or whether it was nearly brown. It was his experience, in extracting atropine by means of chloroform, that the result was more or less brownish, and he preferred ether as the final solvent. It was not quite so powerful a solvent as chloroform, but it yielded the atropine in a much purer state.

Professor Dunstan then drew attention to some points brought out by the table of results, which showed the rectified spirit of the Pharmacopœia extracted a very small quantity of alkaloid from the root. Up to a certain point a diluted spirit was a better solvent than

rectified spirit alone, and that went on up to twenty-five volumes of water to a hundred of spirit. When that proportion was exceeded, the amount of alkaloid extracted again diminished, until, when an equal volume of water and spirit was used, the same amount only was extracted as by rectified spirit alone. Another column showed the fallacy of depending on the amount of extract as a test of the strength of the tincture. The amount of extract obtained was proportional to the amount of water used. He drew on the blackboard a curve, showing the gradual rise and diminution in the amounts of alkaloids extracted, according to the percentage of water added to the spirit, and then added another curve showing the yield of extractive, by which it appeared that the more water there was added the larger quantity of extract was obtained. Another remarkable point, which he intended to work out further, was the similar results yielded by different powdered drugs. Taking nux vomica, although the salts were entirely different chemically from those present in belladonna root, and were soluble to a different extent in alcohol and water, yet the curve which explained the action of alcohol and water on powdered nux vomica had almost exactly the same form. That pointed to there being some constant feature in the process, and he believed it might be connected with the fineness of the powder. When you packed a percolator with very fine powder and attempted to exhaust it with spirit and water, upon the amount of water reaching a certain point it began to cause clogging, which corresponded to the diminished yield of alkaloid. But whatever the explanation might be it was remarkable that two such different substances as belladonna and nux vomica presented a percolation curve almost precisely similar. He was anxious to learn from any practical pharmacist whether there was any objection to using sugar of milk in the extract of belladonna. There would be no doubt a great gain as far as uniformity was concerned, and he wished to know whether it would interfere in any way with the uses of the extract. As far as he could see it would not.

Mr. MARTINDALE said sugar of milk had been used in America in a number of eclectic remedies when it was found that certain resinous bodies were so soft that they could not be powdered in order to bring them to a solid condition. He was inclined to think that sugar of milk would be for practical purposes about the best substance which could be used. The present extract of nux vomica was in a difficult condition to keep for making pills, if it were of the standardized strength, and probably the use of sugar of milk might be of service, though at present the addition of it would render a person liable to a conviction under the Sale of Food and Drugs Act. On the Continent, and in this country, extracts were produced in a desiccated condition, but there was this disadvantage, that they were very hygroscopic, and as soon as the jars were opened they absorbed moisture to such an extent that they became very inconvenient to dispense.

Mr. ALLEN did not think Mr. Gerrard's objection with regard to plaster-spreading would apply to ordinary dispensing. The great object was not to have the plaster in too liquid a form, and he could not see how the presence of a little finely-powdered sugar of milk could interfere with a good result. He had no experience in plaster-spreading by machine, but probably for that purpose the plaster had to be in an almost liquid condition. That, however, was not the condition in which a dispenser would use an extract in spreading a plaster.

Mr. MACEWAN remarked that the abstracts of the U. S. Pharmacopœia were diluted with sugar of milk. They were dry extracts brought up to a certain strength by the addition of this substance.

The PRESIDENT said this was perfectly well known. The point on which Professor Dunstan desired information was whether any objection had been found to the use of sugar of milk in such things as abstracts, or to any extracts being mixed with sugar of milk.

Professor DUNSTAN said when his paper on nux vomica was read it was suggested that such an admixture should be adopted, but one eminent pharmacist said he should not like to countenance mixing anything with an extract; nevertheless he (Professor Dunstan) did not see why, if uniformity could be thereby attained, this should not be done, provided there were no therapeutical objections.

Mr. PICKARD, as a practical pharmacist, thought there would be certain objections to the root for making the tincture. At present there were two preparations differing very widely both in strength and appearance. It was certainly a great desideratum that the dispenser should be able to ensure uniformity.

Mr. BOWEN said that having found standardized extract of nux vomica rather too thin for dispensing purposes, and of course liable to lose weight and become thicker, simply by the evaporation of the spirit left in it, he had dried the extract and diluted it to the proper strength with sugar of milk, and he found this most satisfactory. There was no reason against doing so that he knew of; he had kept it for some months and found it the most convenient form in which to have extract of nux vomica.

Professor DUNSTAN remarked that the only objection to Mr. Bowen's plan was that he rendered himself liable to a prosecution under the Adulteration Act. If the nux vomica were carefully selected there was no difficulty in getting specimens which would yield a thicker extract. The only objection to the keeping properties of nux vomica extract made from good specimens was that it was liable to absorb a little water. There were only a few specimens of the seeds which gave an exceedingly fluid extract.

Mr. BUTT said the question of liability to prosecution was very important, but he thought if the extract were of standard strength there was nothing to fear from an inert substance being added.

Mr. RANSOM, in reply to Mr. Martindale's observation, said it had been found that belladonna roots which had yielded several crops of leaves were not worth using. They were employed now, but for a standard preparation such as was contemplated they would be of no use whatever. Old roots contained a very small proportion of alkaloid. It was not likely this would supersede the old green extract, for which leaves would continue to be used. As a matter of fact much the largest proportion of roots used was imported from Germany, the small German roots being much richer in alkaloid than the English. In answer to Mr. Gerrard he would say that the residue was nearly colourless if the chloroform were allowed to evaporate spontaneously; if dried at 100° C. it became somewhat brownish, but it had been proved by examination that practically no change takes place.

The PRESIDENT, in proposing a vote of thanks to the authors of this paper, said at present medical practitioners were divided into two schools—those who believed in drugs, and those who did not. Those who did believe in them believed in using them unflinchingly and with courage; but to achieve all that a drug was capable of, it was necessary that the pharmacist should supply a preparation on which the doctor could absolutely rely. Therapeutics could not be advanced unless the pharmacist could put before the physician and experimenter a definite preparation, representing as nearly as possible the conditions in which the alkaloidal constituents existed in the natural root. These preparations seemed to point to the right way of meeting this requirement. It would be a distinct advance in practical pharmacy when preparations of nearly all the more potent drugs were prepared in a condition such as was shown in these specimens, containing a definite quantity of alkaloid, and in a condition as nearly as possible like that in which they existed in the root itself. Their thanks were not only due for this

particular paper, but for the work which was being done on this important subject of standardizing all such preparations.

A paper was then read entitled—

HUECHYS SANGUINEA: DOES IT VESICATE?

BY JOHN MOSS, F.I.C., F.C.S.

The paper is printed at p. 845.

A vote of thanks to the author was passed.

The CURATOR called attention to some specimens of Linimentum terebinthinæ upon the table, which had been sent since the paper on the subject was read. One of these, prepared by Mr. J. Bland, in which the Pharmacopœia instructions as to the quantities and character of the ingredients had been followed, was quite transparent, and formed an elegant preparation; another, in which proof spirit had been used instead of water, also formed a clear liquid, but rather thinner than the last. He also showed a specimen of the green olive oil, presented by the Chiswick Soap Company, and used for the manufacture of the green soft soap. As contrasted with a specimen of olive oil prepared in South Australia, and presumably pure, the colour was so different and so unlike in tint the pale greenish tint of some specimens of virgin olive oil, that he could hardly believe that the colour was natural. In justice to the firm who presented it, he must, however, remark that the oil tasted as pure as the olive oil used for salads and it was evidently purchased with full confidence in its purity. Possibly some of the members present might have seen and examined olive oil of a similar dark green colour. Among the specimens of Chinese drugs on the table, there was a specimen of hemp-seed oil, which did not possess a green colour, and judging from it, it seemed hardly likely, as had been suggested at the last meeting, that the use of hemp-seed oil was the cause of the green colour of some specimens of soft soap, unless indeed the oil became greener under the action of alkalies.

The PRESIDENT said at the last meeting Professor Redwood laid some stress on the question of the kind of soap to be used, and, of course, from that one naturally reverted to the olive oil.

Mr. BRAITHWAITE said within the last fortnight he had had occasion to examine a sample of olive oil very similar in colour to that now shown, but he was not at present aware of its source. In the ash he found considerably more than chemical traces of copper, and, at the same time, he examined a sample of green soft soap, the ash of which also gave indications of so much copper that he thought one was warranted in the conclusion that copper was present not as an accidental impurity. At the same time he examined a sample of yellow soft soap, which gave no such indication.

Dr. PAUL said there was a solution of chlorophyll in oil prepared and sold for certain purposes, whether it was for colouring olive oil or not he could not say, but the colour of this sample was very different from anything likely to be produced even from green olives. Olive oil was generally made from what were called "black olives," the colour of which was a brown rather than green. This sample had more the appearance of chlorophyll green.

The CHAIRMAN asked if Mr. Braithwaite had tried to colour olive oil with a salt of copper.

Mr. WILL said if olive oil were boiled in a copper vessel it would become green after a short time.

Mr. BRAITHWAITE said he had merely had time to detect the presence of copper in the oil. He had not made any further experiments at present, but Mr. Holmes had promised him a sample of this oil, which he would examine.

Professor DUNSTAN suggested that the oil should be examined by the spectroscope, which would at once indicate the presence of chlorophyll by the absorption band.

The PRESIDENT said that would not show whether the chlorophyll were present naturally, or had been added afterwards.

The CURATOR remarked that the green olive oil when shaken up with alcohol yielded hardly any colour to that solvent, and when ammonia was added to the alcoholic liquid, no blue colour was developed, from which he inferred that neither chlorophyll nor copper was the colouring matter of the oil, if any were employed.

The CURATOR then explained the modes of using the Chinese oil seed presses, of the still used for preparing menthol and oil of peppermint, and of the mill used for grinding cosmetics. These models, together with the very interesting collection of Chinese oil seeds and other drugs, had been presented by Messrs. A. S. Watson and Co., of Hong Kong, and it was unfortunate that their London representative, Mr. Talbot, was unable to be present to throw some light on the uses of some of these interesting products. One of the oils and accompanying oil seeds were labelled Chaulmugra, but did not consist of the true Chaulmugra—but of that which appears to be known under that name in China (judging from Dr. Porter Smith's specimens and descriptions on p. 140 of his work on Chinese materia medica), the seeds being those of *Gynocardia antisyphilitica*, Pierre, known in Siam and Singapore as Luceraban seeds. Attention was next directed to a valuable and interesting series of all the Ledger barks cultivated in Java, and to a collection of herbarium specimens of the trees yielding the Tengkawang fats of Sumatra and Borneo, together with specimens of the fats yielded by the seeds; also of a similar collection of the more valuable of the gutta-percha yielding plants of those islands. It was interesting to note that some of the seeds of these trees also yielded fatty substances, specimens of which accompanied the herbarium specimens. With one or two exceptions these trees all belonged to new species recently described by Dr. Burck, and were therefore especially valuable, since they had been presented by him. The Curator said he had learned from Dr. Burck that the best of the gutta-percha trees were already under cultivation in Java. The Dutch Government, with the commendable promptitude which characterized its action in the matter of Cinchona cultivation, has thus set an example which the English Government would do well to follow, since the gutta-percha trees are at present recklessly destroyed and are of very slow growth. The Curator further directed attention to fresh specimens of Bael fruit, presented by Mr. P. W. Squire; a series of the commercial varieties of turmeric, presented by Messrs. Hale and Son, to a specimen of Strophanthin, presented by Messrs. Burroughs and Wellcome; and to a specimen of Umkuhla oil from Natal, presented by Mr. J. Medley Wood, Curator of the Botanic Gardens at Durban, Natal. This oil had been sent in sufficient quantity for experiment. Mr. T. B. Groves, who had some months since examined the oil, believed that it would probably be found serviceable for use in medicine.

PRELIMINARY EXAMINATION.

Tuesday, April 12.

The following are the questions set for the Preliminary examination on Tuesday last:—

LATIN.

(*Time allowed—from* 11 *a.m. to* 12.30 *p.m.*)

I. (*For all Candidates.*) *Translate into Latin*:—

1. The king's daughter fears war.
2. The inhabitants of the town were selling corn to the sailors.
3. Javelins have been thrown by the foot-soldiers into the camp.
4. Which horse of the two has my brother bought?
5. Word was brought to Cæsar that the soldiers were running together to arms.

II. Translate into English, and answer Grammatical Questions on either A. (Cæsar) or B. (Virgil.)

(*Candidates must not attempt both authors.*)

A. CÆSAR.

1. Boios, petentibus Æduis, quod egregia virtute erant cogniti, ut in finibus suis collocarent, *concessit*; quibus illi agros *dederunt*, quosque postea in parem juris libertatisque conditionem, atque ipsi erant, receperunt. In castris Helvetiorum tabulæ repertæ sunt, litteris Græcis confectæ, et ad Cæsarem relatæ, quibus in tabulis nominatim ratio *confecta erat*, qui numerus domo *exisset* eorum, qui arma ferre possent: et item separatim pueri, senes, mulieresque.

2. Quum tridui viam processisset, nuntiatum est ei Ariovistum cum suis omnibus copiis ad occupandum Vesontionem, quod est oppidum maximum Sequanorum, contendere, triduique viam a suis finibus profecisse. Id ne accideret, magno opere sibi præcavendum Cæsar existimabat. Namque omnium rerum, quæ ad bellum usui erant, summa erat in eo oppido facultas; idque natura loci sic muniebatur, ut magnam ad ducendum bellum daret facultatem, propterea quod flumen Alduas-dubis ut circino circumductum pœne totum oppidum cingit.

Grammatical Questions.

(For those Candidates only who take Cæsar.)

1. Decline in full *finibus suis*, and *qui numerus* (Par. 1).
2. Write in full the indicative present and subjunctive perfect of the verbs in italics (Par. 1).
3. Parse *tridui*, *occupandum*, *profecisse* (Par. 2).
4. What is meant by a *deponent* verb? Write out the participles of any two deponent verbs.

B. VIRGIL.

1. Est in secessu longo locus: insula portum
Efficit objectu laterum, quibus omnis ab alto
Frangitur inque sinus scindit sese unda reductos.
Hinc atque hinc vastæ rupes geminique *minantur*
In cœlum scopuli, quorum sub vertice late
Æquora tuta silent: tum silvis scena coruscis
Desuper, horrentique atrum nemus *imminet* umbra.

2. Jura dabat legesque viris, operumque laborem
Partibus æquabat justis, aut sorte trahebat:
Quum subito Æneas concursu accedere magno
Anthea Sergestumque videt, fortemque Cloanthum,
Teucrorumque alios, ater quos æquore turbo
Dispulerat, penitusque alias avexerat oras.
Obstupuit simul ipse, simul percussus Achates
Lætitiaque metuque: avidi conjungere dextras
Ardebant; sed res animos incognita turbat.

Grammatical Questions.

(For those Candidates only who take Virgil.)

1. Decline in full *vastæ rupes*, *atrum nemus* (Par. 1).
2. Write in full the indicative present and subjunctive perfect of the verbs in italics (Par. 1).
3. Parse *viris*, *sorte*, *oras*, *percussus*.
4. What is meant by a *deponent* verb? Write out the participles of any two deponent verbs.

ARITHMETIC.

(*Time allowed—from* 12.30 *p.m. to* 2 *p.m.*)

1. A postman, whose pay for a week is 15*s.*, is fined 1*s.* 6*d.* if he comes in late, and at the end of 13 weeks he receives £8 15*s.* 6*d.* How often was he late?

2. If the product of $\frac{7}{8}$ and $2\frac{1}{4}$ be added to the sum of $21\frac{5}{7}$ and $3\frac{6}{11}$, by how much will the result differ from 100?

3. Reduce £4 17*s.* $3\frac{1}{2}$*d.* to the decimal of a guinea.

4. Find the cost of papering a room 37 feet 3 inches long, 18 feet 4 inches wide, and 14 feet high, with paper 2 feet 4 inches wide, at 6*d.* per yard.

5. If 15 men can do a certain quantity of work in $12\frac{3}{8}$ days of $9\frac{4}{5}$ hours each, how many days of 11 hours each will 9 men require to do $4\frac{4}{7}$ times as much work?

6. Give the English equivalents of the *litre* and *gramme*. If a sack of corn containing 1 hectolitre 20 litres cost 15*s.*, what ought to be paid for a sack of corn containing 3 hectolitres 20 litres?

7. If $5\frac{1}{2}$ per cent. would be gained by selling 121 lbs. for £26 11*s.* $10\frac{3}{4}$*d.*, at what price per lb. must it be sold to gain 12 per cent.?

ENGLISH.

(*Time allowed—from* 3 *p.m. to* 4.30 *p.m.*)

1. What is meant by Adverbial and Adjectival Clauses in sentences? Give one example of each.

2. Analyse the following sentence:—"If anger is not restrained, it is frequently more hurtful to us than the injury which provokes it."

3. Parse the following sentence:—

"Sundry blessings hang about his throne,
That speak him full of grace."

4. In the following passage supply the necessary capital letters, and put in the stops and inverted commas where necessary:—he sent for shrewsbury and again spoke earnestly about the secretaryship shrewsbury again excused himself his health he said was bad that said william is not your only reason no sir said shrewsbury it is not and he began to speak of public grievances and alluded to the fate of the triennial bill which he had himself introduced but william cut him short there is another reason behind when did you see montgomery last shrewsbury was thunderstruck.

5.* Write a short composition on *one* of the following subjects:—

(i.) The Reign of Queen Victoria.
(ii.) The present Condition of Ireland.
(iii.) The Advantages of the Metric System.
(iv.) Presence of Mind.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly meeting of the Council was held on Wednesday the 6th instant, at the Society's rooms, No. 11, Harcourt Street, Dublin.

The Vice-President, Mr. H. Draper, took the chair, the President, Mr. Allen, being in attendance at examinations going on in another part of the building.

The other members of the Council present were Messrs. Begg, Grindley, Brunker, M.A., Doran, Wells, Hayes, Dr. Evans, Sir George Owens, M.D., Dr. Montgomery, Dr. Collins and Professor Tichborne.

A letter from Mr. Joseph Calvert, of Lurgan, a licentiate of the Society, suggested that members should be allowed to decide for themselves which of the journals they would take, or that at all events that privilege should be allowed to members joining from henceforward. The writer submitted that it was arbitrary to force a particular journal on members.

Mr. Wells: I think the answer to be given to that is, that the Council have already considered the matter and arrived at a decision upon it, and that they see no reason to depart from that decision.

A letter from Mr. McNaught, Secretary to the Belfast Chemists' Association, was read asking the Council to appoint Mr. A. J. Lewis, of Royal Avenue, Belfast, Solicitor, as the local representative to whom the Council were to forward instructions in legal matters, instead of Mr. Harper.

The Vice-President: We have no power to appoint a solicitor.

Dr. Doran: It lies with themselves.

Mr. Brunker: All that was done by this Council on a former occasion was to approve of a suggestion that Mr. Harper should be appointed by the local association.

The Vice-President: Why did we undertake to exercise such a power of approval?

* This must be attempted by every Candidate.

Mr. Brunker: Because it was necessary, where the name of this Society was to be used in prosecutions, that the solicitor should receive instructions from us and should have power to act. On the suggestion, therefore, of our Local Committee, Mr. Harper was approved of as the local solicitor. But these gentlemen know their own business best. If they think they can do better by changing their solicitor we ought not to make any objection.

Professor Tichborne: I was not aware that we were in communication with the Belfast Chemists' Association. I thought it was a Local Committee of members of the Society.

Mr. Brunker: They are an association who have formed themselves for defence and improvement, and have been for some time in existence in Belfast.

The Vice-President: I suppose Mr. Ferrall should be instructed to write to their secretary stating that we have sufficient confidence in them to sanction the appointment of any solicitor approved of by them.

Mr. Brunker: It should be understood that the gentleman is not an officer of this Society. This matter was very carefully attended to in the first instance. It should be intimated to this local association that the gentleman whom they have selected as their solicitor can be appointed on the same terms as his predecessor.

Professor Tichborne: I should be inclined to refer that letter to our Local Committee.

Mr. Brunker, pursuant to notice, moved the following resolution:—

"That any candidate who presents himself for examination, and who shall receive an examination paper in due course from an examiner, shall be regarded as a rejected candidate if he does not attend the examination throughout."

He had given notice of this resolution in consequence of the communication which the Council had had under consideration from Mr. Lyons. It was only right that gentlemen about to go in for examinations should make up their minds as to whether they knew their business or not. When once they came in to the examination they should go through with it. As matters stood at present, the Council were liable to have their time taken up with letters from candidates who had attended part of an examination, and then retired asking for special consideration. It would be far better to have a hard and fast rule laid down. Besides it was hard on the examiners that gentlemen should be allowed to act in this jack-in-the-box way. One of the results of having acceded to the application of Mr. Lyons, was that only one of the examiners in his case was paid, while the other two were not. The examiners were entitled to be paid for every candidate whose name appeared in the list. The practice which his motion proposed to establish was followed by every other examining body.

Dr. Collins said if a candidate asked for a special examination he would have a right to pay. But the Council had never been asked to give special examinations; and when a man came in on a quarterly examination day it was a different thing, because the examiners had to be there to examine the other candidates. At the Apothecaries' Hall quarterly examinations, they would not charge a man if he retired; and at the stated examinations of the College of Surgeons and the College of Physicians, he did not think that if a man asked to retire he would be charged either.

Sir George Owens: They forfeit a certain amount if they retire.

Mr. Wells: I second Mr. Brunker's motion. The reason for it is not so much a question of expense as to put an end to a practice of gentlemen going through a part of an examination and then disappearing, and afterwards applying to be allowed to go in for examination again at the end of three months. According to the rules a man who has been rejected cannot go in for six months afterwards. We lately granted two special permissions of the kind I state, but we gave the last on the understanding that a rule would be brought forward to prevent it.

Mr. Doran: If a man puts down his name and goes in to the examination, but finding the questions too stiff for him retires, he has no right to be excused from paying his fee on that account. It would be very unfair to the examiners if he were.

The resolution was put and carried *nem. con.*

Mr. Brunker moved:—

"That with a view to proper supervision one member of the Council at least should always be present during examinations; and that the members of Council shall undertake this duty in rotation."

This proposal, if carried out, would only amount to an extension of a system adopted by the Society some years ago. A small committee was then appointed to attend the examinations; but it was found very hard to get the members of it to do so; and the result was that the duty came to be thrown upon two or three. It was only right that, where such a responsibility was assumed, the performance of the duty should be divided as far as possible. At the last annual meeting of the Society the Committee to which he referred was not reappointed. Numerous letters had appeared in the periodicals finding fault with examiners, and with the mode of conducting examinations: and this it was which made it absolutely necessary that some member of the Council should be always present at examinations, for then he would be able to say afterwards whether a particular thing occurred or not, in the event of any statement being made. If the duty were divided amongst the twenty-one members of the Council, it would not come very heavy upon anyone where there were only four examinations in the year.

Mr. Grindley seconded the motion.

Dr. Montgomery said the duty of the member of the Council attending the examination should be defined. There was a Government Visitor already, and the two might come into collision. At present he (Dr. Montgomery) did not see his way to approving of this proposal. Difficulties might crop up. If their visitor was to be merely a nonentity there would be no use in his attending the examination at all. If he were to be there he should perform a duty.

The Vice-President: There should be some member of the Council at the examinations to prevent the possibility of candidates copying or borrowing from one another. There is no intention whatever to interfere with the Government Assessor.

Dr. Montgomery said he did not think the proposed position would be a proper one for a member of the Council to be in. He would be a sort of spy.

Sir George Owens said he differed totally from Dr. Montgomery. He thought Mr. Brunker's resolution would be a most useful one. The gentleman would have nothing to do with the conduct of the examinations, but he would be in a position to report to the Council what took place at them. The Government Visitor might not always be present.

Dr. Evans: Is it expected that whoever goes should remain there all day? I could not spend that length of time. Also I would ask how long does the Government Visitor stay? Is he in and out, or does he stay the whole time the examination lasts?

Mr. Brunker said there would be nothing to prevent a day's examination being divided between three or four members of the Council. He did not propose that they should in any way interfere with the examination. They should simply be there to know what was going on.

Dr. Collins said it appeared to him that the passing of this resolution meant that there would devolve upon members of the Council a duty which the Government Visitor was paid for doing. There could be no objection to any member of the Council going in to an examination for a while; but it would be unreasonable to expect a gentleman to spend his whole day there.

Mr. Brunker: The function of the Government Visitor is not to be present during the entire examination, but to report on what he observes. It was never intended that he was to be present during the whole three days.

Dr. Montgomery: When the question was discussed originally, I think we took a very different view of it from that. Is it understood that the Government Visitor is not to be here during the entire examination; or for what time is it expected that he shall be here?

Mr. Hayes: Can any member inform us whether the Inspector of the examinations of the English Society is there during the whole examination?

Professor Tichborne said it would be very desirable if they could induce more visiting of examinations on the part of members of the Council; at the same time he thought Mr. Brunker's resolution was worded in an arbitrary manner and was impracticable. A good many members could not afford to spend a whole day at an examination; and, besides, the resolution asked that members of the Council, who were not paid, should do what the Government Visitor was paid for doing.

Mr. Brunker said that while the Committee to which he had referred existed the Registrar used to write to the members of it, and Dr. Collins, Dr. Montgomery and Mr. Allen used to attend the examinations.

The Vice-President: I believe Mr. Allen still does so very conscientiously.

Mr. Brunker: I want simply to extend the number of gentlemen liable to visit.

The Vice-President: Take the word "always" out of your motion.

Mr. Brunker agreed to do so. Each day of examination could be divided between six or seven members.

Dr. Montgomery said he would move an amendment that the consideration of the subject be deferred.

The Vice-President, however, put the motion, which was carried by a majority.

Mr. Brunker then moved—

"That the regulations laid down for attendance on a course of practical chemistry be amended as follows: (*a*) For 'such other schools as may be approved by the Council' read 'Such other approved schools as may, from time to time, be added to the list by this Council.'"

It involved a certain amount of hardship that young men who had worked at well-known schools of practical chemistry had not been allowed to present certificates from those schools, while other schools on exactly the same footing were included in the list of schools from which certificates were accepted. His object now was to alter the existing regulation, so that when a candidate who had worked at a well-known school not on the list came up, the Council would have power to accept a certificate from that school without previously submitting the name of it to the Privy Council. The proposal was, no doubt, only to meet exceptional cases, because they had already on their list all the schools of any standing at present in Ireland. But they all knew that well-qualified young men from England and Scotland came over here as students with the object of taking out the Society's licence, and it was to meet their cases that he proposed the resolution. When approved of by the Privy Council it would give the Council the requisite power in the matter.

Dr. Evans seconded the motion, which was unanimously agreed to.

Mr. Brunker moved the adoption of another alteration in the regulations, viz., — (*b*) For the words "been present at at least three-fourths of the working days of said course," read "actually worked at the bench for one hundred hours during said course." He had had this proposal before his mind for some years. The resolution which was passed in January, 1879, introducing the principle of the curriculum of the English Society, for which a Bill had passed through the House of Lords and had been read a second time in the House of Commons, was tentative and afforded promise of working well; but at the time it was passed he was not aware how little it actually required. But acting since on the Committee for the investigation of certificates brought up by candidates, he had seen, and painfully seen in many cases, that the resolution was little more than a farce. It was at present actually possible for a gentleman to obtain the certificate which the Council required after having worked for only twenty-eight hours at practical chemistry. How far would that carry a student in practical analysis? He wanted to lay down a minimum of hours, which would be some guarantee that a young man knew how to handle a test tube. At the College of Science he used himself to work sometimes for six hours a day, while the usual period of work there was four or five hours a day. He believed that in some of the schools now they put in from one and a half to two hours a day, and in others more; but he had ascertained, by asking questions, that it was actually possible to obtain a certificate after having put in three hours a week for thirteen weeks.

Mr. Wells seconded the motion.

The Vice-President: Your hundred hours would be about two hours a day for two months.

Professor Tichborne said there were two things involved in this proposal. One was the substitution of a given time for days. That was a very good suggestion. There was, however, a great objection to the continual changing of these regulations. The next point was that Mr. Brunker wanted to treble the minimum time of practical study. They would not be able to get the students to put in an exact time; they must give a little law. It had been laid down that the minimum should be three-fourths of a three months' course. That meant thirty-six days. A minimum of twenty-seven days at two hours a day would give fifty-four hours. In the school he was connected with the time of attendance was generally an hour and a half. It would not do to make the daily time too long, for many of the students were in situations. Pharmaceutical students had to come to towns like Dublin, Belfast, and Cork, and remain in them in order to study practical chemistry; and it would be a very serious matter to lengthen the time during which they had to stay. If there were any great increase in the number of students it might be desirable to put on a screw of that kind; but, as a matter of fact, young men were not coming to the profession. They should not be deceived by the number of names in that day's lists. There were thirteen gentlemen in for the licence. That represented £65; out of which £19 10*s.* was paid, leaving £45 10*s.* But eight candidates were in for re-examination; so that the examination would only bring the Society in £5 10*s.* Therefore, obstacles should not be thrown in the way of young men coming up from the country to qualify. No doubt it was very important that they should pay due attention to practical chemistry; but they had other things to study besides. What appeared to him to be a weak point in the existing system of training, was that young men were invited to commence making chemical analyses at a bench before they were instructed in theoretical chemistry. In the medical schools the students had to put in five months at theoretical, and afterwards three months at practical chemistry. He would reverse that and make it three months at theoretical, and three months at practical chemistry. He would suggest that Mr. Brunker should reduce his minimum to sixty hours. He (Professor Tichborne) knew that young men from the school he was connected with attended three or four times as often as they got credit for in the certificates which they produced.

The President (Mr. Allen) here took the chair.

Dr. Collins said that according to the amended regulations of the Apothecaries' Hall, the student was obliged to pass an examination in theoretical chemistry before he was allowed in to the one in practical chemistry.

The Vice-President said the question raised by Mr. Brunker was—could any student learn practical chemistry in thirty-nine hours' work? He (the Vice-President) believed it to be utterly impossible that any student could. Two hours a day spread over three months would not be too much to expect.

Mr. Hayes said that between twenty-five and thirty years ago he attended night lectures in practical chemistry under Professor Galloway, and he still felt the advantage of them. It would be impracticable to get an attendance of one hundred hours in three months. Three nights in the week of two hours each would be enough; and making a deduction for unavoidable absence the maximum might be seventy-eight, and the minimum sixty hours. He quite agreed with Professor Tichborne as to the necessity of theoretical instruction. Professor Galloway used to give an hour to theoretical teaching and an hour to the bench.

The President said that such a knowledge of practical chemistry as was necessary for the pharmaceutical student could be very imperfectly acquired even in one hundred hours.

Mr. Hayes: I think double the number of hours that are at present required ought to be enough.

Mr. Wells: At present most of our candidates are plucked in practical chemistry.

Here several members of the Council left.

Mr. Brunker said the subject was a very important one, and he regretted that gentlemen had run away. Those who had been opposing him, had looked rather to the convenience of the candidates than to their efficiency. He did not hold himself bound to a period of three months, but he did want an adequate number of hours at practical work.

The President: I think it a pity that Mr. Brunker should drop the subject.

Professor Tichborne: Do you intend the hundred hours to be a maximum or a minimum?

Mr. Brunker: A minimum.

Mr. Wells: The men from Be'fast know their chemistry, because the schools there are open every night in the week, and they are taught their chemistry.

Mr. Brunker said he would adjourn his motion.

The following gentlemen were elected:—Mr. F. W. Hatton, 53, Lower Sackville Street, Dublin, proposed by Professor Tichborne, and seconded by Mr. Hayes; and Mr. Thomas White, 8, West Beach, Queenstown, proposed by the President, and seconded by Mr. Doran.

The Council then adjourned.

Proceedings of Societies in London.

CHEMISTS' ASSISTANTS' ASSOCIATION.

At the meeting of the Chemists' Assistants' Association, on Wednesday, April 6, Mr. T. S. Dymond, Vice-President, in the chair, the following paper was read:—

The Analysis of Urine.

BY J. E. SAUL.

Next to the manufacture and examination of drugs and galenicals—in other words, the practical application of his knowledge of pharmaceutical chemistry—there is no part of this, his chief science, so important to the pharmacist as the subject which forms the *raison d'être* of this paper. Scanning the whole wide range of analysis—gas, mineral and technical; food, waters, and manures; physiological and toxicological—we fail to find a single department of the art more deserving of cultivation by the pharmacist, or for which his special previous training more completely fits him.

The educated pharmaceutical chemist exists for the purpose of relieving the physician of many irksome practical details, essential in the great battle of Health *versus* Disease. He is not merely expected to provide ammunition in the form of efficient medicines, but also the ordnance and arms which to the champion of health are at least of equal importance. Those many little pieces of apparatus that pass under the name of "medical requisites," and form, perhaps, the chief portion of our "druggists' sundries," are expected both by the physician and his patient to be procurable from the pharmacist. As a consequence no pharmacy is simply a dispensary. The dispensary—where as such it does exist—is only an important department. The proper functions of a follower of our responsible calling are therefore not by any means purely pharmaceutical; not even when examined from the utopian standpoint, formerly so much affected by enthusiastic thinkers with the reforming mania. This being the case, we are quite justified in maintaining that the analysis of urine should form part of the education of every student, and be conducted, even in its more advanced branches, when necessary, by every pharmacist.

Urinary analysis, to-day, is of growing and recognized importance. The first aim of every capable physician is to diagnose disease with something approaching the accuracy of a scientist. To do this with proper success, every faculty of observation must be developed to the utmost. All physicians should be trained observers of the highest class; so trained that each petty detail, as well as every striking symptom, can easily be apprehended and as readily comprehended. In the diagnosis of internal diseases—the saddest and most fatal which affect our feeble frame—the difficulties of the physician are especially formidable. Locked in a protecting embrace, loosened only by the hand of death, the heart, the liver, the stomach, remain during the whole course of life shut out from the eye and hand of man, and thus render accurate diagnosis in nearly every case a stupendous problem. That it will always be so to a considerable extent is more than probable; though I may mention with regard to the stomach in particular, that a medical friend of my own has lately shown me the plans for a little apparatus which he hopes to perfect shortly, and by means of which it would be possible to photograph the inside of the stomach during life; or, at least, he thinks so, and we may heartily wish him success in his rather astonishing enterprise. Whilst, however, the physician is unable to see the wind, he can at any rate note the direction of the tell-tale straw, and in many instances the urine serves the purpose of the straw with the greatest possible success. In certain obscure maladies, the products resulting from chemical changes going on in the diseased system are voided with the urine, and point as readily to their cause, the disease, as any precipitate, obtained in ordinary analysis, indicates the presence of a base or acid.

My intention in writing this paper is to assist those many members of our Association who are still in their student days; to help them, in fact, to acquire a practical knowledge of a useful branch of analysis, without burdening their memories with the redundancy of matter collected in great works of reference from the experience of two generations. Many of the most important improvements in urinary testing are of so recent introduction that few, if any, text-books even are quite up to date, and in addition, those manuals are largely made up of elaborate processes for the determination of normal and abnormal constituents of urine, which are very rarely of semeiological importance. My paper, therefore, will be more *selective* than, in its widest sense, *descriptive*. It will be my aim only to describe methods which I have found *practically* useful, and to write more from an educational standpoint than from that affected by the critic. I may add that whilst engaged in carefully describing the processes I prefer to adopt, I desire you to remember that there is no intention of depreciating other methods, adopted with at least equal success by other workers. They would have been in many cases at least noticed; but the space of a mere paper and forty minutes of time forbid it. We will now proceed to our subject.

Physical Characters.—When a sample of urine is received for analysis, the first proceeding is to make a note of its chief physical characters, such as colour, relative transparency or opacity, specific gravity and volume. It is necessary to determine the latter, more especially, in those cases where the whole amount voided in a given period,—such as twenty-four hours,—is sent. The specific gravity is conveniently taken at or near 60° F. by means of the variety of hydrometer known as a "urinometer." There are numerous makes of this instrument in the market, and many of them are anything but accurate. On account of the risk of fracture, urinometers of gilded brass are often preferred to those made of glass; but for several reasons I prefer the latter. One of the cheapest of these is that known as "Hicks' patent," and is supplied by Mr. J. J. Hicks, of 8, Hatton Garden, E.C. Although low in price, those that I have examined have been fairly accurate. Should it be desired to determine the density with greater precision than these instruments will permit of, an ordinary specific gravity bottle should be used. The average specific gravity of healthy urine is about 1·020; but it varies about 0·005 on either side of that figure. Although of very little value in diagnosis, the determination gives a fair idea of the proportions of such solids as urea, or, if present, glucose.

Bulky deposits in urine are easily accounted for. Should the acidity of the urine have been destroyed through the putrefactive decomposition of urea into ammonic carbonate, the ingestion of alkaline salts, etc., earthy phosphates are naturally thrown out of solution, and on collection will respond to their usual tests. After violent exercise, a debauch, a heated debate in Parliament, or other cause inducing a feverish condition, acid urine is frequently loaded with a fawn-coloured or pink—from the presence of Prout's *purpurin*, called *uroërythrin* by Heller—deposit of acid urates, which will be found to redissolve when the liquid is warmed to about 100° F., or diluted. Uric acid in the free state when precipitated as a "cayenne pepper" deposit, or otherwise, fails to dissolve on heating or diluting the urine.

Reaction.—In reporting on a sample of urine the reaction to test papers should always be mentioned. An abnormal condition in this respect is of great semeiological importance. Urine may be acid in reaction, neutral or amphoteric and alkaline. The first, which is the ordinary condition of the fresh fluid in health, varies within certain limits, and in rough reports it is customary to qualify the word "acid" by the use of such terms as "faintly," "distinctly," etc. In those numerous cases, however, where greater accuracy is demanded, the acidity can be determined volumetrically with sodic hydrate solution, using a few drops of an alcoholic solution of phenolphthalein as an indicator. The acidity is conveniently reported in terms of oxalic acid. The volumetric solution of the Pharmacopœia, which is of normal strength, is much too strong for use in urinary analysis. A solution containing the equivalent of 10 milligrams of $C_2H_2O_4.2H_2O$ in each cubic centimetre will be found the most convenient in practice.

Occasionally recent urine is amphoteric, neutral or alkaline in health; but these conditions, although normal in herbivorous mammals, are of accidental origin and of but short duration in man. The amphoteric state, often noticed in milk, and by pharmacists in the preparation of liquor ammonii acetatis, is considered to be traceable to the simultaneous presence in the urine of both mono- and di sodic phosphates, and to the fact that no neutral sodic orthophosphate is known; or, possibly, to unequal distribution through the fluid of ammonia derived from the decomposition of urea. When fresh urine, voided by a sick person, is neutral or alkaline, the fact has considerable medical interest. In many cases, however, it is only due to the medicine the patient may be taking at the time; alkalies and organic salts of alkaline metals readily inducing the phenomenon. Certain diseases, as is well known, also induce an alkaline reaction in the urine, and the indication is therefore in practice of great diagnostic value.

Sugar.—The presence of glucose in quantity is one of the most striking peculiarities of diabetic urine. Although the chemical indications of sugar are precise enough and offer no difficulty to the practised analyst, yet it is not at all rare for a tyro to completely mislead the physician on this important point. The amount of sugar present varies so much—from 5 or 6 per cent., down to I am afraid to say how small a quantity—and the presence of other constituents obscures to such an extent the ordinary copper tests for glucose, that mistakes by young operators are very common. If present in fair quantity, a condition always accompanied by high specific gravity, the abundant yellowish to brick-red precipitate yielded on boiling with the cupric solutions of Trommer or Fehling leaves no room for doubt; but the case is different when decoloration without much precipitation takes place, or other changes are observed pointing to the presence of copper-reducing bodies only in traces.

Besides denoting the presence of sugar, Fehling affords many rather useful indications to a skilled observer, and is therefore largely used in the laboratory. For detecting glucose, however, Nylander's modification of Boettger's bismuth test is to my thinking more delicate and satisfactory; whilst for quantitative purposes the ammonio-cupric process devised by Dr. Pavy* leaves nothing to be desired. So easily carried out indeed is the latter estimation, that whenever traces of sugar are shown plainly in a sample of urine, I always determine the amount quantitatively for my own satisfaction, even if not for that of the physician. The qualitative test of Nylander is prepared by dissolving 2·5 gm. of bismuthous oxynitrate (perfectly free from silver) and 4 gm. of sodic potassic tartrate in 100 gm. of 8 per cent. caustic soda solution. On boiling 10 c.c. of this reagent with 1 c.c. of the suspected urine for a short time, the whole will assume a black appearance if sugar is present, even in fair traces. An easily applied though rough confirmatory test is that of Moore, which consists in boiling the urine for a minute or two with solution of potash, when any sugar present is degraded into caramel; this colours the urine and yields its characteristic odour on supersaturating with sulphuric acid. Although not exceedingly delicate, this reaction can always be observed in diabetic urine, and is on that account of some use. It should be remembered, however, that certain bodies which may be accidentally present in urine, such as chrysophanic acid, also respond to the test. In this connection it is as well to observe that some normal constituents, such as uric acid, creatinin, etc., and certain abnormal components of urine also reduce Pavy's solution; amongst the latter may be mentioned chloral hydrate, which is split up by the alkali into chloroform and potassic formate, the former body rapidly reducing the copper. Such require to be very carefully guarded against; but those deoxidizers normally present are really infinitesimal in amount, and do not interfere to any great extent with one's figures. That traces of sugar are really present in normal urine I think has been sufficiently proved, especially by the recent researches of Molisch, and which I have myself confirmed.

The quantitative process of Dr. Pavy may be thus described. Taking advantage of the fact that cuprous oxide dissolves in ammonia, forming a colourless liquid, he treats an ammoniacal cupric solution at a boiling temperature with sufficient saccharine urine to exactly discharge the blue colour. The great advantage of this method over that of Fehling lies simply in the fact that there is no bulky red precipitate to interfere with the ready observation of the end reaction. The result is as precise, in fact, as that of any other process in volumetric analysis. To prepare the test solution, dissolve 20·4 gm. of sodic potassic tartrate, and the same weight of caustic potash in distilled water; dissolve separately 4·158 gm.

* *Lancet*, March 1, 1884, p. 376.

of pure cupric sulphate in more water with heat; add the copper solution to that first prepared, and when cold, add 300 c.c. of strong ammonia, and distilled water to 1 litre. The estimation is conducted as follows: 10 c.c. of the ammoniated cupric solution (=0·005 gm. of glucose) are diluted with 20 c.c. of distilled water, and placed in a small flask. This is attached by means of a cork to the nozzle of a Mohr's burette, fitted with a glass stop-cock, and previously filled with diluted urine. The cork of the flask should be traversed by a small bent tube to permit steam to escape. Now heat the flask with a spirit lamp or small Bunsen flame, until the blue liquid boils actively. Turn the stop-cock in order to allow the urine to flow into the hot solution—which should be kept at the boiling point—at the rate of about 100 drops per minute (not more or much less) until the azure tint is exactly discharged. Then stop the flow, and note the number of cubic centimetres used. That amount of dilute urine will contain 5 milligrams of glucose. To render the determination as accurate as possible, the urine should be diluted to such an extent that not less than 4, or more than 7 c.c. are required to decolorize the solution, and the proportions necessary will be found to vary from 1 part of urine in 2½, to 1 in 30 or 40. The subsequent calculation is very simple. If you wish to give the percentage of sugar, multiply 0·005 by 100, and divide the product by the number of cubic centimetres of dilute urine employed. The figure thus obtained, multiplied by the extent of dilution—*i.e.*, if 1 of urine in 20, by 20—gives the required percentage. The number of grains per fluid ounce can of course be obtained by multiplying the percentage by 4·375. To observe easily the exact end-reaction, a piece of paper or other white body should be placed behind the flask. One public analyst has the half of an ordinary opal gas-globe fixed in the proper position. If the operator objects to the escape of the waste ammoniacal fumes, they may be conducted by a suitable arrangement into water or dilute acid.

Albumin. Qualitative.—The discovery of the presence or absence of this body in urine is one of the most important duties of the medical analyst. The faintest trace of albumin may afford most valuable information to a physician, and this body and sugar may be classed as unexceptionally the chief pathological constituents known to occur in morbid urine. Fortunately even mere traces are discoverable with the greatest possible ease, if only the analyst works with the most ordinary care and intelligence. For the qualitative examination of urine for albumin, there are numerous methods advocated by various chemists, many of which yield exceedingly delicate results. The three that I will briefly describe are amongst the most popular in use, and are amply sufficient for all practical purposes. *The boiling test:* First pass a portion of the urine through frozen filtering-paper, and to about 10 c.c. of the clear limpid fluid (which should be faintly acid in reaction) contained in a rather narrow test-tube add a single drop of acetic acid. Hold the tube in a small solid flame, preferably that of a spirit lamp, in such a manner that the upper inch or so only of the liquid is raised to the boiling point. Any albumin present is then coagulated, and stands out in bold relief against the pellucid lower layer, its appearance varying from a faint haze, if only a trace is present, up to a dense coagulum when albumin occurs in quantity. This test is exceedingly delicate. The acid is simply added to prevent precipitation of insoluble salts, and only a trace is used in order to prevent the production of the mucin haze. Mucin, when present, is apt to interfere somewhat with this and the following test; but, fortunately, its identity can easily be determined. *The nitric-acid test:* Prepare a saturated solution of magnesic sulphate by dissolving 10 parts of the salt in 13 of water with the aid of heat, cool and filter. To 5 volumes of this solution add 1 volume of 70 per cent. nitric acid. This is Dr. Roberts' nitric-acid reagent, and the magnesic sulphate is only employed for the purpose of increasing the specific gravity of the solution.* Place some of the reagent in a tube, and carefully, by means of a pipette, add an equal bulk or more of the well-filtered urine. The junction of the two liquids should be sharply defined. If there is much albumin, a more or less opalescent zone immediately forms at the point of junction; but when traces only are present a period of time, varying from a couple of minutes to about a quarter of an hour, is required for the development of the zone. It is important to notice that the zone appears at the *base* of the urine, just above the line of demarcation, as mucin is also precipitated by nitric acid. It always appears, however, as a more or less diffused haze towards the *upper* part of the liquid, and quite distinct from the albumin ring. I have known a zone of urates to form when applying this test, but they readily dissolve on warming. A very simple and excellent way of applying the above Heller's or contact-method of testing is to use an ordinary half-ounce syringe instead of a test-tube. First draw up an inch or so of clear urine, and then a sufficiency of the reagent. The danger of mixing the liquids by clumsy manipulation is thus reduced to a minimum. *The picric-acid test*: The use of trinitrophenol as a test for albumin in urine was first proposed by Galipe, and has been more recently advocated by Dr. George Johnson.† Although rather hastily condemned by certain authorities at first, my own constant use of it, in conjunction with the boiling and nitric-acid tests, ever since its introduction, and in numerous very varying cases, leads me to give this method my unhesitating approval. In addition to its excessive delicacy, the great advantage possessed by picric acid is that it produces no precipitate whatsoever with mucin. On the other hand, what at first sight appears to be its disadvantage is that it yields a precipitate with certain other bodies that may be accidentally present in the urine, such as alkaloids and peptones. On heating the solution, however, to the boiling point, a precipitate caused by these latter bodies dissolves, whilst a true albumin precipitate is unaffected. Instead, therefore, of misleading the analyst, picric acid adds to his information as to the presence or absence of certain abnormal bodies. The reagent is prepared by dissolving 140 grains of recrystallized trinitrophenol in Oj. of distilled water by aid of heat, allowing to stand for a day or two and decanting the bright solution for use. To apply the test, mix the solution with an equal volume of the clear urine, notice the effect, and then heat to ebullition. If preferred, Heller's contact method, recommended in the description of the nitric acid test, may be adopted; but I am not in the habit of employing it. Another very delicate test is to acidulate strongly with acetic acid, and then add a few drops of recently prepared potassic-ferrocyanide solution. An opalescence appearing in some little time indicates traces of albumin. Dr. Pavy's pellets, which contain a mixture of ferrocyanide with citric acid, must be condemned, as they will often react in non-albuminous urine.

Albumin. Quantitative.—As Mr. Proctor has lately remarked in regard to the examination of certain, not specially potent, pharmaceutical preparations, the fine accuracy of the first-class scientist is hardly essential in urinary analysis. When a physician asks you to determine daily the amount of coagulable albumin present in a certain urine, he has no desire to be told to a remote decimal the absolute amount that the sample may contain. His chief wish is to discover whether under the treatment he is adopting, the abnormal body diminishes or increases in quantity. Of the numerous methods of procedure adopted or proposed for this purpose, I prefer a process that has lately become very popular on the continent. It will be found available for the estimation of albumin with ease, and at the same

* *Medical Chronicle*, No. 1, October, 1884.

† *British Medical Journal*, October 11, 1884.

time a sufficient amount of accuracy to satisfy therapeutical demands. Invented by Dr. Esbach, the test simply consists in noting the height in a graduated tube that is reached by a picric acid precipitate of albumin, thrown down from a measured quantity of urine, after resting for twenty-four hours. The determination is entirely empirical; but the graduations on the tube were very carefully worked out by Dr. Esbach and others, and the results have been pronounced quite accurate enough for all clinical requirements. The original *albuminimètre* of the inventor is a stout glass instrument of test-tube shape, about six inches in length, and properly graduated. It is made by Messrs. Brewer Frères, of 43, Rue St. André des Arts, Paris, and sold at more than double the price that Mr. Cetti, of 36, Brooke Street, Holborn, supplies an imitation. The *réactif du Dr. Esbach* is prepared by dissolving 10 gms. of picric and 20 gms. of citric acids in 900 c.c. of water by aid of heat, and making up the volume of the solution to 1 litre when cold. Dr. George Johnson states* that the presence or absence of citric acid exercises no appreciable effect under any conditions of the urine, and this statement my own experience of the test enables me to confirm. It is necessary, of course, that the urine should remain distinctly acid.

Urea.—Carbamide or *urea*, as it is well named, is the chief solid and one of the most characteristic constituents of urine. It is the comparatively simple ultimate form in which the albuminoid-nitrogen of the body is excreted. Uric acid, creatin, creatinin, allantonin, etc., may be considered to be higher stages in the process of degradation, as they can all be split up into urea and other bodies. The combinations of carbamide with nitric and oxalic acids are very insoluble, and yield crystals displaying characteristic forms under the microscope. Owing to the fact that urea bears such an intimate relation to the wasting of the nitrogenous tissues, it is very often a matter of great interest to estimate the amount excreted.

The most satisfactory method of determining urea is to take advantage of the ease with which its nitrogen can be extracted and measured in the free state. Treated with a strongly alkaline solution of sodic hypobromite or hypochlorite, urea under certain conditions is completely broken up, its carbon being oxidized to carbonic anhydride, which is absorbed by the free alkali, the hydrogen converted into water; and its nitrogen liberated as gas. I say "under certain conditions" advisedly, for as usually conducted the whole of the nitrogen is not evolved. The use of hypochlorite of sodium was formerly advocated; but it does not act so energetically as its bromine analogue. Sodic hypobromite was first suggested for the purpose by Knop in 1860, and since that period its employment has become general. Recently Dr. Squibb,† from a praiseworthy desire to render the estimation as simple as possible to the physician, has reverted to hypochlorite. Mr. Martindale, I remember, brought Dr. Squibb's homely little contrivance for the determination under the notice of the profession at the last meeting of the British Medical Association.

The collection and measurement of the evolved nitrogen can be done in any suitable apparatus, from the modified pneumatic trough of Russell and West to Mr. Allen's nitrometer or an inverted burette. The *ureometers*, proper, which have been devised are almost legion in number, and reflect considerable credit on the mechanical ingenuity of analysts. They are all used with either water or mercury; the employment of the latter, although yielding a more strictly accurate result, being, however, quite unnecessary in medical analysis. Amongst the best are those of Noël, Dupré and Gerrard. Formerly I was in the habit of using the rather primitive contrivance of Russell and West; but although its results are not very inaccurate the operation of using it is decidedly messy. Since Mr. Gerrard brought his little apparatus before the Pharmaceutical Society* I have always made use of it, and can recommend the instrument as simple in construction, not liable to get out of order, easy to manipulate and scientific in principle. It is, perhaps, as well I should add that I am engaged in a careful study of this branch of my subject. My work is not yet much advanced, but I think it will result in the publication of certain objections to a detail of this and similar instruments. I shall now proceed to make a determination of urea before you by Gerrard's apparatus. Should you require details of the process in the future, I would refer you to his note in the *Pharmaceutical Journal*.†

I may mention that if through age or other causes the urea has been converted wholly or partially into ammonic carbonate, the analyst will yet obtain a fairly accurate result. The nitrogen still exists in the liquid, and ammoniacal salts are decomposed by the hypobromite in a similar manner to urea. With regard to other azotized bodies which may be present, the following facts may be noted: uric acid gives up about half its nitrogen and creatin two-thirds. Quinine, morphine, strychnine, coniine, nicotine, aniline, ethylamine, acetamide, salicylamide, benzamide, asparagin, leucin, taurin, glycocoll, hippuric and amidobenzoic acids, etc., fail to yield their nitrogen; caffeine loses less than a fourth; and albumin is acted on only very slowly by the reagent.‡

Uric Acid.—Certain gout specialists are attaching increasing importance to the accurate quantitative determination of uric acid in urine; and it may possibly become more the practice than even at present to request pharmacists to carry out these estimations. The old and rather inaccurate plan was to acidify the urine, concentrate somewhat, and weigh the resulting deposit of uric acid. By this means the figure obtained was always too low, and the process therefore could not be commended. Dr. Pavy§ has suggested a method of estimation based on the fact that uric acid exercises a reducing action on an alkaline cupric solution; but I do not consider his method much better than that last described. I have found that the presence of other substances is apt to cause great variability in the reducing effect of uric acid on copper, cuprous urate instead of oxide occasionally forming. The latest, and by far the best, method proposed has been devised by Professor Haycraft,‖ and my own experience of its use enables me to give the process my unqualified approval. His method is based on the known fact that argentic urate, unlike most other salts of silver, is insoluble in ammonia, but dissolves in nitric acid. The solutions necessary are these: 1. Dissolve about 8 gms. of ammonic thiocyanate crystals in a litre of water, and adjust to $\frac{N}{10}$ argentic-nitrate solution; dilute it for use with nine volumes of water and label "$\frac{N}{100}$ ammonic-thiocyanate solution." 2. Dissolve 5 gms. of argentic nitrate in 100 c.c. of distilled water, and add ammonia until the solution becomes clear. 3. Dilute 70 per cent. nitric acid with two volumes of distilled water, boil, to destroy the lower oxides of nitrogen, and preserve from the action of light. 4. A saturated solution of ferric alum. 5. Strong solution of ammonia. The following is a description of the process:—Place 25 c.c. of urine in a beaker with 1 gm. of sodic bicarbonate. Add 2 or 3 c.c. of strong ammonia, and then 1 or 2 c.c. (or an excess) of the ammoniated argentic solution. The precipitate which then falls is so fine and gelatinous that a special procedure is necessary in order to collect it. The subsequent use of nitric acid, too, renders the employment of paper quite inadmissible. In a 4 oz. glass funnel an asbestos filter is prepared in the usual manner. That is to say, by filling to about one-third with broken glass,

* *Lancet*, July 10, 1886.
† *Ephemeris*, January, 1884, p. 448.

* *Pharm. Journ.*, [3], xv., 455.
† *Pharm. Journ.*, [3], xv., 464.
‡ Méhu: *Urine, Normale et Pathologique*. 1880, p. 150.
§ *Medico-Chirurgical Transactions*, lxiii., p. 322.
‖ *British Medical Journal*, Dec. 12, 1885, p. 1100.

and then covering this with a bed of good asbestos to about a quarter of an inch deep. This is best done by shaking the latter in a flask with water until the fibres are thoroughly separated, and then pouring the emulsion so prepared in separate portions on to the broken glass. On account of the nature of the precipitate and of the filter, it is necessary to use a Sprengel's mercury or water pump in order to suck the liquid through. The small apparatus sold to students by chemical instrument makers will be found to answer admirably. Having collected the precipitate of argentic urate on the prepared filter, wash it repeatedly with distilled water, until the filtrate ceases to become opalescent with a soluble chloride. Now dissolve the pure urate by washing it through the filter with a few cubic centimetres of the special nitric acid. Place in a beaker, and estimate the silver by Volhard's method, which can be employed in the presence of nitric acid. It is carried out thus: add to the liquid in the beaker a few drops of the ferric-alum solution to act as an indicator (Haycraft throughout his paper incorrectly says potash-alum), and from a burette carefully drop in $\frac{N}{100}$ ammonic-thiocyanate solution until a permanent red colouration of ferric thiocyanate barely appears. The number of cubic centimetres used of the thiocyanate solution, multiplied by 0 00168, gives the amount of uric acid in the 25 c.c. One milligram may be added to this figure to compensate for loss, and the whole multiplied by four gives the percentage of uric acid in the urine. The sodic bicarbonate is added in the early part of the process to prevent decomposition of the argentic urate, which would occur if that salt were not present.

Shortly after the publication of Dr. Haycraft's paper, a certain eminent physician, who has almost made this subject his own, asked my opinion on a seeming paradox that he had observed with the urine of one of his patients. On the addition of the silver solution to this urine, the precipitate was found to be abnormally heavy, pointing apparently to the presence of uric acid in abundance. At the conclusion of the analysis, however, he was astonished to find that the result, instead of being high, was rather lower than usual. This puzzled him greatly, and, I must confess, seemed at first sight almost inexplicable to me. I got him to send me some of the urine, however, and found it true enough that the precipitation was at least three or four times as voluminous as I had ever before noticed. I found, moreover, that the addition of more reagent produced a further precipitate. This immediately aroused the suspicion that some abnormal chemical was present—a body whose silver salt was insoluble both in ammonia and nitric acid. An iodide immediately suggested itself, and on adding a trace of chlorine and shaking with chloroform, the deep violet colour assumed by the latter at once pointed to the culprit. An interview with our medical friend soon extracted the information that he was treating his patient with sodic iodide. The lesson to be derived from the incident is this:—When the appearance of the precipitate points to the presence of an iodide, always add silver solution until a precipitate ceases to form—in other words, a fair excess of the reagent. The final reading, then, will not be interfered with.

Bile Salts.—The detection of the biliary acids is best done by means of the peptone test of Dr. Oliver,* a physician who, in conjunction with a leading firm of Yorkshire pharmacists, has built up a system of clinical urinary analysis very popular with medical men. The urine, which should be very clear, is diluted to a specific gravity of 1·008. One cubic centimetre of this is added to 3 c.c. of Oliver's reagent. An opalescence at once appears, which will be found to be more or less distinct according to the quantity of bile-salts present. Keller's contact-method can be advantageously employed for applying the test. Dr. Oliver's reagent is prepared by dissolving 30 grains of flesh peptone, 4 grains of salicylic acid and 30 minims of 33 per cent. acetic acid, in enough water to yield 8 fluid ounces of product. The solution should be rendered perfectly brilliant by passing it through frozen filtering-paper. It is quite permanent.

Chlorides.—When considered necessary to determine the amount of sodic and other chlorides in urine, the direct estimation of Volhard is to be preferred. The principle of the process was described under uric acid.

Phosphates.—The amount of phosphoric acid is best estimated by the uranic-acetate method, described in Sutton's 'Volumetric Analysis.' A rough idea of the proportion of earthy phosphates can be obtained by supersaturating some of the clear acid urine with ammonia, warming, and separating, drying and weighing the precipitate. Although used by some medical men, the process is, of course, very inaccurate.

Microscopical Examination.—The microscopical examination of deposits in morbid urine is almost always valuable in its results. When the terrible affection known as Bright's disease is shown by quantities of albumin drained from the blood, the delicate granular or hyaline "casts" of the *tubuli uriniferi* can often be observed, especially on staining with a few drops of iodine solution. In those ropy albuminous urines which are only filtered with great difficulty, and do not clear on warming, the microscope reveals the round corpuscles of pus, accompanied usually by much amorphous mucin. Blood when present in a high-coloured urine is shown by the characteristic strings of discs, recalling irregular rolls of money. If large quantities of blood are present the urine becomes alkaline and highly albuminous, the alkali dissolving the hæmoglobin. It is then necessary to employ other tests, amongst the best of which is the spectroscopic, provided the urine is fairly recent, or the well-known hæmin reaction can be applied. Crystalline precipitates as a rule are easily recognized, but for purposes of comparison the worker should keep by him well-mounted specimens of typical deposits. His list of slides should include a good selection of the various forms of uric acid, triple phosphate and calcic oxalate; hippuric acid and calcic hippurate; the various urates and oxalurates, calcic carbonate, cystin, casts of the uriniferous tubules, spermatozoa, etc. The application of microchemical reagents is always useful, at least for confirmatory purposes. For instance, a neutral or faintly alkaline urine will often yield small crystals of triple phosphate not at all unlike octahedral calcic oxalate. Their instant solubility in a droplet of acetic acid allowed to flow on to the slide, however, immediately reveals their identity. For these observations the particulars given in Professor Attfield's 'Chemistry' will be found sufficient. I have thought it advisable not to burden this paper—already too long—with verbal descriptions of the characteristic shapes of the various crystals. A glance at a carefully-done plate, or, better still, a microscopic slide of the object, will produce a more vivid impression than pages of elaborate letterpress.

I trust these few notes on an exceedingly wide subject will assist our younger members to carry out with credit the easy, but important, analyses demanded every day by all careful physicians.

The paper was illustrated throughout by experiments and specimens and gave rise to a brief discussion, during which Mr. Ellwood expressed a doubt as to the reliable character of the picric acid test for albumin, as he stated he had never been able to obtain good results by this method. Incidentally he mentioned that his interest had lately been excited in the subject through the urine of M. Chauffat, the sleeping Frenchmen, having been submitted to him for analysis. He also called Mr. Saul's attention to the omission of a test for hippuric acid from his paper, as it was this body he had been requested to determine.

* Oliver: 'On Bedside Urine-Testing.' 1885, p. 210, *et seq.*

Mr. Bird asked whether it was absolutely necessary to prepare the hypobromite salt at the time of testing, and whether the decomposition of the solution was spontaneous or due to exposure to air, as the latter might be overcome by covering the solution with a layer of paraffin or similar body. He also asked what method Mr. Saul considered the best for removing the albumin from urine prior to a further analysis.

Mr. Phillips wished for information regarding the picric acid test for sugar in urine.

Mr. Dymond asked for an explanation of the hæmin reaction, which had only been referred to incidentally in the paper, and pointed out that as long as the nitric acid employed in testing was white, there was no necessity for boiling it in order to convert any lower oxides present.

In reply Mr. Saul remarked that, owing to the extent of the subject, he had omitted from his paper many methods of minor importance, and had also abstained from discussing the comparative merits or demerits of the various tests to any extent. However, in reply to Mr. Ellwood, he could confidently recommend picric acid as one of the most delicate and reliable tests for albumin. As to the preservation of the hypobromite solution, he thought the method suggested by Mr. Bird would probably answer, though he much preferred to prepare it extemporaneously. He always heated the urine with a little acid in order to separate the albumin from it. Mr. Saul expressed an opinion that sugar was present in a small proportion in all urine, and he did not employ Johnson's picric acid test for its detection or estimation. With regard to the hæmin test, which was referred to in the paper, Mr. Saul said it was a micro-chemical test used for the detection of blood. It consisted in evaporating the solution with glacial acetic acid and a soluble chloride, when, if blood was present, the peculiar oblique oblong crystals of hæmin were obtained and easily recognized by means of the microscope.

Throughout the discussion there was a strong tendency of the speakers to advocate the advisability of chemists undertaking analyses of urine, since medical men are gradually relying more and more on the results of these analyses in order to ascertain the daily condition of their patients.

Parliamentary and Law Proceedings.

Prosecution under the 17th Section of the Pharmacy Act.

At the Birmingham Police Court on Thursday, April 7, before Messrs. Cook, Baker and Harris, Henry Johnson, drysalter, etc., of 146, Gooch Street, was charged with having unlawfully sold on the 29th ultimo, to Alfred Wright, Assistant Secretary to the Chemists' and Druggists' Trade Association of Great Britain, a certain poison, to wit, one ounce of oxalic acid, the same not being distinctly labelled with the name of the seller of the same in contravention of the 17th section of the Pharmacy Act, 1868. Mr. Porter (Messrs. Glaisyer and Porter), Solicitor to the Association, appeared for the prosecution, and the defendant appeared in person.

In reply to the Magistrates' Clerk the defendant said it was quite true that he had infringed the Act.

Mr. Porter: I wish to say one word in regard to the circumstances of the case. This is the second offence of the kind charged against the defendant. On January 21, 1886, he was charged before the magistrates for a similar offence, and on that occasion he made a promise that he would not sell poisons again. Under these circumstances a nominal fine only was inflicted. Now, as this is a second offence he is liable to a penalty of £10.

The Magistrates' Clerk: It is not charged as a second offence.

Mr. Porter: I submit that makes no difference.

The Magistrates' Clerk: Oh yes, it does.

Mr. Porter: Then I will read the section (section 17 read). I venture to submit the fact of a previous offence does not require to be stated in the summons.

The Magistrates' Clerk: It does not matter what you submit. I shall advise the Bench it does.

Mr. Porter: My witness will prove this is the second offence, and that is all that is necessary.

The Magistrates' Clerk: You must charge it as the second offence, otherwise you cannot go upon it.

Mr. Porter: I will call my witness.

Mr. Alfred Wright was then called, sworn and examined. He stated that on the 29th ultimo he went to the defendant's shop in Gooch Street, and purchased an ounce of oxalic acid which was wrapped in a packet. Mr. Johnson's name did not appear on the packet.

The Magistrates' Clerk: Was Mr. Johnson there?

Witness: I did not see him.

Was there on the packet the name of the former occupier of the shop?—Yes, sir (packet here produced and handed to the Bench).

Did the defendant purchase the business from him?—I believe he did.

Mr. Porter: Has the defendant been before the Court previously on a similar charge, to your knowledge?

Witness: Yes, sir.

Mr. Baker: Johnson was using up the old labels.

Witness further stated that defendant on this occasion used precisely the same kind of labels that he was fined for using before.

Mr. Porter said defendant was not a registered chemist and druggist, and was an illegal trader under the Act.

Defendant denied this statement, and said the poison he was charged with selling was of the simplest possible description. He added that it was not he who sold it, but his assistant.

The Magistrates' Clerk: Why do you have it in your shop?

The Defendant: We can sell it wholesale but not retail.

Mr. Porter: That is not so.

The Magistrates' Clerk: Then why do you sell it retail?

The Defendant: Well, I gave my servant instructions not to sell it retail, but he disobeyed my instructions.

Mr. Cook: Of course the law against selling poisons illegally should be rigidly enforced, else it would not be any good at all. You must pay a fine of 20s. and costs.

On the application of Mr. Porter the magistrates allowed the solicitor's fee for attendance.

The Sale of Oxalic Acid.

On Tuesday last, Mary Ann Haynes was charged on remand at the Weymouth Police Court, on the charge of having administered oxalic acid to her husband. The presence of the poison in a packet of cocoa and in some tea was proved by Mr. T. B. Groves. Evidence was given of the sale of the poison by a grocer in Weymouth, and eventually the prisoner, who pleaded not guilty, was committed for trial at the Winchester Assizes.

ANSWERS TO CORRESPONDENTS.

J. Richards.—Try glycerine of tragacanth.

Nemo.—We possess no information as to the composition of the preparation mentioned.

Ipecac.—"Tropæoline" is a generic term, applied to a class of oxyazo- and amidoazo-sulphonic acids, some of which are used as dye-stuffs, and one of them "tropæoline O O" is used as an indicator in alkalimetry. Phthalic acid is the orthodicarboxylic acid of benzene, and is described in most works on organic chemistry.

Preliminary.—We presume that it is expected that correct answers will be given to all the sums. At any rate we do not feel justified in holding out the hope that marks are given for "sums done in the right manner and wrong in the working."

Communications, Letters, etc., have been received from Messrs. Gibbs, Marsden, Mee, Steenbuch, Draper, Stables, Old Pharmacist, Ipecac, Preliminary.

AMORPHOUS COCAINE.*

BY RALPH STOCKMAN, M.D.,

Assistant to the Professor of Materia Medica in the University of Edinburgh.

(From the Pharmacological Laboratory of the University.)

Since the introduction of hydrochlorate of cocaine into general therapeutic use, attention has frequently been called to the fact that what is supplied as a so-called crystalline salt usually contains a varying quantity of a non-crystalline substance, having, it is said, the same action as the crystalline variety. Most of the earlier specimens were imperfectly crystalline, yellowish in colour, and had a disagreeable odour; while complaints were made that the solutions produced irritation when applied to the conjunctival or other delicate mucous membranes.

With increased experience and greater skill in the manufacture there has been a decided change for the better in all these respects, and the salts as now sent out by good makers may be roughly classed in two varieties. The first of these is crystalline, colourless, and odourless, but contains a varying amount of the non-crystalline salt, generally in the form of granular masses mixed with imperfect crystals. The second is also colourless and odourless, but is in the form of granules, made by evaporating the solution of the salt with constant stirring. This variety is known to contain a considerable quantity of the amorphous hydrochlorate. No satisfactory explanation has yet been given of the reason why some portions should crystallize perfectly while others do not. The results of the examination of some specimens of amorphous cocaine have, however, enabled me to account for this as well as for the peculiar smell and hygroscopic character of some samples of the salt.

In isolating cocaine from coca leaves there is found in the mother liquors a varying quantity of a body generally known as "amorphous cocaine." The names "cocaicine" and "cocainoidine" have also been proposed for it, but have not met with much acceptance. A short description of this body has been given by Lyons (*Amer. Journ. of Pharm.*, Oct., 1885) and by Bender ('Year-Book of Pharm.,' 1886), but neither of them have appreciated its true nature.

The amount got varies greatly, there being sometimes a considerable quantity and sometimes practically none. This seems to depend partly on the kind of leaves used, but probably also on the processes to which they are subjected. Several samples of this body, obtained at different times, have been very kindly given to me by Messrs. Howards and Sons for the purposes of investigation. These were all practically similar, but differed slightly in outward appearance. The colour varied from dark yellow to dark brown, and the consistence from that of treacle to a sticky tenacious solid. The smell was peculiar, recalling that of nicotine, but more aromatic and less pungent, while the taste was bitter and aromatic.

Under the microscope no crystals were ever observed in fresh specimens.

It is alkaline in reaction and soluble in alcohol, ether, acetic ether, chloroform, benzol, amylic alcohol and petroleum ether. Its solubility in water varies with its consistence. The solid specimens are nearly quite insoluble, while on adding water to the more fluid specimens a dense whitish precipitate is at first formed which becomes dissolved up on agitation. It therefore, in this case, dissolves the water rather than *vice versâ*.

On gently heating it becomes quite fluid. It is very soluble in dilute acids, with which it forms non-crystalline salts, all of which dissolve readily in water. If it be dissolved in rectified spirit, and treated with animal charcoal, or with acetate of lead in the usual way, to get rid of the colouring matter, the body ultimately obtained is pale yellow in colour, sticky in consistence, and non-crystalline, nor do crystals form in it even after standing for months. By repeated solution in alcohol, and repeated precipitation with ammonia, a nearly white, non-crystalline, flocculent body is obtained. The original odour and taste remain, no matter how often the purifying process is repeated. It can be dried *in vacuo* over sulphuric acid, but on exposure to the air rapidly absorbs moisture again. The purified hydrochlorate of amorphous cocaine, which is the only salt I have worked with, is also pale yellow in colour, and retains the characteristic disagreeable smell and taste. It is hygroscopic, but if tolerably pure and thoroughly dried shows sometimes a tendency to form imperfect crystals. It is very soluble in water, alcohol, chloroform, acetic ether, and amylic alcohol; insoluble in ether, petroleum ether and benzol. From a study of the physiological action and chemical relations of this body, I have been led to the conclusion that it is a *solution* of ordinary crystalline *cocaine* in *hygrin*, the liquid alkaloid which is also present in the coca leaves. Hygrin is described by Wöhler (Liebig's *Annalen*, cxxi., 372) and by Lossen (*Ibid.*, cxxxiii., 351) as a pale yellow volatile, oily body, giving the ordinary reactions of alkaloids, hygroscopic, and forming hygroscopic salts which crystallize with great difficulty. The odour, they say, recalls that of trimethylamine, but it seems to me to more closely resemble that of nicotine. This body is extracted from the leaves in greater or less amount, along with the cocaine, by the processes which are now used by manufacturers, and its presence accounts for the disagreeable properties and effects which have been observed in many samples of the hydrochlorate.

Cocaine is extremely soluble in hygrin, and when once solution has occurred, it is practically impossible to separate the two bodies, as they are both soluble in the same menstrua, and are both precipitated by the same reagents. The same holds good for their salts but not to the same extent. These facts account fully for the presence of hygrin in the hydrochlorate of cocaine as ordinarily sold, and it is the admixture of hydrochlorate of hygrin which makes the salt hygroscopic, and imparts to it the peculiar odour.

The great solubility of cocaine in hygrin also accounts for the peculiar behaviour of fluid amorphous cocaine when water is added to it, as previously mentioned. The addition of a small quantity of water precipitates the cocaine from its solution, and it is not until the water has become thoroughly incorporated with the hygrin that the precipitate is dissolved up. The addition of more water than the hygrin can dissolve precipitates the cocaine permanently, the latter, as is well known, being only slightly soluble in water.

As regards the physiological action, I found that

* Read before the Pharmaceutical Society of Great Britain at an Evening Meeting in Edinburgh, Wednesday, April 13.

amorphous cocaine and its hydrochlorate produced the same effects as the pure substances, the activity being proportionately detracted from by the amount of hygrin present.

There is, however, one very important difference. In using amorphous hydrochlorate of cocaine to cause anæsthesia of the conjunctiva, it was observed that considerable irritation followed, this being without doubt due to the hygrin.

A few drops of a 10 per cent. solution applied to a rabbit's eye caused almost immediate dimming of the cornea, and marked hyperæmia of the palpebral conjunctiva. Next day there was a large superficial ulcer on the cornea. The bad effects of such a solution are therefore very severe.

A 5 per cent. solution also caused very rapid dimming of the cornea, but not so much conjunctival inflammation. Two and a half per cent. solutions caused easily observed irritation, while it was difficult to observe any marked bad effects from the application of weaker solutions, although they are no doubt present.

By distilling the crude amorphous cocaine with water I obtained a few drops of hygrin, and found it to be an extremely irritating substance. It seems to have no special action beyond the local one.

Chemically, the decomposition products are the same as those of the pure alkaloid, the presence of hygrin only slightly complicating matters.

If amorphous cocaine be heated in a capsule on the water-bath for a prolonged period it slowly disappears—benzoyl ecgonin having been formed, and having dissolved up in the water. The resulting solution is clear yellow in colour, acid in reaction, and smells of benzoic ether and hygrin. On evaporating it, a brown, amorphous, hygroscopic mass remains, in which, after standing for several days, crystals form. It may be decolorized by treating with animal charcoal, but never forms good crystals. Chemically and physiologically it resembles benzoyl ecgonin.

Amorphous cocaine also changes spontaneously into benzoyl ecgonin. A specimen which had been put aside for six months was found at the end of that time to consist very largely (about one-half by weight) of benzoyl ecgonin in the form of acicular crystals. These crystals can be dissolved out by hot water, which takes up at the same time a very small quantity of the cocaine. When heated in a sealed tube with strong hydrochloric acid it undergoes the same decomposition as pure cocaine does—forming ecgonin, benzoic acid and methyl alcohol—but the hygrin discolours all the products. When pure cocaine is so treated no alteration in colour results, while, with the amorphous substance, there soon separates out a dark brown, oily-looking body, most of which floats to the surface, or collects in globules on the sides of the tube. The tube is opened and its contents washed with ether to remove the benzoic acid. On evaporating the ether yellowish crystals of benzoic acid are left, which may be obtained quite pure by sublimation.

The hydrochloric acid solution may then be evaporated to dryness in a capsule on the water-bath, when a dirty brown residue is left, consisting of the hydrochlorates of ecgonin and hygrin. The latter is very soluble in absolute alcohol, the former very sparingly so, and may thus be obtained pure by repeated washing. By decomposing the salt with silver oxide we get pure crystalline ecgonin.

It is almost impossible to obtain crystalline from amorphous cocaine by any of the methods at present in use for separating one body from another. I did get it twice in very small amount, but as the process I used was too wasteful and too complicated to be of any practical use I need not detail it here.

The most generally successful method is to dissolve a tolerably pure specimen of the amorphous hydrochlorate in chloroform, and then precipitate it with ether. The hygrin subsides to the bottom of the test tube much more quickly than a part of the cocaine salt does. On pouring off the supernatant fluid before the cocaine has all settled, and allowing it to evaporate, a gummy mass remains, in which after some days crystals of hydrochlorate of cocaine form, if there be not too much hygrin present.

Solutions of the amorphous hydrochlorate in water give the same reactions as the crystalline hydrochlorate with platinic chloride, mercuric chloride, tannin, and the ordinary reagents for alkaloids. Its behaviour with caustic alkalies, their carbonates and bicarbonates, and with lime and baryta water is very different, however. When any one of these is added to a solution of crystalline hydrochlorate of cocaine there occurs a milky precipitate, which is soluble in excess of the reagent. In the case of ammonia, after standing for a minute or two the cocaine is redeposited from the solution in the form of transparent, delicate, acicular crystals; with all the others the solution is permanent.

When, on the other hand, the alkaline solution is added to a solution of amorphous hydrochlorate, there occurs a milky precipitate mixed with floccules, but only soluble to a very slight degree in enormous excess of the reagent. The floccules especially persist.

This explains the different statements which have been made with regard to the solubility of cocaine in those alkaline solutions, as it is now obvious that in some cases a pure and in others an amorphous specimen has been tested. It is a curious fact, first called attention to by Squibb, that the well-formed large crystals are less soluble in chloroform than the ill-formed small ones. This difference in solubility I found to be due to the amount of hygrin present, the less hygrin there is the less soluble is the salt. In comparing a very pure specimen of the crystalline with a specimen of the non-crystalline hydrochlorate I found that the difference in solubility holds good for various solvents and is very marked. The solubility of the former in chloroform, absolute alcohol, and amylic alcohol was respectively about 1 in 48, 1 in 34, and 1 in 70, while the latter was soluble in the same menstrua in the proportion of about 1 in 5, 1 in 3, and 1 in 8. With other solvents there is also a difference, but not nearly so striking.

Hydrochlorate of amorphous cocaine reduces solution of potassium permanganate very rapidly, generally in a few minutes after being added. The purer the salt, the less rapid is the reduction, but all the samples which I have as yet tried cause reduction within several hours. Whether a perfectly pure salt would do so, or not, I am unable to say.

The purer the salt is, also, the less does it colour strong sulphuric acid.

Good hydrochlorate of cocaine, therefore, should be entirely crystalline, colourless, odourless, and very slightly soluble in chloroform or absolute alcohol. To free it from the amorphous salt, ad-

vantage may be taken of the great solubility of the latter in menstrua in which the crystalline hydrochlorate is very slightly soluble.

I frequently found that specimens which seemed to contain no hygrin gave indications of its presence on being decomposed with hydrochloric acid, and no specimen which I have yet examined was perfectly free from it. It may be said that the amount of hygrin present in a 5 per cent. solution of hydrochlorate of cocaine is practically of no importance, but if larger quantities are distinctly irritating, smaller ones will certainly be also, although perhaps not to a noticeable degree.

In conclusion, I may perhaps be permitted to offer a few criticisms on a recent elaborate paper by Dr. Squibb on the hydrochlorate of cocaine (*Ephemeris*, vol. iii., Jan., 1887), more especially as his views will probably influence the manufacture of cocaine in America and in this country, and as he is unaware that the non-crystallization of the salt is due to an admixture of hygrin.

(1) His method of assaying the leaves, as well as his process of manufacturing hydrochlorate of cocaine, extracts a certain amount of hygrin along with the cocaine.

(2) In describing the ultimate crystallization from alcohol he says that there first separates out a crop of large perfect crystals, leaving behind a gummy residue in which, after several days, less perfect crystals form. It is evident that this second crop contains a considerable admixture of hygrin and should be wholly or partly rejected. Instead of doing so, however, he utilizes the whole by stirring the alcoholic solution while evaporating, thus forming a granular salt. Dr. Paul has already protested against this method of preparing the hydrochlorate of cocaine (*Pharm. Journ.*, Feb. 12, 1887), and states that it can easily be made in the form of large perfect crystals.

(3) Dr. Squibb states that the imperfect crystals are therapeutically as active and give as good results as the perfect crystals. I think I have shown, however, that any admixture of hygrin diminishes its activity and makes it irritating.

(4) Judging from its solubility in chloroform, and from its action on permanganate of potash solution, I seem to have used as a standard a much purer salt than any of those which he examined. In fact, all his specimens seem to have been of only medium quality.

[*The discussion on this paper is printed on p.* 873.]

SOLUBILITY OF GELATINE AS COMPARED WITH OTHER PILL COATINGS.*

BY THOMAS THOMPSON.

The subject I have taken up, viz., the solubility of gelatine as compared with other kinds of pill coating now adopted, is not of a scientific nature; but I trust it may be of sufficient interest for me to claim your attention for a short time. My principal reason for choosing this subject I will give you as briefly as possible.

Some time ago, when in conversation with an Edinburgh gentlemen on the merits or demerits of gelatine pill coating, it was hinted that such a coating was not a desirable one, because after a time the gelatine practically altered in composition and became hard, horny and insoluble. One of our eminent medical men also spoke of it to me, in the same terms; fortunately, he had time at his disposal, and I had the satisfaction of proving to him that such was not the case.

I took a gelatine-coated pill that had certainly been made over two years, and dropped it into a glass containing water at a temperature of 95° Fahr.

In a few seconds, without having used any motion, the gelatine could be seen dissolving and mingling with the water as it rose from the surface of the pill.

When stirred the entire coating was quickly dissolved, indication of such being given by the disintegration of the pill in a most satisfactory manner.

The idea which appeared to have possessed both of these gentlemen was, that the process of heating the gelatine, for the purpose of pill coating, had the effect of decomposing it to such an extent as to produce the consequences before stated.

Now, if a moment's thought be given to the subject the fact will become apparent that heat must, in the first instance, be used for the manufacture of gelatine, or it would not be possible to produce a sheet of it, in such a form as the one at present on the table.

This must certainly have been in a semi-fluid state at first, to allow of its being run out into such sheets and afterwards dried by evaporation. Yet this gelatine will keep in the same condition, if necessary, for several years, and would be equally soluble then as it is now.

I compare the gelatine coating of a pill with this sheet of gelatine, it having been made into a solution with water for the purpose of application to the pill; the water is removed by evaporation, leaving over the pill a coating of pure gelatine, which will to my mind be as soluble in the future as the sheet of gelatine is to-day.

It is needless to say in the face of this, that I failed to see the force of argument used.

From these circumstances the idea struck me that a few experiments would prove the solubility of gelatine coating as compared with other kinds of pill coating.

For this purpose I obtained samples of the various kinds of coated pills such as are sent out commercially and are known as pearl, sugar, gelatine, tolu and keratine.

For my first experiment I selected the aloes and iron pill, in sugar, pearl, gelatine and tolu.

The sugar, pearl and gelatine were obtained from leading manufacturers and may be termed factory-made pills; one of gelatine and one of tolu were made and coated by myself.

For experimenting with, I had one of sugar, three of pearl, two of gelatine, and one of tolu. These were numbered from 1 to 7.

The plan adopted was to drop one of each into a weak solution of red prussiate of potash, at a temperature of 95° F., about the ordinary temperature of the body, and whichever, after once stirring, gave the blue precipitate first, was deemed to be enveloped in the most soluble coating.

In order to make the test in every way a fair one, the needle hole in the gelatine-coated pill was closed.

Time taken to Exhibit Blue Precipitate.

No. 1. *Sugar.*—Showed precipitate in six minutes.

* Read before the Pharmaceutical Society of Great Britain at an Evening Meeting in Edinburgh, Wednesday, April 13.

No. 2. *Pearl.*—In twenty-three minutes, after having been kept at a temperature of 100° F. for eighteen minutes.

No. 3. *Pearl.*—Outer coating fell away after keeping at a temperature of 100° F. for twenty-five minutes, and showed precipitate after two hours and fifteen minutes.

No. 4. *Pearl.*—In three hours and fifty minutes.

No. 5. *Tolu.*—In one hour and three quarters the precipitate was only shown at points, as if the moisture and heat had caused the pill to swell and burst the coating.

No. 6. *Gelatine.*—In one and a half minutes.

No. 7. *Gelatine.*—In four minutes.

In regard to gelatine coating, it became apparent that the consistence of the solution had much to do with the more or less ready solubility of the coating, as evinced by Nos. 6 and 7.

Having by these simple experiments shown that the gelatine-coated pills had by far the most soluble coating, I thought it might be interesting to know how long it would take to produce perfect disintegration of each one. For this purpose the glasses and their contents were kept in a drying closet at a temperature of 100° F. and occasionally stirred; the result was as follows: —

No. 1. *Sugar.*—Took one hour and forty minutes.

No. 2. *Pearl.*—Took four and a half hours.

No. 3. *Pearl.*—Took five hours.

No. 4. *Pearl.*—Was a pill next morning.

No. 5. *Tolu.*—Took some time, showing that although the coating had yielded at certain places, such a coating would retard the action of the pill, as disintegration did not take place for three or four hours with a freshly-made pill.

No. 6. *Gelatine.*—Took thirty minutes.

No. 7. *Gelatine.*—Took one and a quarter hours. (Quinine pills with chloride of barium).

The great difference evinced in the time at which the precipitate appeared on the surface of the pill shows, I think, that some other coating had been used previous to the commencement of the pearl coating, and consequently would have the effect of retarding the action of the pill in the same degree of difference. The length of time taken to produce disintegration can only point to one conclusion, that in order to have the pills in a proper condition for pearl coating they must be made as hard as it is possible to make them, which in the case of gelatine coating is not necessary.

I think the results of my experiments prove conclusively that the gelatine-coated pill has the advantage in every respect, and that factory-made coated pills are not desirable adjuncts to a chemist's business.

The very fact of having to make them so hard before coating shows most clearly that it is not possible to adhere strictly to the B.P. formula. I am sure none of the formulæ given in that volume would produce pills so hard, as some samples I have here. I quite agree with Mr. Gilmour that a chemist should not encourage the sale of factory-made pills, not only for the reason I have endeavoured to point out, but also for his own benefit in securing what middle profit there may be.

When a chemist takes to the sale of such pills for the purpose of saving himself trouble, I think he sinks below the dignity of his profession, and further, he deprives the rising generation of pharmacists of a most important and practical part of their education. Again, he could not give a guarantee as to the accuracy of the composition of the pills, as he could were the pills made by himself.

With reference to the B.P. pills I think the gelatine coating is applicable to all of them; not always so satisfactory in appearance, because there are some, such as pil. coloc. co., lead and opium, etc., where they present a dull appearance. With these exceptions the coating remains intact, and, unlike pearl coating, does not show any pitting or discoloration; it is in every case readily soluble.

The keratine coating is of more recent introduction, and is made, as no doubt you are all aware, by removing from horn shavings all that is soluble in pepsine and hydrochloric acid. The residue is dissolved in solution of ammonia and evaporated until only a trace of ammonia is left.

The idea is to form a coating that would be insoluble in the gastric juice of the stomach and reserve the action of the ingredients until the pill reaches the alkaline liquids in the intestines.

I obtained some keratine-coated aloes and iron pills from London and subjected them to the same treatment as the previous ones. The blue precipitate was given in eighteen minutes, and total disintegration took place in three hours. I do not say the coating was dissolved, but, as in the tolu-coated pill, I think the moisture and temperature had the effect of bursting the coating and liberating the contents of the pill. From this, one may almost conclude that the same action would occur when such pills are taken into the stomach. I feel sure pills coated in the same way as some of these I have here, would be much more likely to pass the stomach unaltered than the keratine-coated pills.

A second series of the before-mentioned pills were subjected to a similar experiment, but with an acidulated solution of pepsine, with practically the same results.

A short time ago, I was asked by Mr. Hill to allow my gelatine pill-coating and capsule-making machine to be exhibited. At that time I was engaged in making these several experiments in pill coating, and as the two are so closely connected, I thought I might read a short paper on the superiority of gelatine pill coating, and exhibit my machine at one and the same time; feeling I could better describe the latter than a stranger could have done. Before the close of the meeting I shall endeavour to practically illustrate its capabilities and method of working to any gentleman who may feel interested in seeing it.

[*The discussion on this paper is printed on p.* 873.]

NOTE ON BLAUD'S PILL MASS.*

BY THOMAS THOMPSON.

I gathered from the last Evening Meeting that there has hitherto been a great diversity of opinion as to whether the chemical action of the constituents of Blaud's pills should take place before or after administration.

It has occurred to me the intention of the inventor must have been that the combination should be introduced in such a form that chemical reaction should take place after administration, as no doubt this would produce the carbonate of iron in the most active condition for absorption by the system. Otherwise I cannot help thinking it would have

* Read before the Pharmaceutical Society of Great Britain at an Evening Meeting in Edinburgh, Wednesday, April 13.

been just as beneficial to have given saccharated carbonate of iron pills.

This subject was freely discussed at the time, and during Mr. Nesbit's remarks he referred to the possibility of the hydrochloric acid always present in the gastric juice attacking a Blaud's pill so soon as it enters the stomach, and forming a portion of chloride of potassium, thus preventing a certain amount of action between the potassium carbonate and ferrous sulphate. In answer to this theory Dr. Clark pointed out that the action of the two salts commenced in the centre of the pill, so that carbonate of iron would to a large extent be formed before the pill reached the stomach, consequently the hydrochloric acid would have little chance. From Dr. Clark's remarks, and thinking over these theories, I gathered that the spontaneous reaction was due to the presence of water of crystallization, and therefore it was scarcely possible to prevent it before the pills could be taked by the patient.

The water of crystallization being the drawback to the proper administration of the medicine, the idea suggested itself to me of using dried sulphate of iron and anhydrous potassium carbonate.

One and a half grains of the dried sulphate of iron equals 2½ grains of the ordinary sulphate—and 1¼ grains of anhydrous carbonate of potassium equals 1½ grains of the ordinary carbonate—and these quantities are the exact chemical equivalents which will produce ferrous carbonate, and are the correct proportions for producing an ordinary Blaud's pill.

The next thing was to obtain an excipient free of moisture, and thus prevent decomposition until the pills should reach the stomach.

I made some pills composed of—

Dried sulphate of iron	36 grains.
Anhydrous carbonate of potassium .	30 grains.
Sugar of milk	25 grains.
Pulv. tragacanth.	10 grains.
Ol. ricini	q.s.

To make 24 5-grain pills.

The result was a soft mass, not easily rolled out. I succeeded so far as to produce the pills I have here, and after standing for forty-eight hours they were coated with gelatine, then set aside for fourteen days; after which careful estimation proved four of them to contain 6 grains of the dried sulphate of iron, B.P., this being the exact quantity introduced into the four pills, clearly showing that no oxidation whatever had taken place, and is equal to 20½ per cent. of anyhydrous ferrous carbonate.

Carrying still further my idea of using the dried salts, the next experiment was to introduce the ingredients into capsules. I calculated that 4½ grains of dried sulphate of iron and 4 grains of anhydrous carbonate of potassium would practically represent three ordinary Blaud's pills.

With these weights, and taking into consideration the capacity of the capsule used, it was easy to arrive at a working proportion.

A given quantity of each ingredient was taken and incorporated separately with a sufficient quantity of almond oil, so that when mixed the combined product was sufficient to fill a certain number of capsules, so that each one would represent three ordinary Blaud's pills.

There are samples on the table of two sizes. The small ones are equal to one, the larger to three Blaud's pills.

I set aside several of these for fourteen days, after which two of the larger ones were dissolved in hot water and carefully estimated; the result being highly satisfactory, each capsule was found to yield equal to 4½ grains of dried ferrous sulphate, clearly showing there had been no oxidation whatever, and, as shown in the pill mass, is equal to 20½ per cent. of anhydrous ferrous carbonate.

This is the exact proportion that should result from the decomposition of three ordinary Blaud's pills, provided no oxidation had taken place, which in the case of the ordinary Blaud's mass would be impossible.

I venture to think that this system of administering Blaud's ferruginous mass would carry out what must have been the original idea, in a satisfactory manner.

The pills as you will see are coated with gelatine, and may be kept for an almost unlimited period without any decomposition taking place.

[*The discussion on this paper is printed on p.* 873.]

NOTES ON BLAUD'S PILLS.*

BY PETER BOA.

I almost feel as though it were necessary for me to apologise for introducing a subject which has already been so ably treated during this session in this house.† Apart from Mr. William Duncan's valuable contribution to the subject the matter has been on two other occasions the subject of incidental discussion, once at a meeting of the Assistants' Association and again at the last Evening Meeting in connection with Mr. Gilmour's paper on pill coating. The points raised had relation principally to—

I. The form in which the iron should exist in the pills.

II. The best method of preparing them.

III. The desirability or non-desirability of coating the pills.

It may be that I have not anything new to advance in regard to any of these points. It seemed to me, however, that one or two things in connection with them might, with advantage be emphasised, and as Mr. Thompson was to have a note on the subject to-night I thought the present occasion a favourable one for unburdening myself of anything I have to say in regard to the matter.

First, then, in regard to the state in which the iron should be. To my mind there does not appear any reason to doubt that the intention of the originator of the formula for these pills was to administer by means of them ferrous carbonate. The original formula, which I believe is—

Ferri sulph. potass. carb.	āā ℥ss.
Pulv. althææ	gr. 30.
Tragac.	q.s.

cannot be made up without formation of ferrous carbonate, in fact conversion of nearly all, if not the whole, of the sulphate into carbonate.

Mr. Duncan remarks in his paper that many pharmacists believe that the reaction should take place in the stomach while the pill is being disintegrated, and they prepare the pills with a view to preventing decomposition in the mortar. This belief is not confined to pharmacists.

In a 'Manual of Gynecology,' by Hart and Bar-

* Read before the Pharmaceutical Society of Great Britain at an Evening Meeting in Edinburgh, Wednesday, April 13.

† "Blaud's Pills," by W. Duncan (*Pharm. Journ.* March 19, 1887, p. 775).

bour, page 543, there is a note as follows:—"Blaud's pill gives a ferrous carbonate and a potash salt, the decomposition taking place after the pill is swallowed." In connection with this note the undernoted formula is given, which is said to be that of a well-known firm:—

Potass. carb. sicc.	15
Ferri sulph. sicc.	15
Pulv. acaciæ	3
Syrup	9

Made into 5 grain pills.

So far as my experience goes I think Mr. Duncan is right in his supposition that the majority of pharmacists, and I may add medical men, believe Blaud's pills ought to contain ferrous carbonate when administered to the patient.

Assuming then that the pills should contain ferrous carbonate the next consideration is, What is the best method of preparing them so as to obtain the greatest amount of this?

In the course of my experience in making these pills, I have tried many variations of the original form with as many varieties of results. Before giving the formula to which I now adhere, I may as well briefly indicate the different stages in its evolution. Starting with the formula of 30 grains each of ferrous sulphate and potassic carbonate and 3 grains of tragacanth to make one dozen pills, I found that oxidation rapidly took place, and in a very short time little or no ferrous carbonate remained; the pills, too, became hard and insoluble. A physician told me the other day that he had known pills made in this way for hospital use pass through patients undissolved. The addition of sugar was tried, but with full quantity of the other ingredients the pills were too bulky. Finding on calculation that the potassic carbonate was in excess I left out some of it, and made up the difference with sugar; this gave better results as regards keeping, but still the pills became damp on the outside, and required frequent touching up to keep them presentable. During this time I had been using crystallized ferrous sulphate. Accidentally the granulated sulphate was on one occasion used, and this batch of pills was excellent. They looked well, and kept well. The mass was observed to be much firmer. Afterwards the granulated sulphate was always used, and with equal satisfaction. When it is borne in mind that cystallized ferrous sulphate and the granulated sulphate have both the same composition, viz., $FeSO_4 \cdot 7 H_2O$, inquiry naturally arises as to why one should give a different result from the other. The two sulphates which I have been using are the manufacture of the same firm, which is one of the very highest reputation for pharmaceutical chemicals; on volumetric estimation—

The crystals gave	54·73 per cent.	$FeSO_4$.
The granulated gave	57·0 „	$FeSO_4$.

or a difference of 2·27 per cent. Both samples apparently contain more than the theoretical amount of $FeSO_4$ which is 54·68 per cent. There is usually, however, a slight error in excess in volumetric estimations. The 2·27 per cent. of difference between the two was not borne out by drying a quantity of each and ascertaining the loss of water; in this way the difference was only slightly over 1 per cent. The Pharmacopœia test indicates about 1 per cent. more $FeSO_4$ in the granulated than the crystallized sulphate; the extra 1·27 per cent. was probably accounted for by slight oxidation of the crystals which change more rapidly than the granules.

Both samples appear to be practically $FeSO_4 \cdot 7 H_2O$. The crystals give a much softer mass than the granules, softer, too, than the granules give with 3 per cent. (more than the ascertained difference) of water added. It would appear, therefore, that there is a physical difference between the water in the crystals and that in the granules. On comparison of external appearance the crystals have a somewhat moist look, while the granules are dry. Probably the water of crystallization is more loosely combined in the former than in the latter. This idea is corroborated by several circumstances: for example, the crystals get brown spots of rust on them much more readily than the granules; and if the behaviour of the two salts when being dried be observed, it will be seen that the crystals, on application of heat, melt and cake, whereas the granules never aggregate, but gradually effloresce and fall to powder. The tendency of the crystals to rust follows them into the pills, which acquire brown spots on the surface more rapidly when made from them than from the granules. As a result of my observations I believe it is a matter of primary importance that granulated ferrous sulphate should be used in preference to the crystallized salt in the preparation of Blaud's pills. I have not been able to find a record of any previous observations on this point, but my experience conclusively indicates the superiority of the granules over the crystals, even although both be practically identical in composition.

The formula which I find gives a constant and satisfactory result is as follows:—

Granulated ferrous sulphate, B.P.	30 grains.
Potassic carbonate (15 to 16 p.c. H_2O)	20 „
Powdered sugar	10 „
Powdered tragacanth	3 „

Rub the iron and sugar together, then add the potash, and after trituration add the tragacanth and beat into a mass for twelve pills. The beating required is considerable, but nothing else is needed to make a mass which rolls easily if not allowed to lie.

This formula approximates closely to No. 2 (called Martindale's) in Mr. Duncan's paper. I prefer to use 20 grains potassic carbonate rather than 18 grains, however, because 17·8 grains of the salt containing 16 per cent. of water are required to completely decompose 30 grains ferrous sulphate, and it is desirable to have the alkali with a greater margin of excess. Each pill theoretically contains a little over 1 grain of ferrous carbonate.

In regard to the coating of these pills I have only a few words to say. The object of coating a pill is either to preserve it or cover its taste. When properly made Blaud's pills keep for any reasonable time with only a very trifling loss of ferrous salt; they are to all intents and purposes tasteless, any perceptible taste they may have is not objectionable. It appears to me, therefore, unnecessary to coat them. It is, besides, just possible that coating may be an objection in the case of pills that are taken in such numbers, from nine to eighteen being a common daily dose. Mr. Gilmour told us at the last Evening Meeting that he had examined pills, 30 per cent. of which was coating. If the pills were not potent, it would be hard to say in such a case whether they or the coating would be the active agent.

[*The discussion on this paper is printed on p.* 873.]

UNCOMBINED ALKALI IN SOFT SOAP.

AN UNSUSPECTED REACTION EXPLAINED.

BY HARRY NAPIER DRAPER, F.C.S.

Dr. Redwood (*Pharm. Journ.*, xvii., p. 742), speaking of the soft soap of the Pharmacopœia, says:—

"What has very much surprised me has been that all the samples I have examined have been free from uncombined caustic alkali, as indicated by the addition of a drop of phenolphthalein to a cold filtered solution of the soap."

and again (p. 754):—

"Once or twice he had been deceived upon dissolving the soap in rectified spirit, and pouring off the clear part and adding the phenolphthalein to it. In that way he at once got a deep reddening, but he had never met with any sample in commerce which, if carefully filtered after being dissolved, gave any indication with the phenolphthalein test."

This result, however, must not be taken as at all indicating that a given specimen of soap is free from caustic alkali, and those for whom the subject has more than a passing interest may be referred to a recent paper in the *Chemical News* (lv., p. 143, April 1, 1887) in which are detailed some of the phenomena attendant upon the presence of alcohol in a liquid also containing phenolphthalein and a fixed alkali.

In the experiments of Dr. Redwood either of two things might have occurred:—

(*a*) The soap might have contained a trace of free alkali, reddening phenolphthalein, but this during the filtration would absorb carbonic acid and be thrown out of solution as carbonate, or,

(*b*) The water present in the soap would enable the alcohol to take up enough carbonate (even absolute alcohol at 100° dissolves enough potassium carbonate to deeply redden phenolphthalein) to give the reaction, but this on cooling during filtration would equally be eliminated from the solution.

And in either case, if the quantity of uncombined alkali or of carbonate were but small, the alcohol would so rapidly absorb carbonic acid as to produce a bicarbonate, which, as is well known, has no colouring action upon phenolphthalein.

As a matter of fact, when an ordinary sample of Pharmacopœial soft soap is dissolved in cold rectified spirit, the unfiltered solution reddens phenolphthalein and the filtered solution does not. If to the filtrate a trace of dry potassium carbonate be added, the liquid again colours the reagent, and when once more filtered passes coloured through the filter. If the flask containing the filtrate be shaken, the colour becomes gradually fainter and fainter, and if breathed into and again agitated the colour disappears entirely and so suddenly as to make the reaction, minus the soap and with nicely graduated solutions, form as striking a lecture experiment as can be well imagined.

It is probable that traces of both potassium hydrate and carbonate are present in even the best specimens of sapo mollis, B.P.

AN EXAMINATION OF THE LEAVES OF GYMNEMA SYLVESTRE.*

BY DAVID HOOPER.

Gymnema sylvestre (R. Br.) is an asclepiadaceous plant growing in the Deccan peninsula, from Concan to Travancore; it is also met with in Assam and on the Coromandel coast, and is distributed in the African continent. It is a stout woody climber with long slender branches. Its name in Tamil is sim-kurinja, in Malay alum chem-kecriûûi; these names refer to a "small hilly" plant.

The leaves are opposite, entire, from 1½ to 3 inches long and from 1 to 2 inches broad, elliptic or obovate, acute, rounded or pointed rarely cordate at the base, thinly coriaceous, both surfaces shortly pubescent or puberulous, the upper darker than the lower surface.

Gymnema sylvestre is mentioned in the non-official list of the Indian Pharmacopœia, 1868; and in Dr. Dymock's 'Materia Medica of Western India.' The powdered root has for a long time been known among the Hindus as a remedy for snake-bites; in such cases it is applied locally to the part affected and also taken internally in the form of a decoction. The most curious circumstance connected with this plant was first noticed by Mr. Edgeworth, who discovered that by chewing some of the leaves it destroyed the power of the tongue to appreciate the taste of sugar; he found that powdered sugar, taken immediately after masticating some of the leaves, tasted like so much sand in his mouth, and this effect lasted for twenty-four hours. Dr. Dymock regarding this property said he was unable entirely to confirm this statement, his experience was, that sugar taken into the mouth immediately after chewing the fresh plant had a saltish taste, but was still easily recognizable. Some leaves from an authentic source were procured by Mr. Lawson, who placed them at my disposal for chemical examination. They had a bitterish astringent and slightly acid taste; after chewing one or two leaves it was proved beyond doubt that sugar had no taste immediately afterwards; a saltish taste is experienced if too small a quantity of the leaf is used. Sugar in combination with other substances in dietetic articles is plainly destroyed as to its taste after using these leaves; in ginger-bread, for instance, the pungency of the ginger is alone detected, the rest is tastless meal; in a sweet orange the taste of the sugar is so suppressed, and that of the citric acid consequently developed, that in eating it resembles a lime in sourness. Among the several kinds of foods, drugs and beverages which affect the palate Gymnema leaf does not profess to render them all tasteless; it does not affect pungent and saline things, nor astringents and acids. It is limited apparently to two diverse substances, sweets and bitters; it has been noticed that sugar taken after the leaf tastes like so much sand, so I have found that quinine sulphate taken after a good dose of the leaf tastes like so much chalk. I am not going to propose its use in the administration of nauseous drugs until the medical properties of the Gymnema have been more studied, otherwise the quantity of the vehicle taken may prove to counteract the effect of the medicine. The experience of several friends, as well as my own, is that the effect peculiar to the leaf does not last twenty-four hours, as stated, but for only one or two hours; after that time the tongue resumes its appreciation of all that is sweet or bitter.

A quantity of the leaves obtained from Guindy Park, Madras, were sun-dried, and reduced to fine powder. By boiling with water and distilling no aroma was perceived, and nothing volatile was condensed. The powdered leaves were submitted to the action of various solvents, and by this means it was ascertained that the peculiar property of Gymnema leaves was dissolved out by alcohol, and as it occurred in the aqueous extract of the residue, it was therefore soluble in water. As benzine and

* Paper read before the Nilgiri Natural History Society, Ootacamund. Communicated by the Author.

ether took from the powder certain principles of the same appearance and weight, it was conceived that nothing would be gained by using both solvents; the preliminary examination was therefore made with ether previously rectified from spirits and water. The ether extract consisted of chlorophyll and two resins separated by their solubility in alcohol. The resin insoluble in spirit formed the larger portion; it was soluble in chloroform, bisulphide of carbon, and benzine. It was elastic and tenacious, decomposed by warming with nitric acid, the product being precipitated with water, and only partially saponified with caustic potash. Sulphuric acid dissolved it in the cold, giving a green solution. It seemed to consist principally of a neutral resin. The resin soluble in alcohol was readily saponified with soda, and gave a permanent greenish-blue colour with sulphuric acid; like the former resin it was of an acid nature, and left a tingling sensation in the throat.

The alcoholic solution of the leaves was almost entirely soluble in water; in fact by treating the leaves separately by alcohol and water 36·37 per cent. organic matter was extracted, and by treatment with water alone 36 per cent. was removed. By direct experiment it was found that 0·47 per cent. was an acrid resin similar to those found in the ether extract. The aqueous solution of the substances soluble in alcohol had a decidedly acid reaction; it gave no coloration with ferrous or ferric salts, showing absence of tannin. It was not precipitated with Löwenthal's gelatine-salt solution. It was deepened in colour by alkalies, but gave bulky precipitates with sulphuric, nitric, hydrochloric and acetic acid. It reduced Fehling's solution on boiling, gave a cloudiness with Nessler, a grey precipitate with lead acetate, but none with picric acid or tannin. The precipitate caused by sulphuric acid was collected on a filter and washed until it ceased to give a cloudiness with barium chloride. This yielded when dry a greenish powder, insoluble in water, but soluble in alcohol, ether, benzine and chloroform. With potash, soda and ammonia it afforded a fine red solution with orange coloured froth, but this was thrown down on the addition of the mineral acids. It dissolved in concentrated sulphuric and nitric acids with intense red colour, but in both mixtures it was destroyed by water. It fused at about 60° C. into a brittle blackish mass. Heated in a test-tube it gave off fumes of creasote, but no crystals were obtained in a subliming apparatus. Gently ignited it first fused, then intumesced, and burnt with a bright flame leaving no ash. It was thrown down as a bulky grey precipitate by acetate of lead; the lead salt decomposed by sulphuretted hydrogen in water left the substance in the evaporated reddish filtrate from the lead sulphide. The body just described has the characteristics of chrysophanic acid; but it having some distinctly peculiar reactions, and possessing the anti-saccharine property ascribed to the leaves under examination, I propose to call it *gymnemic acid*.

Gymnemic acid forms more than 6 per cent. of the constituents of the leaves in combination with a base which has not been isolated. Another organic acid was present in the lead acetate precipitate which was identified as tartaric acid. The filtrate from the insoluble lead compounds was treated with sulphuretted hydrogen gas, and the clear liquor after evaporation was examined for sugar. Glucose was recognized in some quantity by its immediate and abundant reduction of copper in Fehling's solution. The sugar, examined in the tube of a polariscope, had a left-handed rotation.

Chloroform agitated with an alkaline solution of the leaf left a crystalline residue of brownish colour, it had a bitter taste, and produced a flow of saliva. With the ordinary alkaloidal reagents it afforded a distinct precipitate, but it was a neutral principle. Its real nature and properties, as well as those of gymnemic acid, are reserved for a future investigation. The leaves, after being exhausted with ether and alcohol successively, were treated with water. The gum was separated and estimated by spirit in the usual manner. A carbohydrate, still more insoluble in spirit than gum, was found in this extract. It reduced Fehling's solution after prolonged boiling with acid, and was optically inactive.

Diluted soda removed a brownish liquid which consisted of albuminous matters, not all of which was rendered insoluble by alcohol and acetic acid. These were not weighed, but calculated by difference.

A solution of one per cent. hydrochloric acid was employed to remove the oxalate of calcium. A microscopical examination of the powdered leaves showed a fair amount of the conglomerate raphides, in that peculiar crystalline form known to exist in rhubarb. The dilution of the acid menstruum rendered this process very tedious, so a stronger acid was used, and the marc washed until ammonia produced no cloudiness with the acid solution. The collected alkaline liquors were allowed to subside, and the sediment was collected on a filter, dried and weighed, then incinerated and weighed again. The calcium carbonate was calculated into oxalate, and the difference between this and the first weighing was reckoned as pararabin. No oxalic acid was found in the free state.

The ash of Glymnema leaf is very high, a fact in accordance with the amount of lime salts. Gentle ignition of the air-dried leaves left as much as 11·65 per cent. and about one half of this was calcium carbonate. One hundred parts contained—

15·41	soluble in water.
78·71	soluble in acid.
5·88	sand and silicious residue.

The cellulose was estimated by steeping the leaves in sulphuric acid of sp. gr. 1·50 for thirty hours, washing, drying, weighing, burning and deducting the ash; this result did not differ materially from the weight of the totally exhausted powder treated with chlorine water and estimated with the usual precautions.

The following is the tabulated analysis of the *Gymnema sylvestre* previously dried in the sun and powdered :—

Ether extract (chlorophyll and resins)		5·51
Alcoholic extract (gymnemic acid, tartaric acid, glucose, neutral bitter principle, etc.)		19·50
Aqueous extract (gum 1·45 per cent.), glucose, carbohydrate and extractive		16 87
Alkaline extract, by difference (albuminous and colouring matters)		8·15
Acid solution	calcium oxalate	7·64
	pararabin	2·74
Ash (balance of)		5·69
Cellulose		27·86
Moisture		6·04
		100·00

NEW COMPOUND VALERATES.*

BY R. ROTHER.

There is a considerable number of strictly monobasic acids which generate multiple and acidic salts that are the exact analogues of compound salts derived from polyhydronic radicles. That some mode of chemism not expressible in unit valence binds the molecules together is undoubted. The writer has heretofore in explanation of this state assumed a coalescence dependent upon fractional bonds and preferably assigned this union to the basic rather than the acidic part of the saline compact. But the writer now believes that a more comprehensive view of the case results by assuming a polymerization of the implicated acidic radicle. Thus taking, for instance, a double molecule of chlorhydric acid and representing it by $H_2(Cl_2)$ we may replace half the hydrogen by a quinium residue and obtain acidic quinium chloride $(QuH)H(Cl_2)$ an authenticated salt. When quinine as free base is added in excess to ferric chloride, ferric hydrate is precipitated. On adding chlorhydric acid just sufficient to dissolve the hydrate and then adding quinium chloride as long as combination results a chloride of iron and quinium is obtained which may be represented by $Fe(QuH)(Cl_4)$.

When its solution is evaporated spontaneously or with a gentle heat, the double salt remains as a nondeliquescent red-brown amorphous readily soluble mass. On a former occasion (*Pharm. Journ.*, [3], xv., 66) the writer stated that the crystallized ammonium valerate of the market is an acidic salt of valeric acid, but its exact composition was not ascertained. Recently the writer experimented with magnesium carbonate on this compound. From the proportion of carbonate then dissolved it was deduced to be a diacidic valerate having the formula $(NH_4)H_2(Va_3)$. The ammonium and magnesium valerate $NH_4Mg(Va_3)$ thus resulting has an exceedingly sweet taste, free from valeric flavour or bitterness. Its odour is but a faint reminder of its origin. It may be manipulated and exposed with impunity without tainting the atmosphere with the disagreeable aroma of valeric acid. This compound salt is extremely soluble, but can readily be obtained as a nondeliquescent crystalline mass on evaporating its solution to a syrupy consistence. Viewed under the microscope with a half-inch objective it is seen to be made up of spinules arranged in star-shaped groups. Its appearance in polarized light is very fine.

This salt is soluble in alcohol in all proportions, but the residue left on evaporation gives no satisfactory appearance under the microscope. When valeric acid is treated with excess of magnesium carbonate in the presence of water a solution of magnesium valerate results. This solution, whether concentrated or dilute, appears to be acted on by the carbonic anhydrate of the atmosphere, as a thin insoluble pellicle of magnesium carbonate soon covers the surface. In consequence the dry salt cannot be secured entirely free from this contamination. Nevertheless the salt gives a very satisfactory appearance with the microscope whilst the polariscopic effect is very pleasing. The crystals have the form of delicate branched wavy filaments emanating from a centre. This salt has an all-proportional solubility in alcohol, which solution leaves an amorphous residue. This with a half-inch objective and B eye-piece is seen covered with branched wavy striæ. The alcoholic residue differentiates no colours with the polariscope.

Magnesium valerate forms a compound salt with quinium valerate of extreme solubility in water and in alcohol. The aqueous solution is only stable when highly concentrated, since the addition of water at once precipitates the greater portion of the quinium salt. An aqueous solution containing some alcohol remains intact, whether strong or dilute. Such a solution can be heated with impunity during evaporation without separating quinium valerate, providing some alcohol is continuously present. Toward the last all the alcohol must be dissipated in order to permit crystallization. The dense residue when left at rest sets to a crystalline mass after some time. But if stirred for a short time after a rather dense pellicle has covered the surface congelation of the whole mass immediately takes place, leaving a perfectly dry salt. Its appearance under the microscope resembles that of magnesium valerate. The writer believes that the formula $(QuH)Mg(Va_3).x$ Aq. represents its composition.

Although magnesium valerate in aqueous solution suffers decomposition on exposure, the compound salts remain unaffected. In the dry state the compound salts are wholly odourless, whilst their solutions have but a feeble valeric odour; owing to their rather agreeable flavour and inobtrusive odour they commend themselves instead of the simple salts. The writer would suggest an elixir of ammonium and magnesium valerate.

Great convenience results from having in stock an aromatized liquor for general use in the preparation of elixirs. Such a liquor might be termed an alcarome. In a general way glycerin appears better applicable than sugar as a sweetening for elixirs. The mixture of three measures of alcarome with one measure of glycerin might then be appropriately designated as a glycarome.

The writer prepares alcarome by separating the shells from 3 drachms of cardamom and triturating the grains to a fine powder. One and a half troy ounces of coriander is then also finely powdered. The two powders are then mixed with ten drops of oil of cassia and ½ a troy ounce of powdered magnesium carbonate. This powder is now added to a mixture of 2 pints of alcohol and 4 pints of water. The whole is set aside for several days, well shaken at intervals, then poured into a filter, and the filtrate brought to the measure of six pints by the addition of enough ($\frac{1}{3}$) alcohol through the filter.

To prepare elixir, or rather glycarome of ammoniomagnesium valerate, 1 troy ounce of valeric acid is mixed with 6 fluid ounces of water and 125 grains of ammonium bicarbonate. After all the bicarbonate is added and decomposed an excess (about 3 drachms) of magnesium carbonate is incorporated during occasional stirring. One drachm of cochineal is now rubbed to a fine powder and mixed with a solution of the valerates. The mixture is then poured into a filter, ond when all the liquid has passed down, followed by alcarome until 24 fluid ounces of filtrate is collected. To this 8 fluid ounces of glycerin is added, and the whole well mixed.

* From the *American Journal of Pharmacy*, April.

NOTES ON ESSENTIAL OILS.

The Spring Report on essential oils and allied compounds, issued by Messrs. Schimmel and Co., of Leipzig, contains, besides much useful information as to stocks and prices, a number of interesting notes, from which the following are selected: —

Anise Oil.—The quality of the supplies of "1886" anise are said to be very unsatisfactory. About one half the samples have an admixture of brown fruit; and half the remainder contain more or less large swollen tasteless fruit, which Messrs. Schimmel believe to have been already submitted to distillation. This appears to constitute a new form of adulteration.

Valerian Oil.—Under this name a supply of essential oil has been received from Japan, apparently of good quality, and agreeing chemically and in respect to odour and taste with genuine oil of valerian. Nevertheless the oil is believed not to have been derived from the usual source, but from the root of *Patrinia scabiosæfolia*, Link., known in Japan under the name "Kesso." According to Holmes (*Pharm. Journ.*, [3], x., 22) the root itself has before now appeared in the London market. The odour of the root is described as being even more powerful than that of *Valeriana officinalis*.

Bay Oil.—The demand for this oil, which is used in the preparation of "bay rum," is said to be steadily

increasing on this side of the Atlantic. This has led to it being substituted sometimes by mixtures of the oils of pimento and laurel, from which it is, however, easily distinguishable by specific gravity and odour. The genuine distillate from the leaves of *Myrica acris* has a sp. gr. of 1·040, does not dissolve completely in an equal volume of absolute alcohol, and when mixed with an equal volume of strong solution of potash forms a semi-solid mass. It is mentioned that in consequence of the difficult solubility of this oil, "bay rum" is always turbid when prepared and should be carefully filtered.

Cajeput Oil.—The chief market for this article is Macassar, and the principal seat of its production is the island of Booro.

Camphor Oil.—Under the name of "light camphor oil" the firm has introduced into commerce, as a substitute for turpentine oil, the light-boiling fraction of the bye-product obtained in large quantities in the preparation of safrol. One advantage claimed for it is its relatively high flashing point which, with the barometer at 763 mm., is said to be 44·5° C., that of turpentine oil being given as 33·75° C. The specific gravity is 0·895–900 and the boiling-point 175° C. There is also a "heavy camphor oil," which is a green liquid, sp. gr. 0·960–0·970, and boils about 240–270° C.

Cassia Oil.—In view of the probability that considerable adulteration of this article takes place, it is pointed out that the specific gravity is a good indication, because there is no practicable adulterant that is not specifically considerably lighter than cassia oil. Good pure cassia oil should have a sp. gr. of at least 1·068 at 15° C. A lighter oil should be unhesitatingly looked upon as doubtful. Some oil that was found to have a sp. gr. of only 1·029 proved, on further examination, to contain about 30 per cent. of cedar-wood oil, sp. gr. 0·945.

Cedar-wood Oil.—The American imports of this article are said to be of inferior quality, since they consist of only the more volatile portions of the normal cedar-wood oil, being obtained not by ordinary distillation, but by condensation of the vapour given off during the drying of the "red cedar" wood. (*Juniperus Virginianus*).

Chamomile Oil.—The supply of "Roman chamomiles" for the distillation of this oil is said to be falling off, and likely to cease altogether in a few years. The German field chamomile is now used largely for the purpose.

Citronella Oil.—Consul Freudenberg, the German consul in Colombo, this oil is produced in Ceylon almost exclusively in the southern provinces of the island, partly by the richer natives, holding the larger plantations, and partly by the poorer ones, who plant their small plots of land with citronella grass. The former carry on the distillation in regular apparatus by means of steam; the poorer manufacturers boil their grass in small boilers, and construct with earthen vessels a primitive distillatory apparatus. The oil is distilled throughout nearly the whole year, though December and January, March and April, and July and August are the most favourable periods; and good plantations give three crops that correspond nearly with these periods. At present prices the poorer natives can only hold their own by performing all the labour themselves; but the richer ones manufacture on more rational principles, and, therefore, more cheaply. A well-managed plantation will yield per acre 24 flasks (about 45 kilos) three times a year, an inferior one only 18 flasks twice a year. One of the chief difficulties in the industry is the want of fuel. Some years since citronella oil was much adulterated with petroleum, but this was easily detected by observing the specific gravity, so that natives have now given up the practice. Notwithstanding this statement, Messrs. Schimmel say that they have met with a sample containing a considerable quantity of a product of the petroleum distillation having a sp. gr. of 0·830 and boiling at 250° to 300° C. The export of citronella oil from Ceylon during the year 1885 is estimated at 6,461,278 ounces, or upwards of 400,000 pounds, 3,623,701 ounces of which came to this country.

Coriander Oil is said to find an increasing use, not only in the manufacture of liqueurs, but also in perfumery.

Elemi Oil.—This oil, distilled from Manila resin, is spoken of as likely to become an important article in perfumery.

Geranium Oil.—Speaking of the production of this oil in India it is remarked that the "geranium" or "rusa-grass" (*Andropogon Schoenanthus*) undoubtedly yields both the fine "geranium" or "palmarosa" oil, as well as the ordinary "ginger-grass" oil; but in what relation the two oils stand to each other has not yet been ascertained. An adulteration with turpentine has been suggested, but it is thought quite as probable that certain fractions of inferior odour may be separated in the distillation, and constitute the ginger grass oil of commerce.

Hop Oil.—It is stated that in respect to hop aroma 600 grams of the fine distilled oil will correspond to about 100 kilos of prime unsulphured Bavarian hops.

Iris Oil.—In the preparation of this delicate oil it is found necessary to keep the temperature as low as possible, never exceeding 100° C. Its distillation more or less *in vacuo* can be accomplished in laboratory experiments, but in working on the large scale there remain many difficulties yet to be overcome. The yield is only one part of oil from one thousand parts of the root.

Linaloe Oil.—The principal demand for this oil is said to be for the manufacture of a favourite perfume known as "Maiglöckchen-Composition" (lily-of-the-valley), of which it is said to form the basis. The oil should not be used when freshly prepared, since it improves in aroma by being kept a year or more.

Mirbane Oil.—"Oil of Mirbane" is said to be increasingly used as a soap perfume, and also to cover the disagreeable odour of common soaps, for which purpose it is superior to any essential oils.

Myrtle Oil and Myrtol.—Myrtol, which has been recently strongly recommended in the treatment of bronchial and pulmonary catarrh and certain affections of the bladder, consists of the portion of myrtle oil that boils between 160° and 170° C.

Opopanax Oil.—The distillate from opopanax resin is said to be coming much in favour with perfumers.

Patchouli Oil.—The patchouli herb imported from Calcutta and Bombay contains usually 75 per cent. of stalks, and does not yield nearly so fine a distillate as that shipped from the Malay peninsula. The Java patchouli is still better in appearance, but is inferior in fragrance.

Peppermint Oil, Japanese.—An obstacle to the use of the Japanese peppermint oil for food purposes is its peculiar bitter taste. Messrs. Schimmel have reason to believe that the constituent of the oil to which this is due is menthon ($C_{10}H_{18}O$), and are experimenting with a view to its removal.

Rosewood Oil.—Under this name a mixture of essential oils is now met with, the genuine oil distilled from the root-wood of *Convolvulus scoparius* having disappeared from commerce. A small quantity of the wood has recently been received from the Canary islands, and some oil distilled from it is described as of a beautiful golden-yellow colour, having an extremely agreeable rose-like odour, and solidifying, like rose oil, at about +12° C. to form acicular crystals.

Sandal Wood Oil, East Indian.—The question is raised whether the regulation of the East Indian Government that forbids the felling of sandal wood trees before maturity, which is reached in eighteen to twenty-five years, is not too stringently carried out. The felling takes place at the end of the year; the stem is freed from bark, cut into logs and sorted. The finest oil is yielded by dark mature heart-wood; such oil, kept for some years, matures and develops a very fine odour. A lower priced, but far inferior oil, is yielded by the sandal wood grown in the Dutch East Indies, for which Macassar is the principal market.

(*To be continued.*)

The Pharmaceutical Journal.

SATURDAY, APRIL 23, 1887.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

VARYING CHARACTERS OF SOME IMPORTANT MEDICINAL AGENTS.

SOME weeks ago, in mentioning the address delivered by Dr. WHITLA on the present position and prospects of therapeutics, reference was made to his opinion of the assistance that has been rendered to the physician, not only by chemical investigation, but also by pharmacy, in making provision for the use of drugs with greater precision. The preparation of the basic constituents which are the active principles of various medicinal plants was instanced as one of the chief contributions of importance in this direction, and there is no doubt that in some instances the treatment of disease has been greatly facilitated by placing at the disposal of medical men such definite substances as quinine, strychnine, morphine, etc. But among the number of substances belonging to this class there are many which give rise to such different results when employed in medical treatment or in physiological investigation, that it appears evident our knowledge of them is still imperfect. To some extent such different effects may be ascribed to the kind of animals upon which experiments are made, or when the same kind of animal is experimented upon, to the age, sex, or individuality, and especial susceptibility to the influence of the substance administered. In some cases, also, the mode of preparation or the degree of purity of such substances may partly account for the different effects produced. Such differences of effect or inequality in the action of medicinal agents are, however, found to obtain as matter of experience, and in the absence of more precise knowledge of the various causes by which they are brought about it is customary to ascribe them either to an assumed impurity of the particular agent used, or to the idiosyncrasy of the patients. In some instances the directions given in the various Pharmacopœias for the preparation of certain medicinal agents, and for the regulation of their strength, differ in a more or less marked manner from each other, and sufficiently to make the products themselves very different. Even those substances for the preparation of which no directions are given, and there is no statement as to the amount of active principle, but which are defined in the various pharmacopœias solely by a description of their characters, do not unfrequently present very considerable discrepancies in their chemical composition or nature and in their pharmacological value. Thus, for instance, the opinion formerly entertained that the alkaloids met with in commerce constitute in a pure state the active principles of plants, has in several cases been found to be incorrect. Extended investigation has shown that in most of the plants possessing poisonous and medicinal properties, more than one alkaloid or glucoside occur, and that these substances, often differing very much in their physiological action, are not completely separated from each other by the methods of preparation in general use. In other instances it has been found that such active principles of plants are liable to undergo alteration by the processes adopted for their extraction, so that they are either rendered inactive or so changed that their physiological action is entirely different from that of the substances contained in the plants.

In this way it happens that, according to the more or less careful preparation of the alkaloids glucosides, etc., these substances, as met with in commerce, may often consist of varying mixtures of the supposed pure substance with others naturally associated with it in the plant or resulting from alteration. Thus, for instance, the pilocarpine of commerce contains, besides true pilocarpine, jaborine, which has a different physiological action. Eserine or physostigmine not infrequently contains also calabarine; quinine salts also contain cinchonidine, which, according to some authorities, has a tetanizing action. As still more marked illustrations of this fact may be mentioned aconitine, atropine, daturine, narceine, veratrine, digitalin, paracotoin, podophyllin, and many other substances of a like nature, which as generally met with in commerce are often varying mixtures of very different pharmacological value. Such differences in the composition of medicinal agents known by the same names are of importance, since their use might be attended with danger, and hence great attention has lately been paid to the importance of ensuring uniformity in the medicinal agents known by particular names. The attempts that have been made to prepare and introduce an international pharmacopœia may be referred to as indicating the interest that has been taken in this subject, though unfortunately they have not as yet been successful.

Some years ago attention was particularly directed to this subject by Dr. C. J. SNIJDERS, in a paper published by him in a Dutch medical journal, and the Medical Society of Holland, deeming the matter worthy of consideration, commissioned Dr. PLUGGE to prepare a report on the state of knowledge existing in regard to it. The report was intended to present a general summary of what is known in regard to medicinal agents that are employed under the same names, but at the same time differ in composition

and in pharmacological action. This report has now been completed, and published in the form of one hundred and fourteen pages of text, with copious tables giving a comparative survey of the differences between preparations described in various pharmacopœias under the same names. The main object in view was to show in a condensed form what medicinal preparations differ in composition, and, presumably therefore in their effects, pointing out the circumstances which determine these differences, and the influence they would exercise upon their action. In the case of the alkaloids and glucosides it was considered desirable to enter into a more detailed consideration of the conditions under which they occur naturally asssociated with other substances, the influences exercised by the selection of particular parts of a plant for their preparation, by the age of the plant as well as the climate and soil in modifying the amount and relative proportion of the substances associated together in the plant; lastly, also the important influences exercised by the process adopted for the extraction of these substances, and by the mode of preserving them, upon their external characters.

As a compilation of what is known respecting the more potent alkaloids, the report contains a large amount of information, and is also useful as a means of reference to original memoirs. The section on digitalis may be taken as a good illustration of the character of the work. After mentioning the time of collection and the difference between wild and cultivated plants, etc, the characteristic components are described as follow:—First comes the *digitalin* obtained by HOMOLLE in 1845, a very poisonous non-nitrogenous substance. Further investigation proved that it was not a simple substance, but a mixture of several, which have not always been designated by the same names. The product to which HOMOLLE and QUEVENNE gave the name of "French *digitalin*" consisted, according to them, of three substances—*digitalin*, insoluble in ether-alcohol; *digitaline* and *digitalose*, both soluble in ether-alcohol. German *digitalin*, which was at first named *digitalosin* by WALZ, and afterwards *digitalin*, was also a mixture containing, according to him: 1, *digitalin*, convertible by acids into *paradigitaletin*, *digitaliresin* and glucose; 2, *digitaletin*; 3, *digitaloin* (or *digitaloic acid*); 4, *α* and *β-digitalacrin*; and 5, *digitalis fat*. NATIVELLE prepared from digitalis leaves a very active product containing three substances, *digitalein*, *digitalin* and *digitin*. WIGGERS gave different names to these substances as follows:—*digitalein* he named *digitalin*, or digitalinum activum; *digitalin* he termed *digitalein*, or digitalinum incrystallis, also a potent substance, but amorphous; *digitin* he named digitalinum passivum. The confusion thus caused made a fresh examination of the leaves desirable, and that was undertaken by SCHMIEDEBERG in 1875, who established the existence of several substances, to which he gave the names that are still generally retained: 1, *digitonin*, resembling saponin, and destitute of the characteristic effect of digitalis; 2, *digitalin*, a crystallizable glucoside very sparingly soluble in water; 3, *digitalein*, differing from the last substance chiefly in its solubility in water and amorphous condition; 4, *digitoxin*, a crystallizable substance almost insoluble in water, but the most potent constituent of digitalis leaves. All three of the last named substances have the action of digitalis, though in various degrees of intensity. The decomposition products of these four substances formed by the action of acids are partly active and partly inactive. These substances probably occur in varying proportions in digitalis leaves, and by reason of their unequal solubility in water, such preparations as the infusion, extract, tincture, etc., are likely to be of unequal strength. Hence the danger attending the use of digitalis preparations, and therefore the desirability of obtaining a definite active principle of uniform character for the use of this drug in such a manner that it can be relied upon. The substance met with in commerce under the name of digitalin does not, according to Dr. PLUGGE'S opinion, answer to this, but is like commercial aconitine, a varying mixture sometimes amorphous, sometimes crystalline, sometimes soluble in water, and sometimes insoluble. For these reasons Dr. PLUGGE thinks it so difficult to decide which can be relied upon, that the use of these substances and even of digitalis itself should be entirely dropped, and that until a trustworthy form of preparation can be devised, a substitute should be sought for among the numerous drugs which resemble digitalis in their effects.

The report to be presented by the Council of the Pharmaceutical Society of Australasia to the members at the annual meeting, which was to take place on the 9th ult., appears to be a satisfactory one in respect to membership as well as finance. It is suggestive that there has not been one call made on the Benevolent Fund during the year. As an instance of the growing importance of pharmaceutical institutions in Victoria, it is stated that the Council of the Melbourne University has made it compulsory that all its medical students shall attend the course of instruction in Practical Pharmacy at the Society's College. Mention is also made of the recent visit of Messrs. Bosisto and Bowen—past and present Presidents—to this country, and gratification expressed as to the courtesies they received.

* * *

The *National Druggist* estimates that there are at present about nine hundred senior students in the colleges and schools of pharmacy in the United States, and that at least six hundred of them will succeed in obtaining the title of "graduate in pharmacy" at the approaching close of the session. The number is large, but is not considered to be in excess of the demand, and our contemporary pertinently remarks that even if it were, the educational colleges are not to be held responsible for the increasing

number of people who believe they can earn a competency in the practice of pharmacy.

* * *

We learn from the *American Druggist* than an effort is being made in Brooklyn to secure legislation that would prohibit the dispensing of cocaine and its salts, excepting upon the authority of a physician's prescription. As no restriction is laid upon the dispensing of any other medicine, and practically little or no restraint is exercised over the sale of poisonous drugs in the city, it is somewhat surprising that cocaine should be the first medicinal substance selected to become the subject of exceptional legislation.

* * *

According to a recent consular report from Java, enclosing some statistics supplied by the local Planters' Association, the private plantations of cinchona in that island cover 21,000 acres, and contain 30,000,000 trees, of which 14,000,000 are *C. succirubra* trees. The crop for 1887 is estimated at 1,433,250 pounds of bark, capable of yielding on the average 3 per cent. of quinine. In addition there are in the Dutch Government plantations 3,436,700 trees, of which 2,004,700 are "Ledgeriana" plants.

* * *

The French have not yet been very fortunate in their attempts to introduce the cultivation of cinchona in any of their colonies. The attempt made in Algeria appears to have been abandoned ; but, according to the *Archives de Pharmacie*, some experiments commenced two years since in the Ile de la Réunion are likely to be crowned with success. Our contemporary is "awaiting with impatience the moment when the French will be able to provide themselves with cinchona bark without being tributaries to foreign countries."

* * *

In a paper on the official organic drugs of five countries, by Professor Oscar Oldberg, it is estimated that the United States, British, German, French and Swedish Pharmacopœias include between them 593 drugs of organic origin. Out of the entire number only 99 are included in all five of the pharmacopœias, 56 in four, and 43 in two, while 300 are only mentioned in one of them. Of these 300 organic drugs included in only one pharmacopœia, 52 are official in the United States, 13 in Great Britain, 9 in Germany, 9 in Sweden, and no less than 217 in France.

* * *

The post of second botanical assistant in the British Museum, vacated by the appointment of Mr. Fawcett to the Directorship of the Jamaica Public Gardens, in succession to Mr. D. Morris, now Assistant-Director at Kew, has been filled by the appointment of Mr. E. G. Baker, who last year carried off the Pereira Medal, the Peter Squire Prize, and other honours in connection with the School of Pharmacy, Bloomsbury Square.

* * *

At the next meeting of the Chemical Society, to be held on the 21st instant, papers will be read on "The Atomic Weight of Gold," by Professor T. E. Thorpe and A. P. Laurie ; "The Atomic Weight of Silicon," by Professor Thorpe and J. W. Young ; "Substitution in the Benzene Series," by Dr. H. F. Morley, and "A Contribution to the Study of Well Waters," by R. Warington.

Transactions of the Pharmaceutical Society.

EVENING MEETING IN EDINBURGH.

The third Evening Meeting in Edinburgh of the present session was held in the Society's House, 36, York Place, on Wednesday evening, April 13, at 8.30. Mr. H. Bellyse Baildon, B.A., F.R.S.E., Chairman of the Executive of the North British Branch, in the chair.

The minutes of last meeting having been read and approved, a paper was read:—

Amorphous Cocaine.

BY RALPH STOCKMAN, M.D.

Dr. Stockman illustrated his paper by a very successful practical demonstration and a number of specimens.

The paper is printed at p. 861, and gave rise to the following discussion :—

The Chairman said he was sure they had all listened with pleasure to Dr. Stockman, to whom they were much indebted for this able and interesting communication on a subject of much pharmaceutical interest.

Dr. Clark said the paper had produced an effect the opposite of that attributed to the substance dealt with, because in place of arresting his intellectual appetite he had an insatiable desire to hear more. The paper contained much that would be very useful to those who were working at this subject.

Mr. Dott said the word "amorphous" as applied to alkaloids was frequently used in a somewhat loose and ambiguous way. It ought to be applied only to an allotropic modification of a crystalline body, and not, as was often done, to an isomeric body which might be essentially different. Dr. Stockman stated that he had exhausted all the methods usually employed in the separation of alkaloids. He should like to ask if he had tried fractional precipitation, which sometimes succeeded when other methods failed. With regard to the solubility of freshly precipitated cocaine in excess of ammonia, and its subsequent separation in the form of fine needles, he thought that was to be explained by the fact that the alkaloid was precipitated in the amorphous condition and was soluble, but that on standing it gradually assumed the crystalline condition, in which it was comparatively insoluble and therefore separated. He had much pleasure in proposing a cordial vote of thanks to Dr. Stockman.

The motion was seconded by the Chairman and passed with acclamation.

Three papers were then read and the discussion thereon taken conjointly. They were entitled :—

Solubility of Gelatine as compared with other Pill Coatings.

BY THOMAS THOMPSON.

Note on Blaud's Pill Mass.

BY THOMAS THOMPSON.

Notes on Blaud's Pills.

BY PETER BOA.

The papers are printed at pp. 863, 864, 865, and gave rise to the following discussion.

Mr. J. B. Stephenson said he could not see how there could be any difference between the granular and the ordinary ferrous sulphate, and he had found no difficulty in making Blaud's pills with the latter. It was a decided advantage to have both salts rubbed to a fine powder and sifted. By this means and adding sugar and tragacanth and beating thoroughly a good plastic mass was obtained, and pills made from it would be found as green as grass after the lapse of several weeks. He moved a cordial vote of thanks to the two authors of the papers.

Dr. Clark said at the present time there were three distinct varieties of Blaud's pills to be met with in commerce. The first contained the iron in an oxidized con-

dition. Anyone who had examined the American Blaud's pills would know that they did not present the appearance looked for in such pills; they were certainly not as green as grass. There was also a pill in which the old formula with honey was used, the mass being evaporated in a steam pan. In this case ferrous carbonate was produced and retained in that condition. In the third case the reaction was as far as possible prevented before the pill was made. The last, he thought, was the proper form. In this case the nascent ferrous carbonate was produced in the stomach. To attain this condition it was necessary to have the salts as dry as possible, add a fair proportion of sugar and avoid an excess of water. Those who had had experience in making these pills would know that if the syrup was added to the whole quantity of ingredients at once it required the addition of a very large quantity to make a satisfactory mass. The reason of that seemed to be that the small amount of syrup was lost in the large body of ingredients. The way to obtain a mass with the smallest proportion of liquid was to add the excipient to a small quantity of the ingredients and then add the remainder of the ingredients by little and little. In this way chemical reaction took place in the first quantity, and the water of crystallization thus liberated served to mass the next quantity added. In such a mass the particles of ferrous sulphate and potassium carbonate might be detected by the microscope unchanged, and pills so made might be kept in good condition for any length of time. He was at a loss to understand how the ferruginous capsules referred to by Mr. Thompson would act, as he was afraid the particles of the salts would become coated with oil which would prevent chemical action taking place even in the stomach. Referring to the gelatine coating of Blaud's pills he gave as his experience that it was impossible to get a permanent coating of the pills if they contained undecomposed ferrous sulphate. In such a case, no matter how well dried the pills might be, in a few days they lost their gloss and became soft, clearly indicating the liberation of water. He had examined samples of the gelatine-coated Blaud's pills in the market and invariably found that the contents were of a red-brown colour throughout, showing that the makers had not scrupled to abandon the ferrous condition in order to obtain a permanent pill. He thought they owed a debt of gratitude to the two gentlemen who had brought forward these very practical papers.

Mr. Thompson said he had found that the oil did not prevent the reaction between the ferrous sulphate and potassium carbonate when the capsule was placed in water.

Mr. Gilmour remarked that in the capsules shown it was evident that decomposition had already set in. Mr. Thompson's experiments proved that of the pill coatings in general use gelatine was the most soluble. There were four conditions demanded of a pill coating. It must be readily soluble, cover the taste of the pill, preserve it and give it an elegant appearance. The first three were fulfilled by gelatine, but he was afraid it did not meet the last one, and that he thought was the one principally required by the public. This was why pearl coating was so popular, and Mr. Thompson confirmed his own results as to the insolubility of the latter. With regard to Blaud's pills he thought the discussion showed that Mr. Martindale's formula is the one now generally accepted. He believed Mr. Boa was correct in saying the best pills were got when granulated ferrous sulphate was used. Last summer he made a quantity by the old process, using ordinary crystallized ferrous sulphate, and he found that the pills showed signs of oxidation reaching to the very centre after standing for three hours.

Mr. Gorrie said it was generally stated that sugar acted as a preservative in Blaud's pills, but this was true only to a limited extent. Since the publication of Mr. Duncan's paper, he had tried Ince's formula, using glycerine instead of sugar and the result left nothing to be desired.

Mr. Forret said he had tried the dried ferrous sulphate, following Mr. Martindale's formula but using golden syrup as an excipient. Ten days after being made the pills were estimated and showed no signs of oxidation, and he thought they might be kept practically any length of time.

The Chairman said he agreed with Dr. Clark that whatever the intention of the originator of the pills may have been, the proper place for the formation of ferrous carbonate was in the stomach. He seconded the vote of thanks proposed by Mr. Stephenson, and it was passed with acclamation.

At the request of the Chairman, Mr. Thompson then exhibited in operation and explained his patent gelatine pill-coating and capsule-making machine. There were two machines in operation, one coating pills and the other making capsules. A large batch of compound rhubarb pills was coated; the whole operation occupying about half an hour.

The process was watched with much interest, and, on the motion of the Chairman, a vote of thanks was awarded to Mr. Thompson with loud applause.

Attention was directed to the following additions to the Museum:—

Pure Lecithin.
From Messrs. H. C. Baildon and Son, Edinburgh.
Cryptopia.
From Messrs. T. and H. Smith and Co., Edinburgh.
Cinchona Stems.
From the Curator of the Society's Museum, London.

The Chairman stated that in ordinary course this would have been the last meeting of the session, but they had been a little late in beginning, and it was probable that they might be able to arrange for another meeting, which would be duly intimated.

The meeting then closed.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The tenth general meeting of the thirty-eighth session was held at the Royal Institution, on Thursday evening, March 31. The President, Mr. A. C. Abraham, F.C.S., in the chair.

The minutes of the previous meeting were read and confirmed, and several donations to the library and museum were announced.

A vote of thanks was accorded to the respective donors, and there being no miscellaneous communications, the President called upon Mr. A. H. Samuel, F.C.S., to read a paper on Russian Petroleum, from which the following extracts are taken:—

Russian Petroleum.

BY A. H. SAMUEL, F.C.S.

The great centre of the petroleum-bearing territory of Russia is at Baku, on the Apsheron peninsula, jutting out into the Caspian Sea, and notwithstanding the vastness of the production, the present workings are circumscribed within the very limited area of about three and a half square miles.

Chemically, Russian and American crude petroleum present a marked difference, the American being a mixture of the first series of hydrocarbons or paraffins, as represented by the formula $C_nH_{22}+_2$, as methane, ethane, etc., whilst the Russian crude is composed of the second and third series of hydrocarbons or olefines represented by the formulæ C_nH_{2n} and $C_nH_{2n}-_2$, as methene propene, methine propine, etc. Practically, the whole of the refining, at present, of Russian petroleum is carried on at Baku, the situation of which renders it a distributing centre of the first importance, as it has the best harbour on the Caspian Sea.

Experts in the geological nature of the surrounding country estimate that petroleum deposits underlie no less than 14,000 square miles, and Mr. Redwood, who has paid several visits to the Caucasus, states that at least 1000 to 1200 square miles of the Apsheron peninsula may be regarded as oil-producing territory.

The two chief districts in which the wells are located are at Surak Lani and Balak Lani, the former about twelve miles, and the latter from six to eight miles distant from Baku. At Surak Lani there are still the ruins of the ancient temples of the Persian Magi, in some of which, to this day, the gases generated from the oil wells are continually in flame. Zoroaster was supposed to be founder of fire-worship, the origin of which is said to be due to these natural fires from petroleum gases. As the Persians found that as fast as they extinguished the fires in one place, they started spontaneously in flame in another, they concluded that the fires had a supernatural origin. From this the existence of petroleum in Russia would seem to have been known for at least 2500 years. It seems therefore remarkable that it should have been left to the United States of America, in which the earliest records of petroleum discovery do not date further back than the beginning of the latter half of the present century, to be the first in the field to supply the greater portion of the world with petroleum for practical purposes.

The petroleum territory of the Caucasus seems to have been left almost entirely undisturbed for all practical purposes till after the annexation of Baku by Russia in 1801, and one of the first acts of the Russian Government was to make the extraction of petroleum a State monopoly, and the sole right of working it was farmed out to a merchant named Merzoeff.

From the year 1801 till about 1830, this Merzoeff extracted from 2000 to 3000 tons of oil per annum, and from 1830 to 1858, about 3500 tons per annum, all of which he obtained from pit-wells, sunk a few feet from the surface of the ground, and in the most primitive manner possible.

The vast petroleum wealth under his feet slept on comparatively undisturbed until 1872, by which time the American petroleum industry had already made rapid strides, and the world, including Russia, was being almost entirely supplied with American burning oil and other petroleum products.

This state of things, thoroughly aroused the Russian Government, and resulted in its abolishing the monopoly, so long held by Merzoeff, and throwing open the industry to the world.

The Russian Government, however, in lieu of the royalties it had been receiving from Merzoeff, put on an excise duty, which was continued for five years more till 1877, when the increasing American competition caused it to abolish the remaining tax also, and the trade has since remained free and unfettered.

The crude oil in the early days was brought from the wells to the refineries in Baku in Persian carts in roughly made barrels, and it is stated that as much as £100,000 per annum was earned by the carters engaged in this traffic.

Two years prior to the abolition of the excise duty, namely in 1875, the development of the Russian oil industry reached its most important crisis, by the appearance on the scene of the Nobel Brothers, whose fame in connection with Russian petroleum is now world wide.

These Nobels are a most remarkable family. Their father (a Swede), Emmanuel Nobel, was the inventor of the torpedo, the secret of which he took from Sweden to St. Petersburg in 1838, and sold to the Russian Government. One of his sons, Alfred Nobel, became a distinguished chemist, and claims to be the inventor of that terrible explosive dynamite. Their father with his other two sons, Ludwig and Robert, established an immense engineering works on the banks of the Neva, and their firm took a prominent part in the fortifications of Cronstadt, prior to the Crimean war. At the death of the father, Ludwig became the head of the works, and accepted from the Russian Government a series of contracts for converting guns and manufacturing rifle-stocks.

For the latter walnut wood was required, and it was in search of that wood that Robert Nobel was sent to the Caucasus, causing him to visit the petroleum regions of Baku.

Being a throughly practical and scientific engineer, he was so enamoured at what he had seen of the capacities of petroleum production and refining that on his return to St. Petersburg he urged his brother to co-operate in developing the industry, and very shortly after Robert Nobel established himself at Baku and commenced operations in quite a small way as a petroleum refiner.

Calling the resources of engineering, chemistry and commercial organization to his aid, Nobel in the first place replaced the cumbrous system of carting the oil from the wells to the refineries at Baku by laying down pipe-lines, though he was compelled to erect a line of watch houses manned with armed men to guard his pipes against destruction.

Nobel completely revolutionized the whole previous system of extraction, refining and distribution. He introduced the most improved systems of drilling and refining, for which he took advantage in every way possible of the American system. One of his earliest steps was to gain the consent of the Russian Government, and immediately he organized a complete system of supplying the whole of Russia with burning oil.

To effect this, he had built a fleet of tank-steamers for navigating the Caspian sea and the river Volga, using as fuel for same the astatke or petroleum residuum, in place of coal. These steamers were built partly at his brother's works on the Neva and partly in Sweden, and were conveyed in parts—by the canal system—to the Volga and there put together and delivered at Baku. In this way he conveyed his refined oil from Baku to Trabitzin on the Volga, which he constituted his headquarters for forwarding the oil by various railway systems. The oil is pumped from the steamers into railway tank-waggons, and at various points throughout Russia Nobel has established stations where he stores immense quantities in reservoirs, and dealers and consumers have to bring their own barrels or other receptacles for all the oil they want. It is an entire cash-before-delivery business, and the Russian railway companies collect the money for a small commission. By this perfect organization and aid of the protective duties, the Nobels succeeded in completely superseding the sale of American petroleum by the Russian article.

In order to institute a comparison of the vastness of the Russian production with the American, I may state that the most prolific well ever known in the United States, which was struck in the autumn of 1881, yielded for a time at the rate of 260,000 gallons, or about a quarter of a million gallons, in twenty-four hours.

At Balohhani, in 1883, a well was struck, now known as the celebrated Droobja well, which belched forth a column of oil 300 feet in height, and for over one hundred days was perfectly uncontrollable; it has been estimated that for that period its yield per twenty-four hours was not less than 2,800,000 gallons, so that the yield from this one well was equivalent to more than the present production per day of the whole 23,000 wells in the United States of America, which latter is estimated at about 2,700,000 gallons per day.

This well sent forth along with the crude oil vast volumes of gas and sand, the latter of which overwhelmed the derricks and other works of the surrounding well-owners, and in addition to the loss sustained by the millions of gallons of oil that went entirely to waste from want of means of storage, the owners of the well, instead of making their fortune, were ruined by the large sums they had to pay for compensation for the damage their well had occasioned.

The next large-flowing well belonged to Nobel, struck

in 1885. It is properly capped, but will yield at any time it is opened at the rate of over 2,000,000 gallons per day; and another of their wells over 1,125,000 gallons per day whenever opened.

There are about sixty of these flowing-wells which are usually capped with slide valves, but often the rush of oil is so tremendous, with a pressure estimated at something like 200 to 300 lbs. to the square inch, as to be practically impossible to cap the well until it has become considerably exhausted, vast quantities of crude oil being allowed to run to waste.

There were in 1885, about two hundred actually productive wells, of which forty were kept idle, for want of demand for crude oil.

The remainder yielded in 1885, according to Mr. Peacock, Vice-Consul at Batonm, 575,000,000 gallons of crude oil, the yearly production of the average well being about 3,500,000 against the yearly production of the average well in America being 43,500 gallons.

From statistics furnished by Mr. Peacock it appears that at Baku, at present, there are about two hundred and sixty refineries, producing yearly about 140,000,000 gallons of refined burning oil.

Many of these refiners, however, have had completely to shut down, owing to the lowness in prices, supply being greatly in excess of demand, and many others have partially suspended working.

The world's present consumption of burning oil is estimated at about 2,500,000 gallons per day, of which, hitherto, the United States of America have supplied the greater portion.

America in the future must be prepared for fierce competition from her Russian rival, more particularly in those countries bordering on the Russian Empire, as well as in Central and Southern Europe, Northern and Southern Asia, etc.

The Russian crude oil is obtained by boring, much in the same way as the American, and is refined also by the methods described in my paper last session.

The sulphuric acid is made on the spot from sulphur found near Baku, and the caustic soda imported from this country.

The specific gravity of Russian crude is usually about ·870 to ·875, sometimes as heavy as ·885 and as light as ·850. The specific gravity of American crude is now about ·800 to ·820, so that the Russian oil is naturally a heavier oil than American.

There is no demand at present for the small proportion of lighter products, that distil over prior to the kerosene, viz, the benzene, specific gravity ·754, and gasolene, ·787, which latter in America are of considerable commercial value.

The specific gravity of the most carefully refined Russian burning oil is about ·823 against American ·803, or roughly, whilst American is 8 lbs. to the gallon Russian is $8\frac{1}{4}$ lbs. to the gallon.

Russian crude yields only from 22 to 27 per cent. of burning oil, and only about 22 per cent. of the finest quality. American crude on the other hand yields upwards of 70 per cent. of burning oil, or over three times as much as Russian. Russian crude yields a much greater quantity of the heavier or lubricating oil than American.

Russian crude is almost practically free from solid hydrocarbons, such as paraffin wax, which latter is an important product of American crude. On this account Russian lubricating oils have the advantage over American in being capable of bearing exposure to very low temperatures without solidifying, and thereby clogging machinery where exposure is necessary, and also have a higher viscosity in relation to specific gravity than American. Ordinary Russian burning oil has a slightly stronger odour than American, but is freer from colour than the latter.

Russian oil, as now imported into this country, may be said to be a good burning oil when used in the ordinary petroleum lamps and wicks of the shops, although owing to its higher specific gravity it might not be thought so; but it makes up for lighter gravity by being more homogeneous than American, its most volatile hydrocarbons not differing very much in boiling point from its least volatile ones.

As a rule, when the American and Russian oils are compared in two lamps the fonts of which are quite full, the American gives a slightly stronger light than the Russian; but as the consumption of oil proceeds, the illuminating power inclines in favour of the Russian, the latter seeming to have a greater power of ascending the wick than the American.

So far Russian petroleum burning oil has made but little headway in this country. The fact is that the first shipments that made their way here of Russian kerosene were so badly refined as to create at the outset a strong prejudice against it. It was only brought over in inferior barrels, the glue with which they were lined becoming decomposed and further deteriorating the quality of the oil. All this has now been overcome, and recent importations in bulk, in tank steamers, have left but little to be desired as regards quality.

The price of American "Royal Daylight" petroleum is, however, so low, and there is such a small difference between its value in England and that of Russian, viz., about a penny per gallon dearer than Russian, that there is not sufficient inducement for the dealers to push it in lieu of American.

To Russia we owe the new system of successfully carrying oil in bulk across the seas, thereby saving freight and conducing to greater celerity of loading and despatch, and also avoiding deterioration from contact in inferior glued barrels. The experiment of landing a cargo of Russian oil in bulk in Liverpool has recently been tried with success by the s.s. *Petriana*, which success would have been greater had there been tank storage accommodation in that port to receive it, instead of delivering it, as had to be done, directly into barrels.

The Americans some years ago tried the bulk system of transport across the ocean, but failed in it, but following the example of Russia, they have renewed their efforts and have recently sent several cargoes of oil across the Atlantic in bulk, which have all safely arrived.

In order to further develop the Russian petroleum industry, what is mainly wanted now is increased transit facilities from Baku. The present transit for Western Europe is by the Trans-Caucasian Railway from Baku to Batoum on the Black Sea, and a portion of this rail-line has to cross what is called the Suram Pass, the gradients over which are so steep that only a very limited number of waggons can be conveyed over it at one time, and the carriage in consequence is very expensive.

In order to cheapen the route from Baku to Batoum, it is now proposed to lay a pipe-line the whole distance of about 500 miles, on the principle of the American pipe-lines, having pumping stations at stated distances along the route. It will take about three years to complete, but when finished, must vastly increase the export of Russian petroleum products, and may ultimately lead to Batoum itself, on the Black Sea, becoming a great refining centre.

At present the price of Russian crude oil at the wells is as low as $11\frac{1}{2}d.$ per ton, or about one twenty-second of a penny per gallon, against American at the wells about $\frac{3}{4}d.$ per gallon, and it is this excessively low price of Russian crude that causes the present disastrous depression amongst its producers and refiners.

The paper was illustrated with some excellent views by oxy-hydrogen lantern. At the close a short discussion took place, and a vote of thanks, proposed by Mr. E. Davies and seconded by the President, was heartily accorded to Mr. Samuel for his highly interesting paper.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

A special general meeting of the trade was held under the auspices of the above Society on Friday, the 15th inst.

The meeting was convened to discuss the "Pharmacy Acts Amendment Bill" now before Parliament.

A resolution in support of the Bill as read was proposed by Mr. Preston, seconded by Mr. Ward, F.C.S., and carried with one dissentient only, the latter expressing his entire approval of the Bill so far as it went.

The chair was occupied by the President, Mr. Newsholme.

The monthly general meeting was held in the Society's lecture room, Norfolk Row, on Wednesday evening, the 20th inst. The chair was occupied by Mr. J. M. Furness, Vice-President. A paper was read by Mr. Frederick Spurr on "Micro-organisms and Disinfectants."

The paper, which was an exceedingly thoughtful digest of the subject, was of a facetious character, and Mr. Spurr, who secured the careful attention of his audience throughout, was at the close loudly applauded.

A vote of thanks for the paper was passed.

New members were elected.

TORQUAY CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting of this Association was held at Wood's Temperance Hotel on Tuesday, the 5th inst., Mr. T. Ness occupied the chair.

At the inaugural meeting in December prizes were offered by several patrons for the best papers on specified pharmaceutical topics, amongst them one by Mr. Riches for the best essay on the question, "Whether it is desirable, in the present depressed state of the drug trade, to establish a compulsory system of study?" Four competitors entered, the prize being awarded by the judge, Mr. Barnard S. Proctor, to Mr. Austin Hoare. His paper, together with the other three, was read on the 5th inst., and a discussion thereon invited.

Mr. Hoare's paper was written in favour of a curriculum, but the general drift of the papers and speeches was that the cost of increased education could be ill borne by the already impoverished pharmacist. The system of "cutting" by stores was strongly condemned, and several urged that if a curriculum were enforced its necessary accompaniment would be increased legislative protection. The habitual ordering by some physicians of secret and patent medicines was strongly commented upon.

Messrs. Curtis, Smith, F. Riches, Hoare, E. H. Farr, Colebank, J. March and the Chairman took part in the discussion.

Proceedings of Societies in London.

CHEMICAL SOCIETY.

At a meeting of the Society on Thursday, April 7, Mr. William Crookes, F.R.S. (President), in the chair, the following papers were read:—

Researches on the Constitution of Azo- and Diazo-derivatives. II. Diazoamido-compounds (continued). By R. Meldola, F.R.S., and F. W. Streatfeild.

Conjugated Sulphates and Isomorphous Mixtures of the Copper-magnesium-group. By P. C. Roy, B.Sc.

Suboxide of Silver, Ag_4O. By G. H. Bailey and G. J. Fowler.—The authors have repeated the experiments of Wöhler, and find no evidence of the formation of an argentous citrate when argentic citrate is heated to 100° in a current of hydrogen. The change is a progressive one, the citrate undergoing reduction with the formation of CO_2 and H_2O. In an experiment in which argentic citrate had been exposed to hydrogen at 100° for thirty-six hours the residue after extraction with ether contained 85·8 per cent. of silver, and by carrying the reduction still further there would in all probability be a complete transformation into metallic silver, water, and carbon dioxide, along with itaconic or the kindred acids. The oxide precipitated from the aqueous extract by means of potash contains metallic silver, and is only obtained in quantities too minute to admit of a determination of the relation of silver to oxygen of sufficiently decisive character. Faraday's suboxide of silver is also described, and found to be a modified form of ordinary oxide of silver.

Dr. Armstrong pointed out that at the recent Naturforscherversammlung at Berlin, von der Pfordten of Munich had adduced evidence in favour of the conclusion that an argentous oxide may be obtained.

Action of Trimethylenebromide on the Sodium Compounds of Ethylic Acetoacetate, Benzoylacetate, Paranitrobenzoylacetate, and Acetonedicarboxylate. By W. H. Perkin, jun., Ph.D.

ROYAL INSTITUTION OF GREAT BRITAIN.

The Forms of Seedlings: the Causes to which they are due.*

by sir john lubbock, bart., m.p., d.c.l., ll.d., f.r.s., m.r.i.

Sir John Lubbock commenced the lecture with some general remarks on the innumerable types of foliage among mature plants and the causes to which we might refer their various forms, the breadth of some and the narrowness of others, the differences of position, the differences of length in conifers, etc. He said that these considerations had led him to study the cotyledons or first leaves of seedlings. Cotyledons do not present such extreme differences as leaves; nevertheless, they afford a very wide range. Some are broad, some narrow, some are long, some short, some are stalked, some sessile, some lobed, some even bifid or trifid. At first sight, these differences seem interminable, and it might appear hopeless to attempt to explain them. Sir John Lubbock, however, pointed out, as regards many species, taking especially the commonest plants, such as the familiar mustard and cress, the beech, sycamore, pink, chickweed, etc., the conditions of their formation and growth, and it is beautiful to see the various reasons to which the differences are due, gradually unfolding themselves; the same result being sometimes brought about by very different circumstances, emargination of the cotyledons, for instance, being due to at least six different causes. He mentioned one curious peculiarity in the seedling of a species allied to the common mistletoe. It is a parasitic species, and its fruit, like that of the mistletoe, is somewhat viscid, so that it adheres to any plant on which it falls. But, even if it reaches the plant on which it grows, it may light on an unsuitable position—say, for instance, a leaf. What then happens? The radicle elongates for about an inch and then develops on its tip a flattened disk, which applies itself to the plant. If the situation be suitable, there it grows; if not, the radicle straightens itself, tears the berry from the spot where it is lying, curves itself, and then brings the berry down on to a new spot. The radicle then detaches itself, curves in its turn, and thus finds a new point of attachment. We are assured that this has been seen to happen several times in succession, and that the young plant thus seems enabled to select a suitable situation.

The form of the cotyledons, or seed-leaves, depends greatly on that of the seeds, long narrow seeds naturally in most instances producing embryos with narrow cotyledons. The cases, however, which can be so simply accounted for are comparatively few. Many plants with narrow cotyledons have flattened and orbicular seeds.

* Read Friday, May 21, 1886.

In such species, however, the cotyledons lie transversely to the seed. An interesting case is afforded by the pink family, where the pink itself has broad cotyledons, while the chickweed has narrow ones. In both cases the seeds are flattened and orbicular, but in the pink the seed is dorsally compressed, and the cotyledons lie in the broad axis of the seed; while in the chickweed seed is laterally flattened, and the cotyledons lie transversely to the seed.

Another very interesting case which he gave is that of the genus Galium, to which the common "cleavers" of our hedges belongs. Here also we find some species with narrow, some with broad cotyledons; but the contrast seems to be due to a very different cause. *Galium aparine* has broad, *Galium saccharatum* narrow, cotyledons. So far as the form of the seed is concerned there is no reason why the cotyledons should not be much broader then they are. The explanation may perhaps be found in the structure of the pericarp, which is thick, tough and corky. It is very impervious to water, and may be advantageous to the embryo by resisting the attacks of drought and of insects, and perhaps even if the seed be swallowed by a bird, by protecting it from being digested. It does not split open, and is too tough to be torn by the embryo. The cotyledons, therefore, if they had widened as they might otherwise have done, would have found it impossible to emerge from the seed. They evade the difficulty, however, by remaining narrow. On the other hand, in *Galium aparine* the pericarp is much thinner, and the embryo is able to tear it open. In this case, therefore, the cotyledons can safely widen without endangering their exit from the seed. The thick corky covering of *Galium saccharatum* is doubtless much more impervious to water than the comparatively thin test of *Galium aparine*. The latter species is a native of our own isles, while *Galium saccharatum* inhabits Algiers, the hotter parts of France, etc. May not then perhaps, he suggested, the thick corky covering be adapted to enable it to withstand the heat and drought? In this genus, as in many other plants, the embryo occupies only a part of the seed, being surrounded by a store of food or "perisperm." In many cases the embryo occupies the whole seed, and the cotyledons must, therefore, in large seeds, either be thrown into various folds, as in the beech, or be thick and fleshy as in the bean or oak. The reasons for their numerous differences open up an inexhaustible variety of interesting questions. Sir John gave a great number of examples, which were rendered clearer by means of numerous diagrams of seeds and seedlings.

In conclusion, he said it might be asked whether the embryo conformed to the seed, or the seed to the embryo, and showed that at least as regards certain species the former was the case; while the shape of the seed again might be shown to be influenced by considerations connected with the construction of the fruit. In reply to this he compared the seedlings of the sycamore and of the oak. In the sycamore the seed is more or less an oblate spheroid, and the cotyledons, which are long and ribbon-like, being rolled up into a ball fit it closely, the inner cotyledon being generally somewhat shorter than the others. On the other hand the nuts of the beech are triangular. An arrangement like that of the sycamore would therefore be utterly unsuitable, as it would necessarily leave great gaps. The cotyledons, however, are folded up somewhat like a fan, but with more complication, and in such a manner that they fit beautifully into the triangular nut. Can we, however, he said, carry the argument one stage further? Why should the seed of the sycamore be globular, and that of the beech triangular? Is it clear that the cotyledons are constituted so as to suit the seed? May it not be that it is the seed which is adapted to the cotyledons? In answer to this we must examine the fruit, and we shall find that in both cases the cavity of the fruit is approximately spherical. That of the sycamore, however, is comparatively small, and contains one seed, which more or less exactly conforms to the cavity in which it lies. In the beech, on the contrary, the fruit is at least twice the diameter, and contains from two to four nuts, which consequently, in order to occupy the space, are compelled (to give a familiar illustration, like the pips of an orange) to take a more or less triangular form. Thus then, he said in conclusion, in these cases, starting with the form of the fruit, we see that it governs that of the seed, and that the seed again determines that of the cotyledons. But though the cotyledons often follow the form of the seed this is not invariably the case. Other circumstances must also be taken into consideration, by the help of which much light can be thrown on the varied forms which seedlings assume.

Parliamentary and Law Proceedings.

FRAUDULENT VERMIN AND INSECT DESTROYERS.

For selling worthless "Vermin and Insect Destroyer," William Collins, Arthur Gillham, and Elizabeth Gillham *alias* Mills, were convicted at the Middlesex General Quarter Sessions on Wednesday last, and were sentenced, respectively, to eight, two, and ten months' imprisonment with hard labour.

Obituary.

STANISLAS LIMOUSIN.

We regret to record the death, on the 7th inst., in his fifty-fifth year, of M. Stanislas Limousin, a prominent French pharmacist, whose name will be familiar to many of our readers as having been associated with a method of administering pulverulent medicines enclosed between paste wafers known as "cachets médicamenteux." M. Limousin was an active member of the Paris Société de Pharmacie, to the meetings of which he frequently contributed papers on novelties in materia medica. M. Limousin was buried in Père-la-Chaise, on which occasion discourses were pronounced by M. Desnoix, President of the Société de Pharmacie; Dr. Constantin Paul, in the name of the Société Thérapeutique; M. Champigny, in the name of the Société de Médecine pratique; M. André-Pontier, President of the Société de Prévoyance des Pharmaciens de la Seine, and M. Capgrand-Mothes, President of the Société de Fabricants de Produits Pharmaceutiques.

Notice has also been received of the death of the following:—

On the 19th of March, Mr. John Richard Collins, Chemist and Druggist, Belmont Road, Clapham, S.W. Aged 67 years.

On the 19th of March, Mrs. Frances Rayner, Chemist and Druggist, Radcliffe Bridge, Lancs. Aged 94 years.

On the 27th of March, Mr. Henry Thackeray, Chemist and Druggist, Westgate, Hemley. Aged 56 years.

On the 30th of March, Mr. William Hay, Chemist and Druggist, Alford, Aberdeenshire. Aged 65 years.

On the 2nd of April, Mr. John Jeffes, Chemist and Druggist, Warwick Street, Liverpool. Aged 61 years.

On the 2nd of April, Mr. George Turner, Pharmaceutical Chemist, Honiton. Aged 68 years. Mr. Turner had been a Member of the Pharmaceutical Society since 1866.

On the 3rd of April, Mr. John Mortiboy, Chemist and Druggist, Railton Road, Herne Hill, S.E. Aged 46 years. Mr. Mortiboy was an Associate in Business of the Pharmaceutical Society.

On the 8th of April, Mr. Henry Rowson, Pharmaceutical Chemist, Chichester Street, W. Aged 54 years. Mr. Rowson had been a Member of the Pharmaceutical Society since 1859.

On the 12th of April, Mr. George Clarke, Blossom Street, Manchester. Aged 75 years.

On the 14th of April, Mr. John Williams Taylor, Chemist and Druggist, Dereham Road, Norwich. Aged 25 years. Mr. Taylor was an Associate in Business of the Society.

On the 14th of April, Mr. Charles Brooks, Chemist and Druggist, Wandsworth Road, S.W. Aged 36 years.

On the 15th of April, Mr. James Edwin Williamson, Chemist and Druggist, Bute Street, Cardiff. Aged 58 years.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

The Redwood Scholarship.

Sir,—I have read with considerable interest the report of the last meeting of Council, and rejoice to find the deed which settles the Redwood Scholarship does not bind the Council too closely in the matter of subjects for examination.

For a scholarship to be a fitting memorial of the services of an eminent teacher, it seems to me it ought to accentuate a leading feature of that professor's mind. Thirty years ago, with many others, I had the great good fortune to attend the excellent course of lectures, three a week, for ten months,—far too short a time, as the professor used to say, to deal exhaustively with the subject matter,—and if there was one thing more than another which impressed one, it was the thoroughly philosophic character of the mind which, while giving to each division its due attention, raised into prominence the dominant feature of the course, which anyone who will trouble to peruse the questions for prizes set by the Professor during the last quarter of a century will see at once was physics.

While giving to chemistry her proper place, he almost unconsciously let us feel that it was a skeleton science, that there was a something beyond chemistry; the loosening of proximate constituents, the separation of the molecules in analysis, the formation of new combinations by synthesis, was not all. The subtle force comprised in the word physics was the life of matter and the mother of form or state that shows the marvellous knitting together that shimmered on the boundary of sense, a boundary daily yielding still to pure induction.

May I ask then that in the subjects set for examination for the Redwood Scholarship, physics shall take a more prominent place than for the Bell Scholarships? The Professor is happily still with us, he can be consulted in the matter, and correct me if I am wrong.

There is another side to the question. Every year one lives, the more one feels that each one differs in his gift. To one is given music, to another numbers, to another a mole-like vision, to another that of an eagle, to another great penetration, and so on. In our calling, and more especially in the allied one of medicine, we want men of varied gifts; we do not want all our best men stamped as clever with the same die. For instance, a man who will utterly fail in arithmetic, or in languages, may excel in physics, and we lose his help and regulating influence because our gates to progress or help are closed against him. As our scholarships increase,—as increase they will, because the cause is good, for we work for the health of the people, and the well-being of the whole world,—let us so vary our subjects on each, that the Society may be very strong as a whole.

George Mee.

Note on Linimentum Terebinthinæ.

Sir,—After all the correspondence that has taken place respecting this liniment, and the excellent paper recently read by Emeritus-Professor Redwood, it requires some little audacity to re-open the subject. Considering, however, that pharmacists have in the past so frequently failed to produce a satisfactory preparation, and, hence, that they will probably fail in the future, one may venture to point to what is the cause of most, if not all, of the failures.

Last year Mr. Conroy, and, more recently, Dr. Redwood and Mr. Martindale, have stated that success is independent of the quality of materials used, and is to be attained chiefly by proper manipulation. But that dispensers may have a proper mastery of this preparation it is necessary to have a clear idea of the kind of manipulation requisite to obtain a good emulsion; and to this end a few experiments were made.

I conceived that no matter how the soap, water and turpentine might be mixed, the soap would certainly unite with the water and so provide a basis for an emulsion. This was verified by putting the soft soap, without any previous preparation, into a bottle with a wide mouth, and then adding the camphorated turpentine and water; this was shaken for a little while and then allowed to rest over night. On the following morning the greater portion of the soap was dissolved; but not entirely, several small pieces being visible. The mixture was now shaken very vigorously, with the result that shortly it assumed a creamy consistence, and passed, ultimately, on further shaking, into the gelatinous condition. This experiment was repeated, with the sole difference that the soap and water were first rubbed together in a mortar, and a perfectly homogeneous jelly was produced. In these experiments the whole of the ingredients were mixed together at once. Now, it is not my intention to suggest that this method should be followed in the pharmacy, especially as the shaking required is considerable, and sometimes a little too prolonged to be pleasant; but the fact that a good emulsion can be made under such circumstances shows that failures should never ensue, and that when they do it is undoubtedly because the operator's strength or patience has given way. That the turpentine proves no impediment to the union of the water and soap is quite as clearly shown, thus putting it in the dispenser's power to reclaim a bad preparation at any stage of the process. For instance, Mr. Martindale has pointed out the importance of carefully blending the first additions of the camphorated turpentine with the soap and water; but should this not take place the excess of turpentine may, after standing a little while, be poured out of the mortar, and the pestle freely applied to the remaining portion consisting for the most part of soap and water and a little turpentine. The first portions of the turpentine may be readily mixed by adding a few drops at a time to the soap and water, previously well rubbed together on a porcelain slab; when a thin paste has been obtained it may be transferred to a mortar or bottle, and the remainder of the turpentine added in quantities suited to the operator's energy.

The combination of the two "fluids" does not appear to be so much a matter of skill as of energy, although the proper selection of utensils and the gradual mixing of the "fluids" may to some extent reduce the amount required. This being the case, a batch of materials should never be put on one side as spoiled, because a good emulsion is readily producible from a bad one.

For the guidance of such as may be disposed to make the liniment by shaking, I may suggest that a bottle be used having a capacity at least one-third greater than the volume of the ingredients, and that the last third of the camphorated turpentine be added all at once, otherwise the liniment will be found too thick to shake, and so prevent the last portions of turpentine combining.

Manchester. William Kirkby, F.R.M.S.,
Pharmaceutical Chemist.

A Burette Nitrometer.

Sir,—Mr. Proctor, in some pharmacy notes published in the Journal a few weeks since, mentions a nitrometer made by him out of two glass syringes, which he said gave in his hands fairly accurate results for testing the amount of nitrous oxide in spt. æther. nitrosi; but he did not say how he graduated them. However, Mr. Blunt in the Journal of March 19, fully explains how to graduate two glass syringes and make a simple nitrometer, and on making one I found it to work pretty well. It is best to graduate the syringe which goes into the salt solution with a file, as a paper slip graduated is apt to come off, unless it is rendered waterproof by rubbing it with paraffin.

After using this nitrometer it struck me that I could make a better one by using a 1000 grain-measure burette for measuring the nitrous oxide given off, instead of the syringe, and I found that by fixing the point of the burette to the graduated ½ oz. glass syringe by means of about one inch of india-rubber tubing, and attaching to this a Mohr's clamp, I had a very good nitrometer ready for use.

To use it make a solution of salt—about 2 oz. to 8 oz. water—in a glass measure, insert the open end of the burette, press the clamp and suck the salt solution until it completely fills it; then pour 1½ drachms spt. æther. nitrosi into the graduated syringe and let 1 drachm run in, pour out the remaining ½ drachm and add the following solution, potassic iodide 15 grs., water 2 drachms, allowing 1½ drachms to run into the burette; pour out the remaining ½ drachm, then lastly add 1½ drachms acid. sulph. dil., B.P., and let 1 drachm run in. There will be a rapid evolution of nitrous oxide, and the salt solution in the burette will be depressed according to the amount liberated, which can be read off in a few minutes.

Having made half a gallon according to the B.P. and on testing it, I found it to yield nearly nine volumes of nitrous oxide. On testing the remains of some bought about eight months ago, I found it to yield only four volumes of nitrous oxide.

Both samples were also tested according to Mr. Proctor's thiosulphite of soda method, and found to agree very well with the volume test, and I must say that every chemist and druggist should test his spt. æther. nitrosi by this method, as mentioned by Mr. Proctor, in the Journal a few weeks back, as it is easy to do and fairly accurate for practical use, if ways and means cannot be found to apply the volume test of the B.P.

Glasgow. JOHN C. HUNTER, A.P.S.

A VERY SENSITIVE PLANT.

Sir,—Your always interesting review of the month is particularly so this month. There is one item, a case of poisoning by Robinia, somewhere in America, which recalls to my mind a somewhat "steep" story of an unnamed variety of American acacia which—the story, not the tree—went the round of the papers three or four years ago. The habitat of the species was said to be Nevada, and a western soil would seem most appropriate. The particular tree at the time when (as the novelists say) the story commences, was about eight feet high. These acacias are a sort of sensitive plant; when the sun sets their leaves fold together and the ends of the twigs coil up like a pig's tail. If the latter are touched the whole tree becomes manifestly "uneasy." But in 1883 a certain gardener had to remove the plant of which I tell from the pot in which it had been matured into a larger one. To use the gardener's expression, "it went very mad." Hardly had the transfer been effected ere its leaves began to stand up in all directions, "like quills upon the fretful porcupine," and soon the whole plant was quivering with emotion. At the same time it gave out a most sickening and pungent odour, "like that of a rattlesnake when teased." The smell so filled the house that it was necessary to open all the doors and windows, and it was an hour or more before the plant "calmed down" and folded its leaves in peace. After this one can hardly echo Mr. Lowell's question—

"Who'd expect to see a tater
All on end at bein' biled?"

Nothing would seem more natural in America. Is it to be supposed that this plant's extraordinary behaviour was merely an exhibition of individual eccentricity, and if so, may the same be hoped of the poisonous properties of the acacia referred to in your paragraph?

Epworth. C. C. BELL.

HUECHYS SANGUINEA.

Sir,—May I venture to call Mr. Moss's attention to an error, trivial in itself, but important from an entomological point of view? He describes *Huechys* as a "Coleopterous insect." A cursory glance will show any habitual "bug hunter" that the insect in question belongs to the order Hemiptera; it has the characteristic structure of wings, and the suctorial mouth extremely well developed, and shows these distinctive characters more markedly than most of our indigenous insects of the order. It has few characters in common with the order Coleoptera, except those which appertain to the class.

Huechys falls, I believe, in the sub-order Homoptera, and from its small antennæ and three-jointed tarsi would closely approach the Cicadariæ, but on this point I am not sure.

J. OLDHAM BRAITHWAITE.

Laboratory, 50, Southwark Street, S.E.

Erratum.—We have been requested by Mr. Moss to make the following correction in his paper:—On p. 844, col. ii., line 16 from bottom, it should read that the quantity treated as for liquor epispasticus was 7·574 grams and not 5·574 grams, as printed.

TESTING FOR ALBUMEN IN URINE.

Sir,—I see in a paper on urine by Mr. Saul, that "Dr. Pavy's pellets contain a mixture of ferrocyanide with citric acid." As this would interfere with the method of using the test, I wish to call attention to the fact that the pellets are made of ferrocyanide of sodium as the one, and citric acid as the other pellet.

Mr. Saul says the presence or absence of citric acid exercises no appreciable effect under any conditions of the urine, and also remarks that a delicate test for albumen is ferrocyanide of potassium; let him try citric acid and ferrocyanide of sodium, and then say if Dr. Pavy's pellets must be condemned.

66, Oxford Street, London. W. TEMPLE COOPER.

[*** Mr. Saul's objection to the use of Dr. Pavy's pellets must, we think, be understood as applying to urine testing as dealt with in his paper, and not to bedside testing by medical men. The remark on citric acid evidently applies only to Esbach's picric acid test, and not to that with ferrocyanide.—ED. PHARM. JOURN.]

Sir,—I would venture to suggest as a valuable supplementary reference to Mr. Saul's paper on Urinary Analysis in the Journal of Saturday last, Dr. Maguire's 'Albumens of the Urine,' *Lancet*, June, 1886.

33, Corporation Road, Carlisle. JAMES FOSTER.

A CORRECTION.

Sir,—Permit me to correct an error that escaped my notice in revising the proof of my remarks at the last Evening Meeting. The seeds there mentioned under the name of Lucerabo seed should have been written Lukrabo, and the name of the plant affording them should have been *Hydnocarpus* instead of *Gynocardia anthelminthica*, Pierre. These seeds have already been mentioned in this Journal, under the former name (see *Pharm. Journ.*, [3], vol. xv., p. 41).

E. M. HOLMES.

P. H. Marsden.—(1) *Draba verna.* (2) Too young to determine. (3) *Sedum reflexum*, with an immature fungus parasitical on the leaves. Please to send further specimens when the spores are mature. (4) *Parmelia physodes.* (5) *Cladonia pyxidata.* (6) *Calluna vulgaris.*

T. S. R.—As indentures are generally drawn up, the engagement and its responsibilities expire at a specified date.

G. W.—Clark's table of hardness will be found in the *Pharmaceutical Journal*, [1], vol. vi., p. 527; also in Frankland's 'Water Analysis,' and other similar works.

W. Y. Brevitt.—We have not been able to find the reference. In vol. xviii, p. 263, there is a paper containing some information respecting Boyle Godfrey, but it does not include the passage you require.

Jupiter.—We do not know.

Fustic.—The sample sent has the appearance of being an oxide of tin lake.

Pharmacist.—We do not think it desirable that the criticisms contained in your letter should be published anonymously.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Newsholme, Flückiger, Hillington, Draper, C.A.J.

"THE MONTH."

Calcium Gummophosphate.

The administration of compounds such as those known under the names "lactophosphate," "chlorhydrophosphate" and "citrophosphate of lime" is criticized by Dr. Sambuc (*Journ. Pharm.*, Apr. 15, p. 411), on the ground that it is an error to consider them to be soluble double salts in which the phosphate employed retains its primitive condition in the presence of the added acid. On the contrary, Dr. Sambuc states that the phosphate is decomposed, whether it be dicalcic or tricalcic, monocalcic phosphate being formed, together with calcium lactate, chloride or citrate, as the case may be. If this be correct the patient, in order to take one gram of the monocalcic phosphate, would have to swallow, also, 1·2 gram of calcium chloride, or a corresponding quantity of one of the other salts, a proportion that, considering the freedom with which these preparations are sometimes taken, can hardly be desirable. In order to meet this objection Dr. Sambuc proposes to use gummic acid, obtained by decomposing Senegal gum with hydrochloric acid and separating by dialysis, and states that when this is added to freshly-prepared dicalcic phosphate it combines with part of the lime, soluble monocalcic phosphate being formed, together with calcium gummate, which, being, practically, a regeneration of the gum, is not objectionable. As ordinary gum contains, in combination with gummic acid, lime, potash and magnesia equal to about 1·75 per cent. calculated as calcic oxide, 100 grams should, according to this theory, be equal to the solution of 10 grams of dicalcic phosphate. But in addition to this, it has been shown by Messrs. Lefort and Thibaut that natural gum arabic will dissolve 1 to 1·1 per cent. of bicalcic phosphate, possibly in consequence of the presence of some gummic acid not in combination, so that the total solvent power may be somewhat greater.

Croton Oil.

It will be remembered that at an Evening Meeting in 1878 (*Pharm. Journ.*, [3], viii., 705) Mr. H. Senier read a paper in which he reported that he had examined samples of English-pressed croton oil that proved soluble in alcohol only in proportion to the age of the sample, which was contrary to the recorded experience of Pereira and Redwood, and further that the portion soluble in alcohol exhibited the vesicating property, whilst the insoluble portion appeared to be inert. Subsequently, in 1883, in another communication (*Pharm. Journ.*, [3], xiv., p. 446), Mr. Senier gave his reasons for believing that whilst the vesicating property of croton oil resided entirely in the portion soluble in alcohol, the purgative property was confined to the portion insoluble. These conclusions not appearing satisfactory to Professor Kobert, the investigation was taken up by Herr von Hirschheydt, a pupil in the University of Dorpat. Upon the basis of the results obtained, Professor Kobert now (*Chem. Zeit.*, April 6, p. 416) attributes the activity of croton oil, both as a vesicant and as a purgative, to crotonoleic acid, not to be confounded with crotonic acid, but an acid discovered by Buchheim in 1873, the formula of which has not yet been made out. This crotonoleic acid is said to occur in croton oil both in the free state, in which it is freely soluble in alcohol, and in combination as an glyceride. The glyceride does not possess poisonous properties, but the free acid acts as a powerful irritant to the skin and the intestines (purgative). According to Professor Kobert the crotonolglyceride is attacked and split up like other glycerides by the ferments of the juices of the stomach, and the crotonoleic acid being set free then exercises its purgative influence. A similar result may be obtained by administering crotonoleic acid as a pill enclosed in keratin. Kobert is not of opinion, however, that the solubility of croton oil is dependent upon the proportion of crotonoleic acid it contains, but considers it to be connected with the age of the oil. Crotonoleic acid may be prepared by treating the portion of croton oil soluble in alcohol with a hot saturated solution of baryta in a water-bath, washing the stiff white paste that forms with cold distilled water to remove excess of baryta, and barium compounds with acetic, butyric and tiglinic acid, removing by heat traces of water, and repeatedly treating with ether, which only takes up the barium oleate and crotonoleate. The crotonoleate is separated by dissolving it out in alcohol, decomposed carefully with sulphuric acid, and the solution containing the free acid evaporated.

Bile Salts and Cod Liver Oil.

Having been impressed with the inconvenience attending the inunction of cod liver oil, as ordinarily practised in cases where the stomach is not in a condition to bear its internal use, Dr. Hare was led to consider whether, since one of the functions of the bile salts is to aid the passage of fats through animal membrane, they might not act in the same manner when applied to the skin in conjunction with cod liver oil (*Bost. Med. Journ.*, March 24, p. 279). Upon experiment this theory proved to be practically correct; a small quantity of a mixture of taurocholate and glycocholate of soda was found to materially hasten the absorption of the oil, and the rapidity of absorption was in direct ratio with the quantity of bile salts used. When half a teaspoonful of the oil was placed on the thin skin of the inside of the thighs, bile salts being added to one side only, and both thighs rubbed equally hard, it was found that the oil containing the added bile salts disappeared in about half the time required for the disappearance of the pure oil. Repeated applications of the oil and bile salts to the same spot within twenty-four hours failed to produce any sign of irritation of the cuticle. In preparing the mixture of bile salts, the plan recommended by Dr. Hare is to shake ox gall thoroughly with about three times its volume of alcohol, and after allowing the precipitated mucus to settle, filtering the supernatant liquid. Ether is then added in large excess to the filtrate, which causes after a time the separation of a pasty mass that slowly becomes crystalline; this is washed on a filter with a mixture of equal parts of ether and alcohol and afterwards dried.

Benzoyltropine as an Anæsthetic.

In a search made with the hope of finding some compound that might, like cocaine, possess anæsthetic properties hitherto unobserved, Professor Filehne was induced to turn his attention to the tropeines, atropine having been formerly regarded as a gently-acting local narcotic (*Berl. clin. Woch*, No. 7; *Med. Rec.*, Apr., p. 136). By experiment atropine was found to have a slight, but distinct, paralysing influence on the ends of the sensory nerves, whilst with homatropine this effect was very decided. Tracing some analogy between the splitting up of

atropine into tropine and tropic acid and that of cocaine into ecgonine, benzoic acid and methylic alcohol, and ecgonine proving to be inert, Professor Filehne inferred that the anæsthetic property was conferred by the acid radicle. Moreover, he found confirmation of this inference in the fact that just as homatropine stands between atropine and cocaine in its anæsthetic property, amygdalic acid, the acid of homatropine, is, in constitution, intermediate between tropic and benzoic acids, the acids of atropine and cocaine respectively, as is shown by the following formulæ :—

Benzoic acid . . . . . C_6H_5COOH

Amygdalic acid . . . $C_6H_5CH<^{COOH}_{OH}$

Tropic acid . . . . . $C_6H_5CH<^{COOH}_{CH_2OH}$

Professor Filehne was, therefore, led to anticipate that the compound resulting from the union of benzoic acid with tropine would have a greater local anæsthetic effect than homatropine. This was fully confirmed by experiment, benzoyltropine proving to be a powerful local anæsthetic, whilst when applied to the eyes it also exercised the action upon the pupils and accommodation characteristic of other tropeines. A number of "benzyl derivatives"* were therefore tested, and all proved to produce a decided local anæsthetic effect, benzylmethyltriacetonalkamine being the most powerful of those tried, benzyl quinine came next, and the weakest was benzyl morphine. This would seem to be a curious instance of a correct deduction being drawn from a false premiss, for apparently of all the compounds experimented with cocaine was the one which told most strongly against the theory that the anæsthetic *rôle* is played by the benzoic radicle. If this assumption were correct, benzoyl-ecgonine should have anæsthetic properties, which is contrary to common experience with this decomposition product of cocaine. Dr. Stockman reports on benzoyl-ecgonine (*Pharm. Journ.*, [3], xvi., 898), "the chief action of cocaine, namely, the paralysis of the sensory nerves, is quite absent; in fact, the relationship between the two substances seems to be as profoundly altered by the subtraction of a methyl group as is the case with methylstrychnine and strychnine."

Curare and Curine.

In some "chemical studies upon curare" Herr Böhm states that in a large number of the varieties of curare occuring in commerce there is present, besides the active base, another one that is inactive, which gives with metaphosphoric acid a characteristic voluminous white precipitate (*Berichte*, xx., Ref., p. 143). This base, which has been named "curine," is said to occur ordinarily in the aqueous extracts of curare, from many of which, by treatment with water, as much as 75 to 90 per cent. can be removed; others from which water takes up a smaller amount will give up a further quantity to dilute sulphuric acid. Upon rendering the solution slightly alkaline with ammonia the impure curine is thrown as a dirty green precipitate, which by successive purifications with ether, alcohol, and then again with ether, can be obtained in a crystalline condition. Curine is described as slightly soluble in cold water, freely soluble in alcohol, chloroform and dilute acids, somewhat less so in ether, and melting at about 160° C. to a clear pale yellow liquid. It is interesting to note that whilst curine in doses of 5 to 10 milligrams has been found quite inactive, Herr Böhm, by treating it with methyl iodide, has obtained the hydriodate of a new base that possesses a very intense curare action, 1 milligram killing a guinea-pig weighing 1·6 kilog. in an hour. But no conclusion can be drawn from the presence or absence of curine as to the richness of a particular sample of curare in the active curarine. After many attempts Herr Böhm succeeding in separating curarine as an amorphous yellow body, appearing orange-red in thick layers. Upon evaporating an aqueous solution with a little dilute acid to a syrupy consistence well-defined acicular crystals were gradually formed, but these turned out to be a decomposition product and without toxic action. The aqueous solution of curarine is without reaction, and does not appear to neutralize acids. The pure base is tolerably permanent in air, non-deliquescent and intensely bitter. The lethal dose per kilogram for guinea-pigs is stated to be 0·00035 gram.

* *Query*, benzoyl derivatives.

Narceine.

Some experiments made by M. Laborde with narceine specially prepared by M. Duquesnel so as to be free from morphine and codeine appear to have given results varying considerably from those obtained on previous occasions with what may be presumed to have been less pure preparations. M. Laborde states (*Archives de Pharm.*, April 5, p. 183) that he found this narceine much more active than any he had used before. A dose of two centigrams caused the disappearance of insomnia in an adult; and in cases of acute or chronic catarrhal bronchitis it rapidly relieved the cough. The quantity administered can be carried to four centigrams, but it should be given in fractions of a centigram at a time. It also soothes the paroxysms of hooping cough in children, and M. Laborde recommends its administration for this purpose in a teaspoonful dose containing one-quarter of a centigram of narceine. Its effect when injected subcutaneously into dogs, in quantities of one to three centigrams, is described as differing remarkably from that of morphine, the pure narceine producing a quiet natural sleep, whilst with morphine there is considerable disturbance.

Iodoform and Calomel.

An incompatibility observed in a mixture of iodoform and calomel has been investigated by Mr. Drescher, with a view to ascertain the chemical change that takes place (*Drug. Circular*, April, p. 75). Equal parts by weight of the two substances, when triturated together in a porcelain mortar, manifested no change of colour, nor was there any noticeable reaction or foreign odour. Some of the powder placed in a white vial, well corked and exposed to direct sunlight showed at the end of one hour signs of decomposition; after five hours the powder exhibited all phases of colour from whitish to yellow, with numerous greenish and greyish specks. There was also at the top some bright orange-red powder, which proved to be mercuric iodide. Another portion placed in an amber-coloured vial and exposed to direct sunlight, behaved somewhat similarly, except that the decomposition took about three times as long. A third portion, placed in an amber-coloured bottle and exposed to diffused light showed no signs of decomposition at the end of one week, but after two weeks change was quite evident. Some of the powdered mixture gently heated in a test tube gave off the odour of chloroform, especially when

the iodoform and calomel were used in proportional quantities, and there was a formation of mercurous iodide, which upon the temperature being raised, was converted into mercuric iodide. The reaction supposed to have taken place is—

$$2CHI_3 + 3Hg_2Cl_2 = 2CHCl_3 + 3H_2I_2.$$

Solubility of Lithium Carbonate.

With respect to the solubility of lithium carbonate n water at ordinary temperatures, statements have hitherto been fairly uniform, most authors giving it at 1 in 100, only Kremer differing in stating it to be 1 in 130 at 13° C. But in respect to its solubility at higher temperatures, authorities are much more at variance, it having been variously described as being "less soluble," "equally soluble," and "more soluble" in hot than in cold water. In order to clear up this discrepancy, some experiments have been made by Mr. Carter Napier Draper, who reports (*Chem. News*, April 15, p. 169) that he found the solubility of lithium carbonate in water at 15° C. to be 1·4787 per cent., and in water at 100° C. 0·7612 per cent. According to these results, therefore, the solubility of the salt in water at ordinary temperatures is nearly 50 per cent. greater than usually stated, whilst water at 100° C. dissolves rather less than one-half the quantity it is capable of dissolving at 15° C.

Ammonia Impurity in Sodium Bicarbonate.

According to Herr Thümmel (*Archiv*, Mar. 31, p. 245), sodium bicarbonate manufactured by the ammonia process is occasionally met with containing ammonium carbonate, the samples being almost perfectly free from chlorine, but having a disagreeable harsh taste. He reports that in one case, commercial sodium bicarbonate was found to contain more than 10 per cent. of ammonium carbonate, and he argues therefore that the application of a test for this impurity is indispensable. The German Pharmacopœia provides as a test for the presence of ammonia, that the salt when treated with soda solution shall not give off the characteristic odour, or the odour test may be applied by heating a little of the dry salt in a test tube. But Herr Thümmel points out that these tests are uncertain when the ammoniacal impurity does not exceed one per cent. He prefers a solution of mercuric chloride, which is already used as a test for the presence of monocarbonate. If one-half per cent. of the impurity be present, mercuric chloride produces in the solution immediately a flocculent white precipitate which upon standing becomes yellowish. The impurity would also be indicated by the B.P. perchloride of platinum test.

Toxicity of Urine.

Some experiments communicated to the Société de Biologie by Messrs. Charsin and Roger (*Archives de Pharm.*, April 5, p. 184) appear to indicate a considerable diversity in the degrees of toxicity of urine from different animals. It was found that the urine secreted by a rabbit in twenty-four hours is capable of killing an animal of 4·284 kilograms body-weight; that from a guinea-pig, one of 5·663 kilograms; and that from a dog one of 3·317 kilograms. Under the same conditions the urine from a man had a toxicity equal to only 461 grams. It was also ascertained that inanition diminishes the toxicity of the urine considerably, and that the same result follows the use of a milk diet. This last observation appears to have a bearing upon the beneficial influence known to be produced in such disorders as uræmia by a milk diet.

Fasting and Poisons.

Some interesting information was also communicated to the same Society by M. Roger as to the influence of the condition of hunger upon the power of animals to resist the poisonous action of alkaloids. It was stated that either quinine, atropine or nicotine introduced into the peripheral venous system of a rabbit after it has been kept without food for twenty-four hours is only four-fifths as toxic as if introduced whilst digestion is going on. On the contrary, if the alkaloid be introduced into the portal vein, the toxic dose whilst in digestion is nearly twice the quantity required during fasting. Fasting would therefore appear to tend to deprive the liver of its power to arrest the alkaloid, and the disappearance of this property coincides with the diminution of the glycogenic function of the liver. But if sugar be given to the animal three hours before making the experiment the liver again recovers its lost property.

Diastase.

It is well known that diastase, like other ferments, has its activity impaired under certain conditions, one of them being a relatively high temperature. An attempt has been made by M. Bourquelot (*Journ. Pharm.*, Apr. 15, p. 103) to trace the steps in this deterioration by comparative experiments as to the extent to which it influences the power of diastase to effect the hydration, or degradation of starch, as indicated by the reducing power developed through the formation of successive molecules of maltose. It was found that when the action of diastase upon starch was allowed to proceed under normal conditions the final product had a reducing power upon cupric solution equal to about 52 per cent. of what it would have possessed had the whole of the carbohydrate been converted into glucose; the number 52 is therefore taken as the standard of the reducing power. But when 10 c.c. of a 1 per cent. mixture of starch paste and water was kept in contact for three days with 10 c.c. of a one-half per cent. solution of diastase that had previously been kept for twelve hours at a temperature of 68° C., the product only had a reducing power of 28·4. With increasing quantities of diastase, up to 60 c.c. and the same quantity of starch the reducing power remained practically the same, the highest figure reached being 28·6; whilst with 10 c.c. of diastase and increasing quantities of starch the figures only varied between 30·1 and 32·9. The action of the deteriorated diastase, however, proved to be, as far as it went, as rapid as that of normal diastase. It would appear, therefore, that under the influence of heat, it is not the quantity of the ferment that is diminished but the quality that is modified; unless it be supposed that natural diastase consists of two or more soluble ferments, which are destroyed in succession by a rise of temperature.

Pepsin.

Some recent experiments by M. Sundberg (*L'Union Pharm.*, Apr., p. 145) appear to throw considerable doubt upon the ordinary assumption that pepsin is of an albuminoid nature. The most superficial layer of gastric mucus was scraped from calves' stomachs, triturated with sodium chloride and sufficient water added to make a saturated solution, which after standing two days was submitted to dialysis to remove the sodium chloride. The solution of pepsin so obtained, though it pos-

sessed considerable digestive power, contained only traces of albuminoid matter; but in order to purify it further, the acidulated solution was kept for several days at a temperature of 40° C., after which calcium chloride and sodium phosphate were added, and it was neutralized with very dilute ammonia. The precipitation had to be repeated two or three times to bring down all the pepsin, which was then washed, dissolved in a little 5 per cent. hydrochloric acid and the solution dialysed. The solution, after the removal of the salts, was very active, but it no longer gave any of the reactions for albuminoid matter, yielding no precipitate with either neutral or basic lead acetate or platinum perchloride. Five or six volumes of absolute alcohol, however, caused the formation of a slight precipitate which with acidulated water gave a very active solution.

Vulcanized India-Rubber.

According to M. Balland the gradual loss of elasticity frequently observed in articles made of vulcanized india-rubber is due to the slow formation of sulphuric acid by the action of atmospheric moisture on sulphur present in the rubber. He recommends that the action of the acid should be prevented by occasional prolonged washing of the article with water, or with water rendered slightly alkaline (*Journ. Pharm.*, Apr. 15, p. 417). In this way he has been able to maintain drainage tubes in a supple condition for a considerable time.

Huamanripa.

A Chilian plant, called by the natives *Huamanripa*, has recently been reported on by M. Bignon, of Lima, who says that it possesses a deserved reputation as a specific in all diseases of the respiratory tract. It grows only on the slopes of the Cordilleras at a considerable height, and is a small composite plant belonging to the genus *Cryptochæte*. It has long lanceolate leaves, and flourishes from January to May, after which it disappears, although the rhizome remains. It is said to be very aromatic and resinous. An infusion is used, made from 25 grams of the leaves to a litre of water, which is bitter and aromatic; if made of greater strength it causes nausea. According to Dr. Zapater the infusion increases the circulation, accelerates the cardiac movements, and augments the secretions, especially the flow of saliva. In larger doses it causes vomiting, excessive perspiration, and diminishes the number of pulsations, as well as the respiratory movements, and lowers the temperature. In pleurisy and inflammation of the lungs it seems to have almost a specific effect, according to Dr. Zapater. When it is desired to prevent nausea, a little brandy is given with the infusion (*Am. Drug.*, p. 75).

Chinese Anæsthetic.

A curious account of a Chinese anæsthetic is given in *Nouv. Rémèdes* (April, p. 165). It appears that Dr. W. Lambuth mentions in his third annual report of the Soochow Hospital, an experiment made, at the suggestion of a Chinese doctor, with this preparation. A substance resembling wax, but harder, and semi-transparent, in the form of a tablet, was cut into small pieces and digested in water for twenty-four hours, together with a small white woody excresence. The liquid was then found by Dr. Lambuth to possess well marked anæsthetic properties. It was found that a numbness of the lips and tongue was produced, and that the finger immersed in the solution for some minutes could then be pricked with a needle without any pain being felt. The tablet was described as being the juice of the eyes of a frog. It was probably the substance obtained by the Chinese by placing a frog in a jar containing flour and irritating the animal, when it exudes a liquid which forms a paste with the flour. This is then dried and made into cakes bearing some resemblance to button lac.* If the anæsthetic property be due to the frogs' excretion, and not to the white woody excrescence above mentioned, the fact suggests the possibility of the animal using the secretion to deaden the pain to which it might be subjected by its enemies.

Aseptol.

Aseptol is recommended in the *British Journal of Dental Science* for the treatment of gingivitis and pyorrhœa. A 3 per cent. solution is used, and is injected between the gums and teeth every three days, for a couple of weeks. This treatment is said to reduce chronic swelling, arrest the flow of pus, restore the gingival margins to their natural shape, and cause them to be free from tenderness.

Heritiera littoralis.

In the April number of *Nouveaux Rémèdes*, Messrs. Heckel and Schlagdenhauffen conclude their examination of the false kola (*Heritiera littoralis*). The results obtained indicate that the seeds contain about 5 per cent. of tannin, analogous to that of kola nuts, in which it is present in only half that quantity. They do not contain any caffeine. The proportion of fatty matter in the false kola nuts is ten times as much as that in the true kola nut.

Orthosiphon stamineus.

M. C. Périnelle, in the *Répertoire de Pharmacie* (p. 191), speaks highly of the value of *Orthosiphon stamineus* (see *ante*, p. 267) in urinary diseases. It has been experimented with by Professor Guyon at the Necker Hospital and elsewhere, and judging from the results obtained, he believes that it is destined to be introduced into the Pharmacopée Française. A plant has already been received in the Jardin des Plantes, and is flourishing there. A kilogram of the plant affords about 195 grams of aqueous extract. It appears to contain a volatile oil.

Rhamnus Purshiana.

The series of interesting pharmacognostical notes communicated by Professor Schrenk is continued in the April number of the *American Druggist* (p. 61). He points out that the bark of *Rhamnus Purshiana* may be distinguished from that of *R. Frangula* by the presence of sclerenchymatous cells of most irregular angular shape, wedged together so as to form large compact groups, which increase in size and number toward the surface; to these the short fracture of the outer bark is due. The sclerenchymatous cells are absent from the bark of *R. Frangula*.

Coca Leaves.

With respect to coca leaves Professor Schrenk remarks that the lines on the under surface of the leaf are formed by a narrow band of tissue consisting of several rows of elongated oblong cells, which contrast very much with the polygonal cells of the epidermis bordering these lines. A cross section through one of these lines shows that it is a ridge consisting of a subepidermal strand of collenchymatous cells. There is no connection, as has been stated, between the lines and the veins of the leaf. He believes that the lines serve as an elastic stiffening of the blade of the leaf.

* A specimen of this curious medicament, presented by Mr. A. C. Abraham, may be seen in the Museum of the Pharmaceutical Society.

Professor Schrenk also points out the occurrence on tobacco leaves of curious branched glandular hairs, which he thinks may be of diagnostic interest. These hairs appear, however, to be difficult to find, and in some pieces of leaf from a cigar factory he found none.

Nicotiana Tabacum.

M. Patrouillard, who on a previous occasion pointed out the adulteration of senega root with that of *Asclepias Vinc-toxicum*, has now found another adulteration of the same drug in the form of the rootlets of *Ruscus aculeatus* (*Journ. Pharm.*, April, p. 364). These differ from senega root in the paler colour of their external surface, and in being cylindrical and of nearly uniform thickness throughout. The transverse section also has a nearly uniform white colour, whilst in senega the cortical portion is darker than the meditullium, especially in the layer immediately surrounding the meditullium. The senega root examined by M. Patrouillard contained about a quarter of its weight of the adulteration.

Adulteration of Senega.

Some little interest has been excited by the announcement of the discovery of a new and remarkable variety of asparagus on the steppes of Akhal-Tekiz. It has not been botanically identified, but it is represented as growing perfectly wild, the stalks being nearly as thick as a man's arm and attaining a height of five or six feet, so that one of them is said to suffice ten Russian soldiers for a meal. If the preference of experts for wild asparagus finds justification in this variety, and its flavour is described as equal to that of the best European kinds, asparagus lovers may have a good time before them.

A New Asparagus.

The investigations of Professor Strasburger on the extent to which pollen grains from one plant will germinate on the stigma of another species have led him to the conclusion that there is a diastatic ferment in the pollen grain, which can often be recognized by its rapid and energetic action on starch paste. He believes that this ferment varies in different species, and that it probably is of importance to the nutrition of the pollen grain when the latter passes through the tissue of the style, and that it enables the pollen tube to pierce the cell walls and also the embryo sac. M. P. Van Tieghem has shown that pollen has the power, at least in the case of the hyacinth, crocus, narcissus, wallflower and violet, to invert sucrose into glucose. This power appears to be very considerable, judging from the small amount of pollen required to produce a considerable quantity of glucose (*Journ. Roy. Micro. Soc.*, pp. 269, 273). It would be interesting to know how far pollen is concerned in the manufacture of honey by bees, especially when they are fed on cane sugar. The spores of *Lycopodium* and of some ferns appear to possess, but in a less degree, this inverting property of pollen.

Ferment in Pollen Grains.

Mr. Worthington Smith gives an interesting account, in the *Gardeners' Chronicle* (April 23, p. 545), of the St. George's mushroom. He remarks that it derives its name from generally appearing about St. George's Day (April 23). To this mushroom the name of "*mouçeron*" is given in France, because it grows in mossy places, and from its French name the English word mushroom is derived.

Agaricus gambosus.

A fungus which is known to affect henbane leaves in Europe, *Peronospora Hyoscyami*, De Bary, has lately been noticed on the leaves of *Nicotiana glauca* in California, and it is feared lest it may spread to the tobacco plantations in the United States (*Nature*, March 31, p. 321). As this fungus has been found in England, there is a possibility of its spreading to the tobacco cultivated in this country, which grows under conditions less favourable to its vitality than in the United States.

Peronospora Hyoscyami.

On the young leaves of *Amygdalus communis*, as well as on those of the peach, plum and cherry, nectariferous glands are found, which are stated by Sig. L. Macchiati to vary in size according to the time of day, being largest in the morning and smallest in the afternoon. The object of these glands appears to be to protect the flowers against the attacks of caterpillars. The glands disappear altogether from the mature leaves (*Journ. Roy. Micro. Soc.*, p. 267).

Nectaries of Almond Leaves.

Mr. Meehan, in the *Proc. Acad. Nat. Sci. Phil.* (*Nature*, March 31, p. 521), has called attention to relation of insects to the flowers of *Cassia marilandica*. He points out that the pollen seems never to burst the anther cases. These should open by pores at the apex, but the membrane there is only opened by insect agency. The insects pitch on the three lower and longer anthers, and pierce only the four upper and shorter anthers, so that the lower ones do not appear to be of any use, although they are full of pollen. Mr. Meehan expresses the opinion that the dependence of a plant on insect aid is an indication that its race is nearly run, and that the opposite assumption has been an injury to the study of the main questions of fertilization.

Cassia marilandica.

Mr. Burbidge has lately directed attention to the curious fact th t the foliage or erect leaves of the flat-leaved group of narcissus always twist from left to right, whereas the floral leaves and perianth segments show a tendency to twist from right to left. The only exceptions noticed appeared to be in the Corbularias and *N. triandrus*. In the former, however, the foliage leaves often become reflexed, and the perianth leaves are reversed as compared with those of the daffodil (*Gard. Chron.*, Apr. 2, p. 454).

Spiral Growth of Leaves.

Leclerc du Sablon points out (*Ann. Sc. Nat.*, v., 1) that a relation exists between the sensitiveness of tendrils and their structure. The side of the tendril most sensitive to contact is that on which the greatest number of fibres with thin walls or of very elongated cells are found. Thus the tendrils sensitive on one side only, as in the *Cucurbitaceæ* and *Passifloreæ*, present these fibres only on that side, and in those which are sensitive on their whole surface, as in the *Ampelidæ*, the fibres are symetrically placed in relation to the axis.

Sensitiveness of Tendrils.

Two new mosses have recently been added to the already long list of the British flora, viz., *Eurhynchium abbreviatum* and *Rhyncostegium rotundifolium*; the former was discovered in Herefordshire, and the latter in Somersetshre. *Webera cucullata* has also been found in Rossshire, and a description of it is given in the *Scottish Naturalist*, April (p. 91). Some interesting notes on new and rare British mosses are given in the *Journal of Botany* (p. 111) by Mr. Boswell, in which he states that *Tortula canescens*, which had not been found in this country for many years, has lately been found in Cornwall. It has also been found in Scotland in several places.

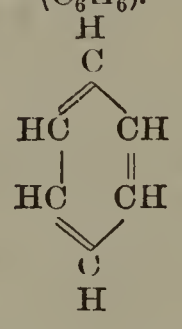
New British Mosses.

THE STRUCTURAL FORMULÆ OF SOME NEW ANTIPYRETICS.

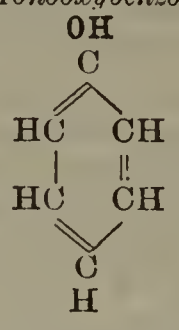
An interesting paper in the *Pharmaceutische Cen'ralhalle* (March 31, p. 157) is devoted to a graphic representation by means of structural formulæ of the chemical relation to one another and to benzol and pyridine of a considerable number of the compounds that have been introduced during the last few years as antipyretics, The relation to one another is conveniently shown by printing the substituting group characteristic of each particular compound in thick type.

Of the oxy-derivatives of benzol, in which hydrogen is replaced by hydroxyl (HO), reference is made to *Phenol*, *Resorcin* and *Hydroquinone*. The reader is assumed to possess a general knowledge of the methods of preparing these bodies, as well as of the differences in the isomers dependent upon the different position of the substituted group in the molecule. They are then represented as follows:—

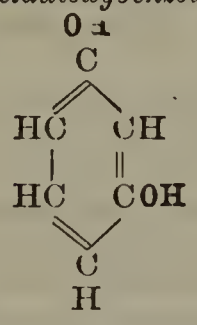
Benzol (C_6H_6).



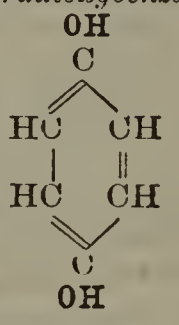
Phenol (C_6H_6O).
Carbolic Acid.
Monooxybenzol.



Resorcin ($C_6H_6O_2$).
Metadioxybenzol.

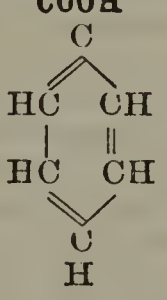


Hydroquinone ($C_6H_6O_2$).
Paradioxybenzol.

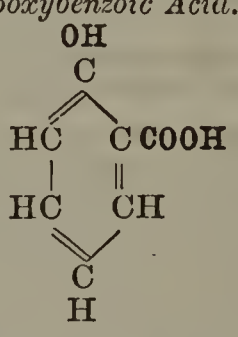


Next come *Benzoic acid* and *Salicylic acid*, in one of which carboxyl (COOH) replaces one atom of hydrogen, and in the other carboxyl and hydroxyl replace two atoms of hydrogen.

Benzoic Acid ($C_7H_6O_2$).

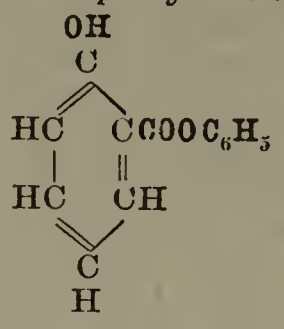


Salicylic Acid ($C_7H_6O_3$).
Orthooxybenzoic Acid.



The salts of these acids are formed by a base taking the place of the hydrogen of the carboxyl group. Quite analogous to such salts in its relation to one of these acids is the compound that has recently been introduced under the name "*Salol*," which is the phenyl ether of salicylic acid. It is prepared by heating a mixture of proportional quantities of phenol sodium and sodium salicylate with phosphorus chloride, dissolving out with water the sodium chloride and phosphoric acid formed and crystallizing the salol from alcohol. Or phosgene gas is passed at a moderate temperature through a mixture of phenol sodium and sodium salicylate in proportional quantities, the sodium chloride dissolved out from the product with water and the salol crystallized from alcohol.

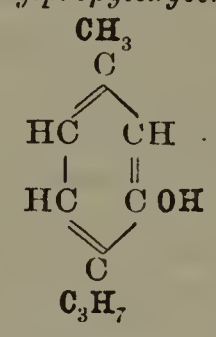
Salol ($C_{13}H_{10}O_3$).
Salicylic acid pheny ether.



It will be seen from the formula that the monovalent radical phenyl (C_6H_5) here takes the place of the hydrogen of the carboxyl.

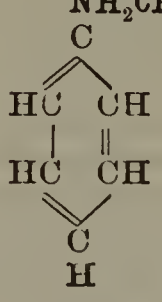
In *Thymol* there are three benzol hydrogens replaced, one by hydroxyl and the two others by the radicals methyl (CH_3) and propyl (C_3H_7). The constitution can therefore be represented as follows:—

Thymol ($C_{10}H_{14}O$)
Methylpropyloxybenzol.

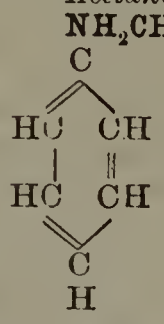


In *Antifebrin* we have a body which is formed when an atom of hydrogen of the amide (NH_2) in aniline (amidobenzol, $C_6H_5 \cdot NH_2$) is replaced by acetyl (CH_3CO). In the preparation of antifebrin aniline is boiled with glacial acetic acid in slight excess in a return condenser for two or three days, until the whole becomes solid on cooling, and the product, after removing unattacked aniline by melting and pouring it into water, is crystallized from alcohol. In the first stage of this process aniline acetate is formed, and this, on further application of heat under separation of water condenses to acetanilid, or antifebrin.

Aniline Acetate.

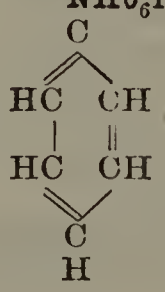


Antifebrin (C_8H_9NO).
Phenylacetamid or
Acetanilid.



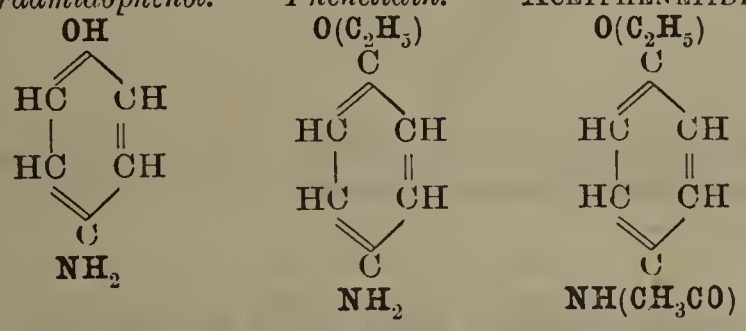
Analogous with this are the combinations of anilid with other acid radicals. Of these compounds it would appear that, at present, *benzanilid* has the best prospect of being introduced into medicine (*Berl. klin. Wochensch.*, 26–30). The preparation of benzanilid resembles that of acetanilid, and its formula is—

Benzanilid ($C_{13}H_{11}NO$).



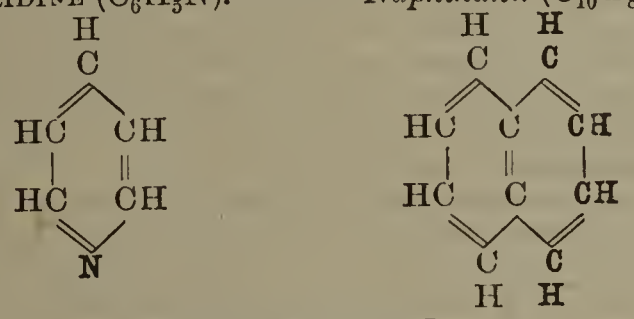
Acetphenetidin, a body similarly constituted to acetanilid, has also recently been recommended as an antipyretic. It is prepared by nitrating phenol, separating the ortho- and paranitrophenols formed, ethylizing the latter and reduction of the resulting p-nitroethylphenol, the product being the ethyl ether of paraamidophenol, or p-phenetidin. This by treatment with glacial acetic acid is converted into paraacetphenetidin.

Paraamidophenol. *Phenetidin.* ACETPHENETIDIN.

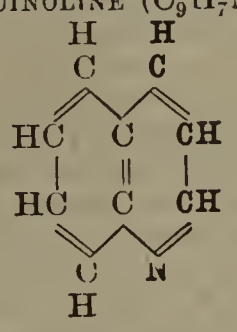


Another series of compounds mentioned are *Pyridine*, *Quinoline* and derivatives from quinoline, the connection of which with benzol may be shown through the formulæ of naphthalin and pyridine.

PYRIDINE (C_6H_5N). *Naphthalin* ($C_{10}H_8$).

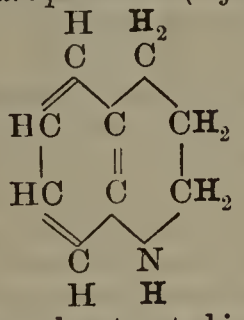


QUINOLINE (C_9H_7N).



Kairolin and *Kairin* are two bodies closely allied to quinoline and to each other; they are both hydrogenized quinolines (containing hydrogen added to CH and N groups), and contain also alkyl groups replacing hydrogen. The action of nascent hydrogen (tin and hydrochloric acid) upon quinoline gives rise to the formation, besides dihydroquinoline, of tetrahydroquinoline, which may be represented as follows, the variations from the quinoline formula being printed in thick type.

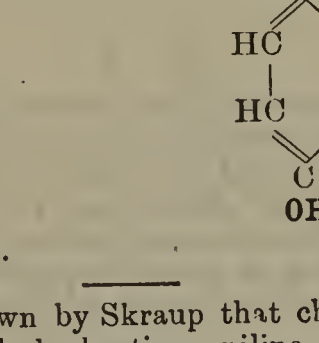
Tetrahydroquinoline ($C_9H_{11}N$).



Tetrahydroquinoline, when treated in the known manner with methyl iodide, yields a tertiary amine, a sulphate of which is known under the name *M-Kairolin*.* Its systematic name is methyltetrahydroquinoline or methylquinolinetetrahydride, and the empirical formula of its sulphuric acid salt is $C_{10}H_{13}N \cdot H_2SO_4$. By the use of ethyl iodide the corresponding compound, *A-Kairolin*,* ethyltetrahydroquinoline ($C_{11}H_{15}N$) is obtained. The following represents the constitution of M-kairolin, the methyl compound, a C_2H_5 group taking the place of the CH_3 group in the formula for A-kairolin.

* The letters M and A are used by the manufacturers to distinguish the methyl and ethyl (aethyl) derivatives.

M-KAIROLIN ($C_{10}H_{13}N \cdot H_2SO_4$).
Methyltetrahydroquinolin Sulphate.



Whilst in the cases of the kairolins all the substitution is represented as taking place in the pyridine nucleus, in the formation of *Kairin* part of the substitution takes place in the pyridine and part in the benzol nucleus. Upon heating quinoline with fuming sulphuric acid 1-(ortho-)quinolinesulphonic acid is formed, which upon being fused with potash gives 1-oxyquinoline or ortho-oxyquinoline (C_9H_7NO). By the action of nascent hydrogen this is converted into 1-(ortho)tetrahydrooxyquinoline ($C_9H_{11}NO$), and from this, by treatment with methyl iodide, is obtained tetrahydromethyloxyquinoline, the hydrochlorate of which ($C_{10}H_{13}NO,.HCl + H_2O$) is the compound known as *M-kairin*. By the use of ethyl iodide the corresponding ethyl compound is formed, which is known as *A-kairin*, or *kairin*. The stages are represented by the following formulæ:—

1-*Oxy(ortho)quinoline* (C_9H_7NO). 1-(*Ortho*)*tetrahydrooxyquinoline* ($C_9H_{11}NO$).

M-KAIRIN ($C_{10}H_{13}NO_2 \cdot HCl + H_2O$)
Oxytetrahydromethylquinoline Hydrochlorate.

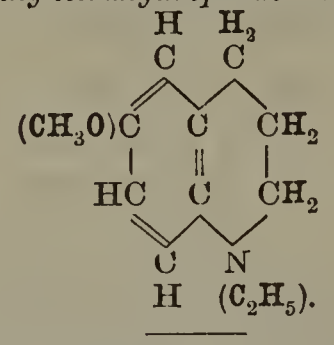
A-KAIRIN ($C_{11}H_{15}NO.HCl$)
Oxytetrahydroethylquinoline. Hydrochlorate.

It has been shown by Skraup that chinoline can be formed synthetically by heating aniline (or aniline and nitrobenzol) with glycerine and sulphuric acid to a temperature of about 190° C. Homologues of chinoline can be prepared in a similar manner. When paraamidoanisol and paranitroanisol are heated with glycerine and sulphuric acid for some time at a temperature of from 140° to 150° C., parachinanisol ($C_{10}H_9NO$) is formed, which distils from an alkaline liquor in the vapour of water. By the action of nascent hydrogen this is converted into tetrahydroparachinanisol or *Thallin*.

Parachinanisol ($C_{10}H_9NO$). THALLIN ($C_{10}H_{13}NO$). *Tetrahydroparachinanisol.*

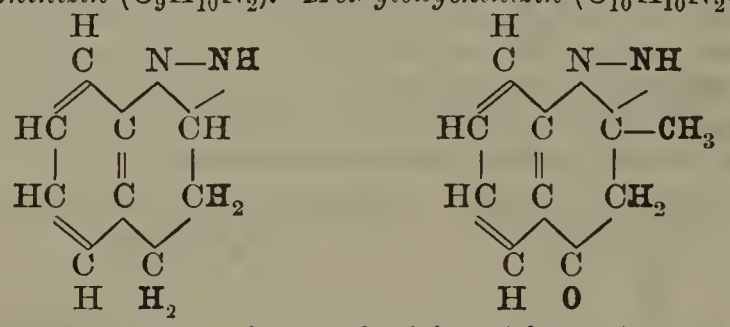
By heating thallin with ethyl iodide the ethyl group can be substituted for hydrogen, the product being ethyltetrahydroparachinanisol, or *Ethylthallin* ($C_{12}H_{17}NO$).

ETHYLTHALLIN ($C_{12}H_{17}NO$).
Ethyltetrahydroparachinanisol.



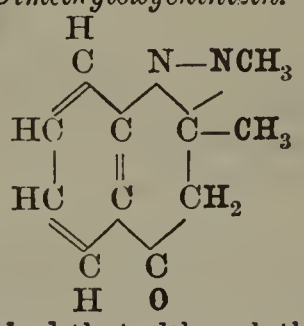
By the action of equal volumes of phenylhydrazin and acetoacetic ether upon one another, condensation takes place with elimination of water and alcohol and methyloxychinizin is formed. The hypothetical chinizin is interesting on account of the assumed combination in it of the two nitrogen atoms. Its relation with methyloxychinizin is illustrated by the following formulæ:—

Chinizin ($C_9H_{10}N_2$). *Methyloxychinizin* ($C_{10}H_{10}N_2O$).



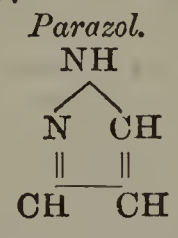
Upon heating methyloxychinizin with methyl iodide and methyl alcohol to a temperature of 100° C., the compound dimethyloxychinizin or oxydimethylchinizin, known better as *Antipyrin*, is formed.

ANTIPYRIN ($C_{11}H_{12}N_2O$).
Dimethyloxychinizin.

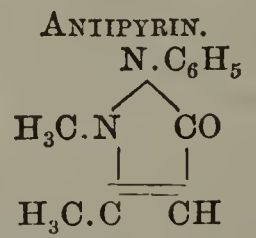


[It may be remarked that although this was the constitution first attributed to antipyrin, Dr. Knorr has since altered his views, and described it (*Annalen*, ccxxxviii. 137) as a "pyrazol" derivative. Parazol is represented as the type of a new class of bodies, and as standing in the same relation to pyrrol as pyridin to benzol. The relation between parazol and antipyrin is shown in the formulæ:—

Parazol.



ANTIPYRIN.

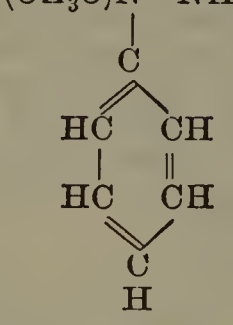


According to this view a tetrahydride of pyrazol is first formed, which is termed pyrazin, and next a CH_2 group is replaced by CO, the product being pyrazolon, and antipyrin is supposed to be a phenyldimethylpyrazolon.—ED. PH. J.]

Another compound which has been credited with antipyretic properties is phenylhydrazinlevulinic acid or *Antithermin*. It is formed as a yellow precipitate upon bringing together phenylhydrazin and levulinic acid in acetic acid solution, condensation taking place with the elimination of the elements of water. Levulinic acid may be considered as acetylpropionic acid—

$CH_3CO.CH_2.CH_2.COOH.$

ANTITHERMIN.
Phenylhydrazinlevulinic Acid.



Further information respecting most of the foregoing compounds will be found in a paper by Mr. T. S. Dymond, at p. 895.

ESTIMATION OF ALKALOIDS IN NARCOTIC EXTRACTS.*

BY EUGEN DIETERICH.

The examination of all extracts regarding their value is obviously a necessity, and in the case of narcotic extracts is sure to be satisfactory, because we are dealing with fixed and known chemical compounds, namely, the alkaloids. A narcotic extract to be normal must contain a certain quantity of alkaloid, and should it contain a smaller quantity, be it caused by careless preparation or sophistication, it must be rejected.

The requirements which the present German Pharmacopœia exacts (description of the colour and formation of limpid or turbid solution) are evidently unsatisfactory, and demand a decided correction, considering the importance of such medicaments as the narcotic extracts. Recent publications by Kunz and Schweissinger and also Leuken, who merely gave reactions for their identity, have stimulated a desire for further research. With a view of making the examination of narcotic extracts also a subject for study, Dieterich makes a critical comparison, and gives figures after trying all known methods. He obtained from extracts of belladonna, aconite, digitalis and hyoscyamus all the reactions mentioned by Leuken; but the differences in colour between violet and raspberry red and the differences between heavier and lighter precipitation and colour (difference between belladonna and hyoscyamus) are not so great as to allow one with limited experience to come to any positive conclusions. Schweissinger's assertion that unsophisticated extract of belladonna does not reduce Fehling's solution has not been confirmed, and has since been retracted by him.

Schweissinger's method for determining the alkaloid in aconite, belladonna, hyoscyamus and nux vomica by gravimetric analysis was successful, and the author's figures closely correspond with those given by the former.

Instead of treating the extract with dilute sulphuric acid, adding ammonia and shaking with chloroform, Kunz exhausted with alcohol, evaporated, then made alkaline and treated with ether, and, lastly, with chloroform. By evaporating the ether and chloroform solutions the alkaloid was obtained and subjected to further purification. By this method he undoubtedly obtained a pure alkaloid; but it must be taken into consideration that he operated with 50 grams of extract. Schweissinger found that the chloroform would not emulsionize so readily with the alkaline solution of the extract, and went a step further in not only determining the alkaloid gravimetrically, but also volumetrically. Dieterich followed Schweissinger's method, and the alkaloid obtained by evaporating the chloroformic solution corresponded in weight with that found by Schweissinger, but did not correspond with the figures obtained by titration, as the following table shows:—

* Translated and abridged from *Pharm. Centralhalle*. Reprinted from the *American Journal of Pharmacy*.

Extract of Belladonna.

	By weight.	By titration.
1.	1·060 per cent. alkaloid.	0·070 per cent. alkaloid.
2.	1·020 „ „	0·116 „ „
3.	1·320 „ „	0·335 „ „
4.	1·480 „ „	0·138 „ „
5.	1·445 „ „	0·046 „ „
6.	1·313 „ „	0·470 „ „

Extract of Hyoscyamus.

7.	0·572 per cent. alkaloid	0·058 per cent. alkaloid.
8.	0·710 „ „	0·116 „ „

It is evident that by titration a smaller quantity is obtained than by weighing, but the difference is so great that it cannot be attributed to impurity of the alkaloid. 0·04 gram of pure atropine required 13·6 c.c. of 100th normal acid, which is equal to 0·0393 atropine.

A strong penetrating odour and white fumes were noticed coming from the chloroform solution whilst evaporating on a water-bath, and recalling the fact that chloroform vapour at a red heat is decomposed yielding carbon, chlorine and hydrogen chloride, decomposition was supposed to be due to the flame under the water-bath. Part of the chlorine compound was found in the alkaloidal residue by the following experiments:—A piece of moistened blue litmus paper was placed over the flame whilst the chloroform was being evaporated, and reddening of the paper was soon observed. A small quantity of chloroform was placed alongside of some ammonia in a covered flat glass vessel, and immediately on placing a lighted spirit-lamp under the chloroform white fumes of ammonium chloride were noticed, and in a very short time the ammonia solution after acidulating with nitric acid gave a strong chlorine reaction with silver nitrate. Undoubtedly a portion of the alkaloid combines with the acid thus liberated and is lost for titration.

It being desirable to control the gravimetric analysis by titration, another solvent—ether—was used with satisfactory results. Slight differences were noticed in the yield of alkaloid, but by repeatedly shaking with ether a larger yield was obtained; it is, however, doubtful if all the alkaloid can thus be extracted, and as a result of his experiments Dieterich comes to the conclusion that it is impossible to completely exhaust such organic substances by shaking or precipitation. Very satisfactory results were obtained by displacement. To accomplish this the extract was treated with an alkali, the mixture made porous and then exhausted with ether. To liberate the alkaloids lime, baryta and ammonia were used, and for porous substances lime and washed powdered pumice stone. After making sure that the lime (in the form of burnt marble) did not decompose atropine, hyoscyamine, strychnine, brucine, etc., the quantity of water most suitable for the purpose remained to be ascertained. The extract was dissolved in water and mixed with lime and pumice stone and exhausted by continuous displacement (the apparatus used is described in *Phar. Centralhalle*, 1886, p. 273) with ether, a water-bath supplying the requisite warmth. The ethereal solution was evaporated to about 1 c.c., several drops of alcohol and 10 c.c. of water were added, and the solution was titrated with 100th normal acid, using rosolic acid as an indicator. The results were as follows:—

	Extr. Bellad.	Water.	Lime.	Pumice.	Alkaloid.
9.	1 gm.	1 gm.	2·5 gm.	10 gm.	·665 p.c.
10.	2 „	2 „	5 „	10 „	·838 „
11.	2 „	1 „	5 „	10 „	·925 „
12.	1 „	2 „	5 „	5 „	·982 „
13.	2 „	2 „	5 „	5 „	1·040 „
14.	2 „	2 „	5 „	10 „	1·040 „
15.	2 „	3 „	10 „	5 „	1·128 „
16.	2 „	2 „	10 „	— „	1·069 „
17.	2 „	3 „	10 „	— „	1·180 „

The largest yield was obtained with a large excess of lime (No. 17). Less favourable were the following experiments:—

(18) Two extract bellad., 2 ammonia, 15 pumice; 1·156 per cent. alkaloid.

(19) Two extract bellad., 2 water, 1 baryta, 15 pumice; 1·127 per cent. alkaloid.

Ammonia takes up a great deal of colouring matter and renders titration difficult, and the same, but in a less degree, is the case with baryta. Before giving a definite method experiments were made to determine whether there is any decomposition of the alkaloid, and secondly, whether the alkaloid may be completely removed from the extract treated with lime. Accordingly 10·0 grams of extract of belladonna were dissolved in 15·0 grams of water, 50·0 lime added and treated for half an hour with ether. The 100 c.c. of alkaloid solution thus obtained was divided into five portions of 20 c.c. each, and a few drops of alcohol and water were added in experiment 21, when reduced to about 1 c.c.

	20 c.c. evaporated	Dried at	Percentage of Alkaloid. Weight.	Titration.
20.	Spontaneously	40° C.	1·322	1·165
21.	Water-bath	—	1·315	1·159
22.	„	60° C. for 15′	1·222	1·045
23.	„	100° C. for 10′	1·117	0·627
24.	„	100° C. for 15′	1·110	0·569

Experiments No. 20 and No. 21 can be taken as normal, whilst from No. 22 to No. 24 according to temperature and time used in drying a considerable discrepancy in the figures attained by titration is noticeable. The question arises if by drying the alkaloid there is a decomposition, or if the dried alkaloid is not so readily affected by the acid. Solutions No. 23 and No. 24 were allowed to stand one day and again examined. The solutions were neutral just as on the previous day; if it were due to difficult solubility, they should have reacted alkaline and required the addition of more acid. A decomposition, it must be inferred, takes place. Experiments No. 20 and No. 21 show in weighed (crude) and titrated (pure) alkaloid a ratio of 100 : 88.

(25) To determine whether ether is quick or slow to dissolve out the alkaloid, 2·0 extra of belladonna were dissolved in 3·0 water and mixed with 10·0 lime. The powder was displaced with five portions of ether. Each portion was collected and examined separately with the following results:—

I.	0·968 per cent.
II.	0·072 „
III.	0·072 „
IV.	0 057 „
V.	traces
Total	1·169 p. c. of alkaloid.

Hence it must be concluded that ether answers for completely extracting the alkaloid.

(26) Two gm. extr. belladonna dissolved in 3·0 water, added 0·040 atropine and 10·0 lime, extracted with ether and carefully evaporated to about 1 c.c., added a few drops of alcohol and 10 c.c. of water. It required for titration 21·7 c.c. 100th normal acid. After deducting 13·6 c.c. for the 0·04 atropine added, the remaining 8·1 c.c. indicate 1·170 per cent. of alkaloid. The result thus obtained must be considered satisfactory, and shows that lime does not decompose the alkaloid.

(27) 0·024 gram of atropine dissolved in 3 c.c. of water, added 10 0 powdered lime, exhausted with ether, evaporated and dissolved the residue in a few drops of alcohol and 10 c.c. of water; required for neutralization 8·1 c.c. 100th normal acid corresponding to 0·0234 atropine. The loss sustained is very small, and proves beyond doubt that displacement is preferable to shaking.

So far the experiments were made only with extract of belladonna, and although good results were obtained it was concluded to examine the extracts of aconite, conium and hyoscyamus, and to use—firstly, the ordinary method with lime; secondly, with lime and fractional displacement; and thirdly, the ammonia process. The following shows the yield in alkaloids:—

	Extract.	First method. Per cent.	Second method. Per cent.	Third method. Per cent.
28–30.	Aconite	1·279	1·299	1·305
31–33.	Conium	0·635	0 618	0 647
34–36.	Hyoscyamus	0·837	0·837	0·803

Whilst the extraction of extract of aconite and extract of hyoscyamus is easily accomplished in half an hour, it required from one and a half to two hours to completely exhaust the conium extract. The figures obtained prove the efficacy of the new process. The only doubt was in reference to extract of nux vomica, as some text books give the solubility of strychnine in ether to be 1 : 1250, and brucine as insoluble. To ascertain their solubility in ether, 0·1 strychnine and 0·1 brucine were triturated with 3·0 c.c. of water and 10·0 of lime. After extracting the powder with ether for one hour, the liquid was evaporated and dissolved in a few drops of alcohol and 10 c.c. of distilled water ; for titration 7·5 c.c. 100th normal acid were required, equivalent to 0·1365 alkaloid In the meantime the extraction was carried on for another hour. The liquid treated as before required for titration 3·1 c.c. 100th normal acid equivalent to 0·0564 alkaloid, making the total 0·1929. This experiment proves conclusively that brucine is not insoluble in ether, and it naturally follows that the amorphous alkaloid, as obtained by the action of the alkalies, must be more soluble than the pure alkaloid.

It was necessary to slightly modify the process for extract of nux vomica owing to the large amount of alkaloid it contains. The same quantity of water and only half the quantity of extract, rosolic acid as indicator and 20th normal acid, in place of 100th normal acid, were used; assuming the presence of equal quantities of brucine and strychnine, 1 c.c. of 20th normal sulphuric acid is equivalent to 0·0182 gram of alkaloid.

The experiments were made as with extract of belladonna, with the following results :—

(38 and 39) 1·0 extract nux vomica, 3·0 water and 10·0 lime yielded 18·92 p.c. and 18·74 p.c. alkaloid.

(40) 1·0 extract nux vomica, 3·0 water, 10·0 lime were treated three times with cold ether and then displaced, the four fractions yielded 15·10, 2·36 and 0·92, or a total of 18·74 per cent. alkaloid.

(41) 1·0 extract nux vomica, 1·0 water, 2·0 ammonia and 15·0 pumice stone, after one hour's extraction 18·38 per cent., after fifteen minutes more 0·18 per cent., total 18·56 per cent. of alkaloid.

(42) 1·0 extract nux vomica, 0·1 strychnine, 0·1 brucine, 3·0 water, five drops diluted sulphuric acid, 10·0 lime yield 18·74 per cent. of alkaloid after deducting the strychnine and brucine added.

Experiments No 38 to 42 furnish proof that both lime and ammonia answer for the modified process. Whilst titrating it was noticed that toward the end the reactions were not so distinct as with the other extracts, so that very sensitive test-paper had to be employed; furthermore crystals of alkaloids separated out in the ethereal solution and had to be redissolved in alcohol. Lime, therefore, again proved preferable to ammonia.

The above results indicate that the method is well adapted for estimating the amount of alkaloid contained in the extract, but it requires exact work, and, above all, a complete liberation and solution of the alkaloids.

To determine whether the addition of lime, owing to its great affinity for water, would prevent the complete exhaustion of the extract, the extract was dissolved in normal ammonia and mixed with lime, so that the alkaloids were liberated by the ammonia, while the lime merely took up moisture and colouring matter, and by uniform incorporation with the extract rendered it fit for extraction. The following experiments show the results obtained :—

(43) Twenty gm. extract aconite, 2 c.c. normal ammonia, 10 gm. powdered lime, yield 1·279 per cent. alkaloid (compare experiments 28, 29, 30).

(44) Two gm. extract belladonna, 2 c.c. normal ammonia, 10 gm. powdered lime, yield 1·156 per cent. alkaloid (compare experiments 17, 18, 20, 21, 25).

(45) Two gm. extract hyoscyamus, 2 c.c. normal ammonia, 10 gm. powdered lime, yield 0 766 per cent. alkaloid (compare experiments 34, 35, 36).

(46) One gm. extract nux vomica, 2 c.c. normal ammonia, 10 gm. powdered lime, yield 18·74 per cent. alkaloid (compare experiments 38 to 42).

By comparison it will be observed that the same quantities were obtained as before, proving that either ammonia or lime, or both, may be used. The slight difference in extract of hyoscyamus is due to the fact that a new sample of extract was used. The process practically consists in, firstly, liberation of the alkaloid ; secondly, extraction with ether ; thirdly, evaporation of the ethereal solution ; and fourthly, titration. Of these the third requires a great deal of attention.

(α) *Examination of Extracts of Belladonna, Aconite, Conium and Hyoscyamus.*—Triturate 0·2 gram of powdered lime, prepared from marble, with 3 gm. of water, add 2 gm. of extract, when dissolved carefully add 10 gm. powdered lime. The mixture is then placed in a closed continuous displacement apparatus, the receiving bottle containing about 30 gm. of ether is suspended over a water-bath (not too hot) and the process of extraction is regulated by bringing the ether bottle nearer or further from the water-bath. With extracts of belladonna, aconite and hyoscyamus extraction is carried on for thirty or forty-five minutes at the highest. Conium extract requires at least two hours. It is advisable to exhaust a second time with ether. The ethereal solution of the alkaloids is transferred to a tared porcelain capsule, and the receiving bottle rinsed two or three times with small portions of ether ; 1 c.c. of distilled water is added, and the ether carefully evaporated over a water-bath at a temperature not exceeding 30° C., care being taken not to work near hydrochloric, nitric, acetic or other volatile acid. The residue weighing 1·5 grams is dissolved in 0·5 c.c. of alcohol, specific gravity 892, the solution diluted with 10 c.c. distilled water, and after adding one or two drops of rosolic acid solution (1 : 100 alcohol) titrated with 100th normal sulphuric acid, each cubic centimetre of which neutralizes 0·00289 gm. atropine or hyoscyamine, 0·00523 gm. aconitine, and 0·00127 conine. The following results were obtained :—

Extract of Belladonna (thirteen experiments) 1·170, 1·184, 1·163, 1·170, 1·156, 1·142, 1·156, 1·142, 1·156, 1·170, 1·184, 1·170, 1·170 per cent.

Extract of Aconite Root (six experiments) 1·305, 1·252, 1·279, 1·252, 1·279, 1·279 per cent.

Extract of Hyoscyamus (six experiments) ·780, ·766, ·766 ·751, ·751, ·766 per cent.

Extract of Conium (six experiments) ·609, ·597, ·622, ·622, ·597, ·589, per cent.

(β) *Examination of Extract of Nux Vomica.*—0·2 gm. powdered lime and 1 gm. extract of nux vomica are intimately mixed, 3 c.c. of distilled water added and evenly mixed with 10 gm. powdered lime, then exhausted in the same manner as before for one and a half or one and three quarter hours. The receiving bottle is rinsed with alcohol twice and then with ether, and after adding 1 c.c. of distilled water the percolate is evaporated in a tared porcelain capsule (at the same temperature and with the same caution as stated above) to 1 5 grams; then add 0·5 c.c. alcohol specific gravity ·892, 10 c.c. of distilled water and two drops of rosolic acid solution and titrate with 1-20th normal sulphuric acid. Toward the end it is advisable to use delicate blue litmus-paper, conveying the solution on the paper by means of platinum wire ; 1 c.c. of 1-20th normal sulphuric acid corresponds to 0·0182 gram of alkaloid.

The method may be modified by triturating 1 gm. extract nux vomica with 3 c.c. normal ammonia and adding 10 gm. powdered lime. The first process yielded the following results of six experiments :—18·74, 18·92, 18·74, 18·56, 18·65 per cent. alkaloid.

The Pharmaceutical Journal.

SATURDAY, APRIL 30, 1887.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE PHARMACY ACTS AMENDMENT BILL.

SINCE the adjournment of the debate on the Pharmacy Acts Amendment Bill on the 5th inst., as reported in this Journal of the 9th inst., no further progress has been made with the measure in Parliament, but several notices of motion have been given which will have the effect of preventing its being dealt with, unless it comes on for consideration before half-past twelve o'clock. This process of opposition, which is technically termed "blocking," has been adopted by Mr. HERMON HODGE, the member for Accrington, by Mr. GENT-DAVIS, the member for Lambeth, and by Mr. PICTON, the member for Leicester. In addition, notices of amendments to be moved have been given by Mr. ELLIS, the member for Leicestershire, and by Colonel DUNCAN. The latter proposes to make the power of prescribing courses of instruction in chemistry, botany, and materia medica, and of approving the schools where such instruction shall be given, subject to approval by the Privy Council, and his motion of amendment will be to insert words to that effect in the second clause of the Bill. Mr. ELLIS'S amendment goes much further, and is aimed at doing away altogether with the attendance of the courses of instruction which are considered to be essential for ensuring adequate pharmaceutical education, so that by the proposal to eliminate from Clause 1 of the Bill the words stating that the powers of the Pharmacy Acts shall be extended in that respect, the chief object for which the Bill has been introduced would be defeated. Another amendment proposed by Mr. ELLIS is conceived in the interest of public hospitals or dispensaries, and is intended to make such establishments equivalent to the open shops of chemists and druggists, as places in which candidates for pharmaceutical qualification must have served for not less than three years in the capacity of apprentices or pupils. These last-mentioned amendments are so thoroughly inconsistent with the possibility of developing a system of pharmaceutical education that would be beneficial either to future chemists and druggists or to the public, that it can scarcely be expected they will meet with much favour when they come to be discussed in Parliament. If there be any condition under which the practice of pharmacy is conducted so imperfectly as to offer no opportunity for acquiring proficiency in the art it is in the "dispensary," as it is generally met with, and even in public hospitals, dispensing, the only part of pharmacy that is practised there to any extent, is not frequently carried out in such a manner as would be satisfactory to the outside public. Colonel DUNCAN'S amendment is, however, of a reasonable nature, inasmuch as it aims at providing a means by which interests outside those of the pharmaceutical community may be duly safeguarded, and any tendency to undue demands upon students counteracted. This amendment is not in any way a hostile one, but those of which Mr. ELLIS has given notice strike at the very root of the Bill, and are in direct antagonism to the objects with which the Bill has been brought into Parliament.

It is under present conditions very uncertain when the Bill may come on for discussion. Last Monday it was down on the orders of the day for going into Committee, but as it stood far down in the list it was not reached by the time the House rose, and in fact there had been little probability of any other result. Meanwhile, however, a certain amount of opposition to the Bill has been brought into prominence by the distribution among members of Parliament of circulars which are evidently intended to influence them unfavourably to the objects of the Pharmaceutical Society. The arguments contained in one of these circulars are sufficiently replied to by Mr. SCHACHT in a letter that appears on p. 900. It is not apparent what source these circulars emanate from, for they are anonymous, and it is only from their tenour that it might be conjectured that they have been issued in the interest of the class of "grinders" brought into existence by the Pharmacy Act of 1868, and enabled through its defects to drive a lucrative trade in "preparing" candidates for examination. Certainly, it cannot be imagined that any establishments designed for imparting sound pharmaceutical training could have adopted such a mode of opposing the Bill, because the interests of such establishments could not be otherwise than benefited by the support which the passing of the Bill would render to them. But the case would be different with the grinders who have within the past ten years become the substitutes for true teachers and trainers in pharmacy. The establishment of a thorough system of pharmaceutical education may well be expected to put an end to that state of things under which candidates present themselves unsuccessfully four or five or six times, and even oftener, for the examination they have to pass in order to obtain qualification to keep a chemist and druggist's shop. These rejected candidates, amounting to more than one-half of the total number, go back again to the grinder, and form a perennial supply of grist to his mill. This is the real evil in regard to phar-

maceutical education, an evil that cannot be remedied so long as the mere passing of an examination is the only thing compulsory, and it is to remedy this evil that the Bill now before Parliament has been introduced with the object of carrying out the chief purpose for which the Pharmaceutical Society has laboured for upwards of forty years since its foundation. The late reports of Dr. GREENHOW, the Government Visitor of Examinations, contain references to the defective technical training and early education of greater part of the candidates presenting themselves for examination, which leave no doubt as to the magnitude of the evil that now exists, and though his particular business is to see that the examination is conducted in such a manner as to afford a sufficient test of competency in those who pass, the fact of his repeated reference to the large proportion of candidates who are incompetent to satisfy that test, furnishes the strongest evidence of the need for measures which will have the effect of compelling the candidates to become better educated and trained.

In the circular above mentioned as having been sent to members of Parliament to induce them to oppose the Bill, numerous quotations are given from Dr. GREENHOW'S reports extending over a period of eighteen years; but these quotations refer only to the opinion he holds as to the sufficiency of the examination as a guarantee that those who pass it are competent to carry on the business of a chemist and druggist. His testimony in this respect may be taken as sufficient evidence that the Pharmaceutical Society has, through its Examining Board, beneficially performed its duties in the public interest; but it does not constitute any argument against the necessity for further means of dealing with those candidates who cannot satisfy the requirements of the Examining Board. It has indeed nothing to do with that matter nor with the objects for which the Bill now in Parliament has been brought forward by the Society. However much it may be regarded as certain that those who pass the examination possess that competent practical knowledge of their business which it was the intention of the Pharmacy Acts to ensure, it is not the less certain that a very large proportion of those who present themselves to qualify under that Act, after having been for at least three years engaged in the business as apprentices or pupils, are found to be unable to pass the examination, and we have Dr. GREENHOW'S authority for stating that there is no other cause for their failure than incompetence. It is to this aspect of the case that the attention of the Council has been directed in framing the Bill by which it is now sought to obtain powers for the Society to establish a system of pharmaceutical examination. It is in the interest of those candidates who fail that these powers are now sought for, by which they can be compelled in future to go through a course of training that will enable them to satisfy the test of qualification. It is argued that since the Pharmaceutical Society has a school of its own, that it is with an interested motive that these powers are sought for; but that is not the case, for though the School has been maintained since the foundation of the Society, it has not been as a source of profit that this has been done. Throughout, the School has been supported only by continual contribution from the Society's funds, and solely with the object of stimulating pharmaceutical education. The assistance that has been rendered by the Society to provincial schools ought also to show that there is no desire to obstruct the supply of educational opportunities of a satisfactory character, and as regards the contention that the extension of powers now sought for by the Society would entail additional expense upon pharmaceutical students, it may with far greater reason be answered that any expense thus occasioned would be light in comparison with that attending repeated failures in examination, and consequent repeated recourse to the devices so inadequate to supply the want of systematic training and education.

It will be seen from a notice on the front page of the Journal, that the time for the examinations for the Jacob Bell Memorial Scholarships is now approaching, and that intending candidates must send notice of their desire to compete for them on or before the first day of June next. Two scholarships are offered of the value of thirty pounds, to be held for one year, and the Council provides in addition for laboratory instruction with admission to the lectures to the holders of the scholarships.

* * *

We have been requested to notice that Professor Bentley's lectures and demonstrations on Systematic and Practical Botany, at the Gardens of the Royal Botanic Society, Regent's Park, will commence on Saturday, May 7, at half-past eight o'clock in the morning.

* * *

We notice with pleasure that Mr. A. F. Pollard, second son of Mr. H. H. Pollard, Local Secretary to the Pharmaceutical Society at Ryde, has been elected to an open Classical Exhibition at Jesus College, Oxford.

* * *

At the next meeting of the Chemical Society, on Thursday, May 5, the papers to be read are "A Contribution to the Study of Well Waters," by R. Warington; "The Distribution of Lead in the Brains of Two Lead Factory Operatives, dying suddenly," by A. W. Blyth; and "Crystals in Basic Converter Slag," by J. E. Stead and C. H. Ridsdale.

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The Annual General Meeting of the Chemists' Assistants' Association will be held on Wednesday, May 4, at 9 p.m., to receive the annual report and elect the new Council.

* * *

The next meeting of the School of Pharmacy Students' Asssociation will take place on Thursday, May 5, when a paper will be read on "A Method of Estimating Nitrates" by Miss M. E. Buchanan; and a "Report on Botany" by Mr. E. G. Baker.

Transactions of the Pharmaceutical Society.

PRELIMINARY EXAMINATION.

At a meeting of the Board of Examiners for England and Wales, held on Thursday, April 28, the report of the College of Preceptors on the examinations held on April 12 was received.

Four hundred and twenty candidates had presented themselves for examination, of whom *one hundred and ninety-eight* had failed. The following *two hundred and twenty-two* passed, and the Registrar was authorized to place their names upon the Register of Apprentices or Students :—

Akam, Arthur .....Bradford.
Attenburrow, James .....Eastbourne.
Ballantyne, William .....Glasgow.
Bean, Percy .....Blackburn.
Beattie, Frederick .....Portobello.
Bell, William .....Southampton.
Bellamy, Archibald John .....Cardiff.
Belton, Walter Henry..... .....London.
Bennison, George.....Whitby.
Benson, Arthur Herbert.....Wigan.
Besting, George Edward.....Tunstall.
Bilby, Frederic Wm. Collins ...Kidderminster.
Birt, Charles.....Birmingham.
Blamey, John .....Penryn.
Bolwell, Albert George .....Bath.
Bonser, John Henry .....Derby.
Bowen, Isaac.....Llangammarch.
Brewis, Edward James .....Newcastle-on-Tyne.
Broad, Wm. Thos. Dane .....Bath.
Broom, Frank Willey ....Exeter.
Brown, Herbert .....Carrington.
Brown, John Arthur .....Leicester.
Brown, Sidney .....Southmolton.
Brown, William Arthur .....Ashbourne.
Buckle, John William.....Easingwold.
Bushby, George Frederick .....Manchester.
Calvert, William David .....Barnsley.
Carnegie, Robert .....Peterhead.
Chalmers, James .....Broughty Ferry.
Chapman, John .....Southwell.
Cheatle, Charles Edwd. Garne..Cheltenham.
Clark, Percival Turton .....Stoke Ferry.
Clow, David .....Kelso.
Coleman, John David .....Cardiff.
Collier, Henry William .....Laudon.
Conley, Thomas .....Edinburgh.
Connan, Campbell .....Crieff.
Cowles, Hector Charles .....London.
Craig, Henry Riddell ....Biggar.
Crossley, Richard.....Earlestown.
Cundall, Thomas Bowser .....Pocklington.
Currie, James Charles.....Stirling.
Dale, John Graves .....Stockton-on-Tees.
David, David Joseph .....Cowbridge.
Davies, David Evans .....Pontypridd.
Davies, David John.....Swansea.
Davies, John.. .....Torquay.
Davies, Thomas .....Aberystwith.
Davies, William .....Lampeter.
Davies, William Henry .....Cardigan.
Dennis, Ernest E. Gascoigne...Louth.
Dinwoodie, John Alexander ...Stranraer.
Dobbins, William Merry .....Redditch.
Duckworth, Daniel .....Blackburn.
Dunning, James .....Manchester.
Edgar, Alexander.....Denny.
Edgar, John James..... .....Daventry.
Edwards, Henry Charles .....Rye.
Elliott, Smith .....Oswaldkirk.
Ellis, John Alfred .....Wisbech.
Fagan, Albert Ed. Thorsby ...Scarborough.
Farmer, Thomas .....Bridgnorth.
Field, Sam..... .....Worksop.
Fisher, Richard Gibson .....Hornsea.
Ford, Jessie ....Denhead.
Frith, John Benjamin... .....Coggeshall.
Furness, Ernest Walter .....Atherstone.
Gard, John .....Camelford.
Gilbert, Arthur Stanley .....Camborne.
Glover, Alfred Augustus.....Bedford.
Glover, John.....St. Helens.
Gower, John.....Carmarthen.
Greaves, Henry Eldred .....Ironville.
Green. George Edward .....Sevenoaks.
Griffiths, John Herbert .....Little Brighton.
Griffiths, William Ewart.....Tonbridge.
Guy, Fredk. Jno. Vavasour ...Uppingham.
Hall, Charles Albert .....Peterborough.
Halliday, Herbert .....Skipton.
Halstead, Reginald Gordon ...Leeds.
Hampton, Peter .....Arbroath.
Hannah, Henry .....Paisley.
Hardy, George Bonner .....Parkstone.
Hattersley, Sydney Herbert ...Conisborough.
Healey, Harold St. George.....Taunton.
Hendry, Alexander John .....Turriff.
Hill, Leonard Vincent .....Sheffield.
Holoran, Frank George .....Retford.
Hoare, William Harold .....Derby.
Honeyman, Edmund .....Newcastle-on-Tyne.
Huckle, Arthur Hy. Headley London.
Hunter, Robert .....Glasgow.
Hyne, Henry .....Landport.
Jackson, George .....Leeds.
Jackson, Thomas.....Preston.
James, James Richard .....London.
James, Thomas.....Llandyssil.
Jennings, Hy. Geo. Herbert ...Bulwell.
Jones, Arthur Alderson .....Liverpool.
Jones, Driver Fitzherbert .....Devizes.
Jones, Henry Rees .....Aberystwith.
Kay, Arthur Charles .....Glossop.
Kaye, Alexander.....Perth.
Killoh, Alexander .....Aberdeen.
Kissell, John Victor .....St. Mewan.
La Fontaine, Edwin William...Newark.
Lander, Arthur .....St. Keyne.
Lankford, Frederick James ...Westbury-on-Trym.
Law, Joseph.....Rochdale.
Laybourne, Robert George.....Grantham.
Liley, Geerge Cobden.....Drighlington.
Litherland, William Heald.....Wigan.
Longman, Samuel Hurman ...Wincanton.
Loosmore, Edward James .....Swansea.
McClumpha, Robert .....Newcastle-on-Tyne.
Macdonald, Reginald Edwd. ...Edinburgh.
McKinlay, John Robert.....London.
MacLennan, George .....Nairn.
McNeill, William.....Currie.
McRae, John .....Fochabers.
Marlor, Thomas .....Oldham.
Marples, Joseph Henry .....Birkenhead.
Martin, George Hymers .....Gateshead-on-Tyne.
Mason, Joseph .....Sheffield.
Masters, Frederick Miller .....London.
Melrose, William .....Greenock.
Milne, James .....Aberdeen.
Minifie, Cyril Conrad .....Sherborne.
Mitchell, William.....Hyde.
Mitten, Bessie Jordan.....Hurstpierpoint.
Montgomery, Colin Campbell...Rutherglen.
Morcombe, Joseph .....Pembroke Dock.
Morgan, Alfred.....Market Drayton.
Morley, Sydney Edwin .....Portsmouth.
Moss, Ernest Robert .....Mansfield.
Munro, William Alexander.....Hawick.

Murray, Alexander .....Edinburgh.
Murray, Alexander .....Stirling.
Napper, Alfred Herbert .....Manchester.
Newell, Charles Samuel .....Carlisle.
Newton, Robert .....Edinburgh.
Osborne, William John .....Louth.
Parker, John Robert .....York.
Parry, Owen .....Cardigan.
Paterson, James Alexander ...Edinburgh.
Pattison, Thomas Dowson .....West Hartlepool.
Pearson, George Bruce .....Great Yarmouth.
Pirie, James M.....New Deer.
Platt, Robert.....Chester.
Porritt, Frederick William.....North Ormesby.
Pritchard, John .....Brynmawr.
Priestman, Abraham .....Barrow-in-Furness.
Punch, James .....Sedbergh.
Reed, Joseph.....Dumfries.
Rees, Thomas John .....Pentrechwyth.
Rees, William Edward .....Llanidloes.
Rees, William Hy. Philipps ...Haverfordwest.
Rhodes Albert Arthur .....Brigg.
Richards, Ralph Conrad.....London.
Roberts, Herbert Charles .....Leicester.
Robson, Tom Wardhaugh .....London.
Ross, John Alexander.....Forres.
Rotherham, Frank Herbert ...Birmingham.
Royle, James .....Wilmslow.
Salmon, Thomas William .....Stockton-on-Tees.
Sanderson, George Alfred .....York.
Sanford, Joseph Michael.....Exeter.
Satterthwaite, Robert.....Lancaster.
Sarjeant, Alfred ....Ramsey.
Sawden, Harry Edward .....Liverpool.
Scott, Henry..... .....Keswick.
Searle, George Alexander .....Guernsey.
Shankland, David .....Govan.
Shaw, George Arthur .....Stockport.
Simpson. Stewart Richard .....Llandilo.
Sinclair, Robert.....Dunfermline.
Smith, Henry .....Elgin.
Smith, Herbert Thomas .....Leeds.
Smith, John Henry.....Morecambe.
Smith, Rowland .....Chesterfield.
Smith, Walter .....Reading.
Smith, Walter .....Fyvie.
Spark, William.....Maryport.
Spencer, George Herbert .....Bawtry.
Steggles, George .....Petworth.
Stewart, Peter Alexander .....Hamilton.
Stratford, Horace Oliver.....Margate.
Swindells, Richard .....Hyde.
Sylvester, Ernest Jno. Arthur..Southsea.
Symington, James Martin..... Maryport.
Taylor, Frederick William .....Blackburn.
Taylor, James .....Eccles.
Taylor, Walter..... .....Gainsborough.
Thirkell, John .....London.
Thomas, Frank Robert ... .London.
Thomas, Thomas .....Llanelly.
Thorp, Alfred Wild.....Gildersome.
Tiffany, John William .....Halifax.
Tiltman, William.....Launceston.
Toohig, Albert William .....Narberth.
Troupe, George Robert .. ..Middlesborough.
Tully, Alexander Bell.....Kelso.
Turner, Charles Getting .....Shirley.
Twelves, Charles Henry .....Whittington Moor.
Tyler, William Harry .....Ashby de la Zouch.
Wallace, Mungo .....Glasgow.
Walters, Frank Wright .....Pentrich.
Ware, Alan Henry .....Exeter.
Warhurst, William Herbert .. Liverpool.
Welch, Geo. Richard Julians...Bradford-on-Avon.
Weston, Charles Edward .....Newquay.
Westrup, John Spencer .....London.
White, Challen.....Launceston.
White, Thomas Randal .....Durham.
Wilkie, Herbert Farnington ...Duns.
Wilkinson, Arthur Molyneaux .London.
Wilkinson, William Franklin...Blackpool.
Willey, Thomas Charles .....Louth.
Wilson, William .....Walthamstow.
Woodcock, Herbert Hy. Addis.Margate.
Wright, George Burkitt .....Doncaster.
Young, Archibald John .....South Queensferry.

The following is a list of the centres at which the examination was held, showing the number of candidates at each centre and the result:—

	Candidates.				Candidates.		
	Examined.	Passed.	Failed.		Examined.	Passed.	Failed.
Aberdeen	8	6	2	Lancaster	11	5	6
Birmingham	20	7	13	Leeds	12	8	4
Brighton	7	1	6	Lincoln	8	6	2
Bristol	14	7	7	Liverpool	18	9	9
Cambridge	4	1	3	London	37	20	17
Canterbury	5	3	2	Manchester	38	19	19
Cardiff	7	5	2	Newcastle	12	5	7
Carlisle	12	6	6	Northampton	5	2	3
Carmarthen	23	16	7	Norwich	4	1	3
Carnarvon	3	0	3	Nottingham	16	10	6
Cheltenham	4	1	3	Oxford	2	0	2
Darlington	8	4	4	Peterborough	6	4	2
Dundee	8	5	3	Sheffield	12	9	3
Edinburgh	29	16	13	Shrewsbury	6	2	4
Exeter	13	9	4	Southampton	11	6	5
Glasgow	15	9	6	Truro	8	5	3
Guernsey	1	1	0	Worcester	4	1	3
Hull	7	2	5	York	14	7	7
Inverness	8	4	4				

The questions set for this examination will be found in the Journal for the 16th inst., p. 851.

Proceedings of Societies in London.

CHEMICAL SOCIETY.

At a meeting of the Chemical Society held on Thursday, April 21, Mr. William Crookes, F.R.S., President, in the chair, the following were elected Fellows of the Society:—Messrs. W. C. T. Beasley, E. R. Blundstone, S. F. Burford, J. W. Chenhall, G. Collar, H. Danber, jun., H. Gordon, W. Gregory, D. L. Howard, E. Rawlins, L. H. Schubert, L. O. Simmons, S. Sutcliffe.

The following papers were read:—

The Atomic Weight of Gold. By T. E. Thorpe, F.R.S., and A. P. Laurie, B.A.—Former determinations of the atomic weight of gold have been made by Dalton, Proust, and Oberkampf, in 1806; Berzelius, in 1813; Pelletier, Javal, and again by Berzelius, in 1844; by Levol, in 1850; and Thomsen in 1876. The numbers obtained differ widely from each other, partly owing to the unstable character of the salts of gold, and partly to imperfect methods of analysis. The number usually accepted is 196·2, being the value obtained by Berzelius in his second series of determinations, from the analysis of the double chloride of gold and potassium. A special reason for undertaking a revision of the atomic weight of gold arises from the circumstance that a higher value than that usually assigned to this element is demanded by the periodic law. The salt employed by the authors was the bromide of gold and potassium, which crystallizes readily from water, and (as proved by a series of analyses of different crystallizations) is stable at ordinary temperatures. The salt was prepared by digesting together gold, water, bromine and potassium bromide, and was then three times crystallized. The figure representing the mean of twenty-five experiments was 196·850.

The Atomic Weight of Silicon. By T. E. THORPE, F.R.S., and J. W. YOUNG, B.A.—The authors have attempted to redetermine the atomic weight of silicon by estimating the quantity of silica yielded by decomposing known weights of silicon tetrabromide by means of water. The result of the experiments was to give the atomic weight of silicon as 28·332 if H = 1.

Note on Substitution in the Benzene Nucleus. By H. FOSTER MORLEY.

Reply to the Foregoing Note. By HENRY E. ARMSTRONG.

CHEMISTS' ASSISTANTS' ASSOCIATION.

At a meeting of the Chemists' Assistants' Association on Wednesday, the 20th inst., Mr. H. H. Millhouse in the chair, a paper was read on—

THE NEW ANTIPYRETICS.

BY T. S. DYMOND.

The large number of substances recently introduced, reputed to possess great antipyretic power, has suggested that a concise and comparative summary would be of use. Under the headings of "Chemical Relations," "Preparation," "Characters and Tests," "Physiological and Therapeutical Properties," and "Medicinal Use," resorcin, hydroquinone, antifebrin, antithermin, acetylamidophenol, quinoline, kairin, thallin, and antipyrin have been separately treated. In the first and second divisions, some other bodies have been introduced to show more clearly the successive steps by which these bodies are built up, and in the last two divisions the well-known antipyretics are incorporated in order to demonstrate their comparative value.

CHEMICAL RELATIONS AND PREPARATION.

The structural formulæ and processes for preparation to which these two divisions are devoted have, unknown to the author at the time this paper was written, appeared almost simultaneously in a German publication, a translation of which will be found on a previous page of this Journal (p. 886).

CHARACTERS AND TESTS.

Resorcin crystallizes in rhombic prisms, colourless, but becoming red on exposure to the air, inodorous, with a sweetish acrid taste. Melting point 118° C. It distils unchanged. It is readily soluble in water (1 in 2) and in alcohol. It gives a purplish-black colour with ferric chloride, disappearing on the addition of ammonia. The commercial drug occurs in white crystalline plates.

Hydroquinone crystallizes in rhombic prisms or monoclinic plates, colourless, inodorous, with a faint sweetish taste. Melting point 169° C. It sublimes unchanged. It is soluble in water (1 in 20) and very soluble in hot water and in alcohol. From its solution a small quantity of ferric chloride throws down lustrous green needles of quinhydrone, while excess of the reagent precipitates yellow quinone. The commercial drug occurs either in crystals or plates.

Antifebrin crystallizes in colourless plates resembling boric acid, odourless, producing a slight burning sensation on the tongue. Melting point 113° C. It distils unchanged. It is soluble in 189 parts of water at 6° C. and is freely soluble in alcohol. The drug occurs commercially as a pure white crystalline powder or in crystalline plates. Warmed with nitric acid it gives an orange coloration.

Acetylamidophenol occurs in small colourless or faintly reddish needles, slightly soluble in water, but more so in absolute alcohol and acetic acid. Melting point 135° C.

Antithermin.—The characters have not yet been published.

Quinoline is a mobile, volatile, colourless liquid with an alkaline reaction, a pungent aromatic odour, and giving a burning sensation on the tongue. It does not congeal at −20° C., b. p. 238° C., sp. gr. 1·081 at 10° C. It is sparingly soluble in water, but readily in alcohol. From its solution potassium bichromate throws down a yellow crystalline precipitate. Ferric chloride does not affect a solution of hydrochloride of quinoline. The tartrate is most often employed. It occurs in white needle-shaped crystals soluble in water (1 in 40). The less soluble salicylate is occasionally used.

Kairin crystallizes in rhombic prisms, colourless, inodorous, and with a bitter taste. It is soluble sparingly in water and readily in alcohol. A solution of the hydrochloride is rendered dark purple by potassium bichromate, and dark brown by ferric chloride. The commercial drug is the hydrochloride, $C_{10}H_{13}NO.HCl.H_2O$ ("kairine"). This occurs as a greyish crystalline powder, with a faint odour of phenol, freely soluble in water and alcohol.

Thallin crystallizes in large prisms, colourless, inodorous, with a bitter saline and pungent taste. Melting point 42° C. Sparingly soluble in water, readily in alcohol. A very dilute solution of the sulphate gives with ferric chloride, first a yellow, then an emerald green coloration unchanged by sulphuric acid. The commercial drug is the sulphate ("thallin"), $(C_{10}H_{13}NO)_2.H_2SO_4.2H_2O$. This occurs as a granular or crystalline powder, usually reddish in colour, and having a faint odour resembling anise and meadowsweet. It is readily soluble in water (1 in 5), but sparingly in alcohol, and the solutions become darker on exposure to light.

Antipyrin crystallizes in rhombic prisms, colourless and inodorous, with a rather pleasant sweetish bitter taste. Melting point 113° C. It decomposes at a higher temperature. It is readily soluble in water and alcohol. The solution gives a deep red coloration with ferric chloride, changing to yellow with sulphuric acid.

It has long been the endeavour of scientific men to establish a relation between the physiological and physical characteristics of the elements and their compounds. Blake and Rabuteau have attempted to show that the elements increase in their poisonous properties in the same ratio as their atomic weights, and Papillon that the spectroscopic characters vary with the physiological action. These theories have broken down, but still some such relationships are observable, and Blake has shown that, with some exceptions, those metals which form isomorphous salts have the same physiological action, and the physiological power increases with the atomic weight of the members of these isomorphous groups. Thus the salts of calcium (40), strontium (87) and barium (137), all paralyse the ventricles of the heart, and in power in the order named. It is noticeable that most of these antipyretic substances are isomorphous, crystallizing in rhombic prisms.

The physiological action of the various groups of the carbon compounds is a vast field open for research, for the science of pharmacology, in its modern sense, is still in its infancy. It is, however, known that the distinctive action of the lower members of the fatty series of the carbon compounds is stimulant and anæsthetic, while that of the lower members of the aromatic series is antiseptic and antipyretic. Both groups affect the nervous system, but the former affect the sensory centres, and so produce anæsthesia, while the latter affect the motor centres, and so produce convulsions and paralysis. The introduction of the radicle hydroxyl into these aromatic compounds tends to intensify the convulsant action, while the introduction of the radicle methyl has a paralysing action, and when it is introduced into the molecule of the convulsant alkaloid strychnine, or the non-convulsant alkaloid morphia, it gives a paralysing action to the derivatives. From these facts Crum Brown, Fraser and Schroff have come to the conclusion that it is possible to modify the chemical action of a drug by modifying its chemical constitution. Lauder Brunton and Cash have also found that most of the alkaloids in which a union is made between the amidogen and the methyl radicles in the alkaloids have a paralysing action, and its power, it is said, is greater than when the methyl

radicle is not in connection with the amidogen in the alkaloid. Isomeric bodies may have a very different action. Thus salicylic acid—orthooxybenzoic acid—is antipyretic, while meta- and paraoxybenzoic acids are not. Resorcin, pyrocatechin and hydroquinone are all antipyretic, but in very different degree, and their antipyretic action bears no relation to the different positions of their hydroxyl groups. The lower members of the quinoline series act on the sensory centres of the brain, and the higher members on the motor centres. Of these compounds any two members which have the same amount of carbon and nitrogen but a different amount of hydrogen, that one will be most physiologically active which contains the most hydrogen. Thus parvoline, $C_9H_{13}N$, is more powerful than quinoline, C_9H_7N.

Trials are now being made to produce artificial alkaloids which shall possess a strong antipyretic action without depressing the heart or causing sickness. The success that has already been achieved illustrates the use of a thorough knowledge of organic chemistry. The physiologist has only to indicate to the chemist the theoretical compound he requires, be it of never so complicated a nature, and the chemist has but to follow certain processes, as definite as the processes by which the more simple inorganic compounds are formed, to introduce one radicle into one place and another radicle into another place till he has built up the compound that he requires.

The therapeutical value of these new antipyretics cannot be estimated alone by their antipyretic power, but their action on the specific febrile process must be also studied. For this purpose the following definitions are introduced.

Fevers are divided into two classes:—(1) Idiopathic, in which the fever is part of the disease, and (2) Symptomatic, in which the fever is induced by the disease, as in pneumonia and erysipelas. Idiopathic fevers are further divided into (i) specific fevers, such as typhoid fever, scarlet fever, etc., and (ii) malarial fever. Malarial fevers are again divided into (*a*) intermittent fevers, which come and go at regular intervals, as ague, and (*b*) remittent fever, in which the paroxysms do not intermit, but only remit in severity till the fever overcomes or is overcome.

A febrile temperature may therefore be induced—

(1) By idiopathic fever.

(2) As a symptom of inflammatory diseases, especially the hectic fever which accompanies a wasting disease, such as phthisis.

(3) By simple exposure to heat. This increases tissue change, and so a febrile temperature is kept up after the external temperature has fallen. This is called thermal fever.

Ferments are either (1) organic, such as emulsin or pepsin, or (2) organized. Drugs which arrest fermentation are called antizymotics. Those which arrest organized ferments are either (1) antiseptics, or (2) disinfectants. Antiseptics arrest septic decomposition due to bacilli, and disinfectants destroy the poisonous microbes of communicable diseases.

Antiperiodics lessen the severity, and prevent the return of periodical diseases, and do so by preventing the development of the spirilla in the blood which cause remittent fever, and of the bacilli that cause intermittent fever.

Antipyretics reduce the temperature (1) by reducing the action of the heart and pulse; (2) by producing perspiration, and so increasing external radiation and loss of heat; (3) by dilating the capillaries, and so increasing internal radiation and loss of heat; (4) by acting on tissue change, and so reducing the production of heat; and (5) by reducing the oxidizing power of the red blood corpuscles, and so the production of heat.

PHYSIOLOGICAL AND THERAPEUTICAL PROPERTIES.

Resorcin first stimulates then paralyses the nerve centres. This is accompanied with dilatation of the blood-vessels, and hence it reduces the temperature by increasing heat radiation. In high fever the reduction of temperature is accompanied by subsidence of pulse and by profuse sweating, and it takes place with resorcin more quickly than with salicylic acid or quinine, though the effect is more transient. It is antizymotic, being a powerful antiseptic, disinfectant and deodorizer, and has been stated to be a useful antiperiodic. The disadvantages attending its use are profuse perspiration, the short duration of the antipyretic action, and the rapidity with which the temperature again rises.

Hydroquinone has the same action as resorcin, but it is about four times more powerful. It also diminishes the oxidizing power and heat production of the red corpuscles. The drawbacks to its use are not so great as those of resorcin, and it maintains clearness of mind and senses.

Pyrocatechin has the same action as resorcin, but it is about three times more powerful.

Salicylic acid first stimulates, then paralyses the nerve centres, and in febrile states lowers the pulse rate, blood pressure and respiration. It lessens production of heat by acting on tissue change. In febrile states the temperature is reduced about 3° C. It is a powerful antipyretic, destroying bacteria and torula, and preventing alcoholic and organic fermentation. A drawback to its use is that it produces deafness, giddiness and headache when taken for some time, and cardiac complications may ensue.

Antifebrin rapidly reduces the temperature and pulse rate. The effect lasts three to seven hours. It is said to be about four times as powerful as antipyrin, and its use is not followed by vomiting or diarrhœa, though there is some tendency to collapse.

Acetylamidophenol is said to be an active and harmless antipyretic.

Antithermin is said to be a powerful antipyretic.

Quinoline is a powerful antiseptic and antipyretic, but is apt to produce irritation of the stomach and collapse.

Kairin is a powerful antipyretic, and reduces temperature by acting on tissue change. It reduces the pulse and usually produces copious perspiration. The febrile temperature is usually reduced ½° to 2° C., the action taking place in twenty-five minutes and lasting two to three hours. Its action is somewhat uncertain, and it is apt to induce vomiting, cyanosis and collapse.

Thallin lessens production of heat by reducing the oxidizing power of the red blood corpuscles, while it increases the loss of heat by dilating the cutaneous vessels and so increasing radiation. Its effect is more rapid than antipyrin and less so than kairin, the minimum temperature being reached in one hour, but it lasts four or five hours. It usually causes profuse sweating and is apt to produce depression of strength and other ill effects.

Antipyrin first stimulates, then paralyses, the nerve centres. It slightly increases blood pressure, but has no action on the respiration. It dilates the cutaneous vessels and so increases loss of heat by radiation. The reduction of temperature takes place almost immediately and reaches a minimum in four to six hours. Thirty grains given hourly for three hours reduce the febrile temperature for one to twenty hours. The rise of temperature is occasionally accompanied by rigor. The drawbacks to its use are that it induces profuse sweating and feeble pulse, vomiting and occasionally collapse.

Quinine in small doses stimulates and in large doses paralyses the nerve centres, the pulse rate and the blood pressure are therefore diminished, the blood-vessels become dilated and heat is lost by radiation. The production of heat is diminished by its acting on tissue change, and by diminishing the oxidizing power of the red blood corpuscles, which are at the same time increased in size. The movements of the white blood corpuscle, are checked. Quinine is a powerful antiseptic, destroying low animal and vegetable life, arresting alcoholic fermentation and diminishing some forms of organic

fermentation. A drawback to the use of quinine is that it causes deafness and headache when it has been taken for some time.

Aconite acts as an antipyretic merely by reducing the action of the heart, and therefore the pulse rate and temperature. It is used to give relief in symptomatic fever.

MEDICINAL USE.

Resorcin.—5 to 30 grains are given for a dose. It may be conveniently dispensed with syrup of orange and water. It does not shorten the duration of fever, whether idiopathic or symptomatic, except perhaps malarial. It lowers the temperature in phthisis and typhoid, and to a less extent in pneumonia and erysipelas.

Hydroquinone.—15 to 90 grains may be given daily in divided doses. It exercises a favourable antipyretic influence in almost all fevers, but has no better effect than resorcin on their duration.

Salicylic Acid.—Sixty or more grains per diem in divided doses are given at intervals of a half to four hours, or 5 to 15 grains for a single dose. It acts as a powerful antipyretic in acute rheumatism, and less so in typhoid fever. It has also some antiperiodic power, though much less than quinine, but beyond this it has no effect on the specific febrile process. It has, however, the power of removing the excretions of urea and uric acid in cases of rheumatism, and especially gout.

Antifebrin.—The dose is 4 to 15 grains, not exceeding 30 grains in twenty-four hours. It has been given with some success in typhoid fever, erysipelas, rheumatic fever, etc.

Acetylamidophenol.—3 to 30 grains are given for a dose.

Antithermin.—The dose has not yet been stated.

Quinoline.—7 to 12 grains of the tartrate may be given for a dose. It is powerfully antipyretic in all fevers.

Kairin.—3 to 30 grains of the hydrochloride ("kairin") are given for a dose. Four grains may be given every one to three hours, gradually increased to 15 grains, and then decreased again. It is best given in wafer paper or capsules. It reduces temperature in all fevers.

Thallin.—4 to 12 grains and more recently 3 grains are given for a dose. It is used in all fevers with powerful antipyretic effects.

Antipyrin.—From 7 gradually increased to 90 grains (30 grains hourly for three hours) may be given per diem. It has a powerful antipyretic action in typhoid fever and phthisis, and to a less degree in erysipelas, pleurisy and pneumonia.

Quinine.—As an antiperiodic 6 to 60 grains are given, and it is invaluable in malarial fever. 5 to 20 grains are efficient as an antipyretic in typhoid, scarlet and enteric fevers, etc. It does not shorten the duration of these fevers, but in small doses it is valuable as a tonic at a certain stage of the disease. One large dose daily is given in symptomatic fever, though in pneunomia its beneficial effect is doubtful. It is but little used in rheumatism.

In considering the relative value of these new antipyretics, one must be careful to remember that the high temperature is merely one of the symptoms of the fever, whether idiopathic or symptomatic, and that in idiopathic fevers the body has become poisoned, and the high temperature may be regarded merely as a safety valve. There are medical men who go so far as to say, that unless the antipyretic arrests or abridges the specific febrile process, it is useless. But we have also to remember that under the influence of high temperature, tissue change goes on very rapidly and exhausts the body, while a very high temperature may cause death. We find, then, of those antipyretics in common use whose action has been sufficiently studied, that antipyrin, antifebrin, thallin and kairin act simply as antipyretics, and have no action on the disease itself. Of these antipyrin and antifebrin are perhaps the most powerful.

Resorcin, hydroquinone, salicylic acid and quinine are also more or less powerful antipyretics; quinine the most certain, and salicylic acid the most powerful in rheumatic fever only; but they are also more or less powerful antiperiodics, quinine by far the most so, and they therefore arrest the fever of malarial diseases, though they have no effect in arresting the disease in typhoid, scarlet fever, etc. These drugs have all certain drawbacks. Kairin and resorcin interfere with the digestive system, induce profuse perspiration, interfere with the heart's action even to collapse, and the temperature rises with a chill. Hydroquinone, thallin, antipyrin and antifebrin, all are followed by one or more of these after-effects, to a less extent. Salicylic acid comes next and then quinine, the administration of which is almost free from serious consequences. Whether, therefore, we look on these drugs with regard to their antipyretic and antiperiodic value, or whether we look at their freedom from dangerous concomitant symptoms, the best, by far, is quinine.

In the discussion which followed the reading of the paper Mr. J. E. Saul remarked that no mention had been made of the use of piperonal and lantanine as antipyretics. The former had been employed in a dose of 75 centigrams every two or three hours, whilst lantanine, the alkaloid of *Lantana brasiliensis* (*Pharm. Journ.*, [3], xvi., 289), had been stated to have been effectively used in intermittent fevers that had not yielded to treatment with quinine. The administration of two grams in twenty-four hours, given in doses of 10 centigrams each, is said to have effected a cure in 95 per cent. of the cases in which it had been employed. Mr. Saul also drew attention to the fact that the dose of thallin sulphate had been reduced from 4 to 12 to 3 to 8 grains, and that thallin tartrate is also now sometimes employed. In view of possible confusion arising out of the name of this compound, Mr. Saul pointed out thallin gives a green colour with silver nitrate, auric chloride, and chromic acid.

Mr. W. G. Blackham referred to the use of picrate of ammonia as an antipyretic. It had been asserted by Dr. Clarke that in doses of less than 1 gram it had been employed in some ten thousand cases with success. He also considered that Mr. Dymond had not drawn sufficient distinction between disinfectants and antiseptics in his definition of those bodies.

Mr. Dymond briefly replied, and said that he wished to express his thanks to Mr. Holmes for lending him specimens from the Museum of the Pharmaceutical Society, enabling him to illustrate his paper.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

At the last meeting of the Liverpool Chemists' Association, the following paper was read:—

Note upon Fluid Extract of Cinchona Bark.

BY A. C. ABRAHAM.

For the preparation of fluid extract of bark with water only I have always advocated the employment of that water at, or near, the boiling temperature.

This preference, together with a very suggestive article by Dr. Paul (*Pharm. Journ.*, vol. xvi., p. 56), prompted me some time since to try to effect the removal of the alkaloids *soluble in water with water only*, and the subsequent removal of those insoluble in water by means of an acid menstruum.

The three following experiments were tried upon a bark bought from a good house as containing quinine 1·94; quinine and cinchonidine 4·34. Total alkaloids 6·52.

It was a quill bark, and was, therefore, chosen in pre-

ference to others richer in quinine, which, being in the state of scrapings, did not answer the description of the Pharmacopœia.

It was, as will be seen, well over the Pharmacopœia standard, and as the resulting fluid extract had to be estimated, I did not consider it necessary to confirm, in any way, the guaranteed analysis under which I had bought it.

1*st Experiment.*—Five lbs. treated exactly as ordered in the Pharmacopœia produced 51·2 fluid ounces of fluid extract of the required strength.

2*nd Experiment.*—Five lbs. was percolated with boiling distilled water until 6½ gallons had passed (the same quantity as was collected in experiment 1), and when evaporated with the quantity of glycerine ordered in the Pharmacopœia produced 43·52 fluid ounces of product of the standard strength.

3*rd Experiment.*—The residue from the last was percolated with 2½ gallons distilled water acidified with 2¼ fluid ounces of hydrochloric acid: product 35·88 fluid ounces of the required strength, viz., 5 per cent.

Since making these three tests, I have repeated with another bark experiment No. 3. The percolate in this case was *neutral*, and, consequently, of course very weak, and I found it necessary to double the acid before I could produce any decided effect in the way of taking out the remaining alkaloids.

It will be seen that by the official process, a product of 51·2 fluid ounces was obtained, and that by the use of boiling water, and subsequently of the acid, the product was altogether 79·4 fluid ounces, showing an increased yield of 28·2 fluid ounces by operating in this way. The conclusions which I draw from these facts are—

1*st.*—That if we want to have a fluid extract representing as far as possible the bark from which it is made in a unaltered state we should certainly let water do what it can, and then, if we wish to add an acid solution of the cinchona alkaloids to it, treat the residue with an acid menstruum.

2*nd.*—That in the latter case the acid menstruum should be at least double the strength of that ordered by the Pharmacopœia. I may say that my preference for boiling water is not founded upon any experiments with such barks as are now official, but with the old flat calisaya. Nevertheless I have every reason to believe that what holds for the one holds for the other, and that in either case a given quantity of boiling water will remove more than can be removed by an equal quantity of cold; partly by its superior solvent action and partly by removing certain matters (which are afterwards thrown out on cooling) which interfere with the action of the menstruum.

REGISTERED CHEMISTS' TRADE ASSOCIATION OF LIVERPOOL.

The eleventh annual meeting of this Association was held at the Royal Institution, Colquitt Street, on Thursday, April 7. The Vice-President, Mr. B. Dickins (in the unavoidable absence of the President, Mr. Councillor Woodcock), occupied the chair.

The annual report was read as follows :—

"In presenting the annual report, the Committee have the pleasure of stating that the year which has passed has been comparatively free from events prejudicial to the interests of the trade. Legislation has been of such a kind as to merit the approval of the Committee. Sir John Lubbock's Early Closing Bill was carefully considered, and the principles were approved of by the members.

"As the seventh edition of the Liverpool Chemists' Price List was issued shortly before the British Pharmacopœia, 1885—the stock at that time being exhausted, and there being a considerable demand for the list—the Committee, in order to bring it up to date, have issued a List of Additions to the Price List, containing the new preparations of the B.P., 1885, and other articles in frequent use. Copies may be had free, on application to the Treasurer or Secretary, by enclosing a stamped envelope.

"The usual donation of two guineas has been voted to the Benevolent Fund of the Pharmaceutical Society.

"In order to increase the number of members of the Association and make its objects better known, the rules of the Association have been reprinted, and copies were circulated to every chemist in Liverpool and suburbs.

"By the deaths of Messrs. Ellithorne and Wright the Association has lost two valued members. Two have resigned. Four new members have been enrolled.

"The annual supper was held at the Merchants' Dining Rooms, Castle Street, on March 17, and was an unqualified success. The attendance of members and their friends was the largest on record. The recitations and musical selections were of an exceedingly high order, and greatly contributed to the pleasure of the evening.

"Copies of the Register of Pharmaceutical Chemists and Chemists and Druggists for the current year have been presented by the Pharmaceutical Society, and can be seen on application to the President, Treasurer or Secretary.

"The Treasurer's statement of account to December 31, 1886, duly audited, shows a balance of £11 14*s.* 8*d.*, exclusive of £5 6*s.* 8*d.* due for price lists, and a stock of four hundred and seventeen lists in favour of the Association."

The Treasurer's financial statement having also been read, it was proposed by the Chairman, seconded by Mr. J. S. Ward, and carried, "That the report and financial statement be adopted, and the Secretary be instructed to have them printed, and a copy sent to each chemist in Liverpool and Birkenhead."

Mr. Parkinson proposed, and Mr. Day seconded, a vote of thanks to the President, Mr. J. Woodcock, C.C., for his valuable services during the year, which was carried by acclamation.

Mr. Kirkus proposed that Mr. B. Dickins be elected President for the ensuing year. The motion was seconded by Mr. Parkinson, and was carried unanimously.

The following retiring members of the Committee were re-elected, viz., Messrs. Alexander, Hocken, Parkinson, Redford and Warhurst, and Messrs. T. F. Abraham and J. S. Ward were elected to fill two vacancies.

Votes of thanks to the officers for their services during the year having been passed, the proceedings terminated.

At a meeting of the Committee of the above Association, held on the 20th inst., Mr. B. Dickins, President. in the chair, Mr. J. Hocken was unanimously elected Vice-President. Messrs. R. Parkinson and John Bain were respectively re-elected Honorary Treasurer and Honorary Secretary.

MIDLAND COUNTIES CHEMISTS' ASSOCIATION.

The fourth monthly meeting was held at the Grand Hotel, Colmore Row, Birmingham, on Thursday evening, April 21, when Mr. A. Southall, F.C.S., occupied the chair. The following paper was read :—

The Composition of the Ash of Ipecacuanha Root.

BY H. E. MUNNS.

Having had occasion to do a considerable amount of work upon ipecacuanha, I found that in the literature of the subject the composition of the ash had been entirely neglected. I therefore selected a sample containing about the normal percentage of emetine, and made a careful analysis of the ash obtained by slow incineration. This amounted to 3·22 per cent, and had the following composition :—

Silica	31·98
Iron and Alumina	3·53
Lime	15·98
Magnesia	4·57
Phosphoric anhyd.	6·19
Alkalies	13·80
Sulphuric anhyd.	4·84
Chlorine	1·56
Carbonic anhyd.	15·25
Undetermined, including trace of manganese	2·30
	100·00

Mr. Thonger proposed, and Mr. Perry seconded, a vote of thanks to the author.

In the discussion the following took part :—The Chairman, Messrs. Perry, Thonger and Alcock.

The following paper was then read :—

Linimentum Terebinthinæ.

BY GEORGE E. PERRY,
Pharmaceutical Chemist.

Since the issue of the present edition of the British Pharmacopœia the preparation of this liniment has been perhaps the most fruitful source of disagreement and discontent. The majority of pharmacists—the best of us amongst the number—have experienced, it would seem, more or less difficulty in getting a satisfactory product when adhering strictly to the official form and directions.

Having myself, long before the present Pharmacopœia came into existence, had some trouble with this liniment, and having arrived at what I considered a solution of the difficulty; having too, in common with others, failed more than once in making, by the official form, a presentable preparation, and having in consequence been led to undertake a fresh series of experiments, I have thought that a note from me on the subject might not be without interest to the members of this Association.

First then as to the *characters* of this liniment. Until very recently we have had nothing to help us on this point; no official description such as, I submit, ought to be annexed to every preparation the characters of which, from any cause, ingredients, method of making, etc., are likely to vary. Professor Redwood, however, in his very useful paper—and he speaks of course *ex cathedrâ*—has now told us what the liniment was intended to be when carefully prepared with proper materials according to the directions given in the Pharmacopœia. He says "the liniment should be a thick, creamy emulsion," but further on he adds that "if carefully and well prepared with neutral or nearly neutral soap, the product will be too thick to admit of its being easily put into a bottle with a narrow neck; it should be put into an open-mouthed bottle, because after standing for some days it usually becomes more liquid, and too much so to admit of its being conveniently kept in a covered pot."

To a "creamy emulsion" no objection can be taken; but if its character is to be such as Dr. Redwood describes, I think the liniment will prove itself—as I shall show it is—a very undesirable preparation; in common phraseology "neither one thing nor another." What in my opinion we should rather aim at producing is a preparation similar, as far as its fluidity is concerned, to the lin. ammoniæ of the Pharmacopœia,—a liquid, not a semi-solid, capable of being dispensed in the ordinary way in a narrow-mouthed bottle.

Now as to the method of preparation. Professor Redwood says that given a fairly neutral soft soap, with scientific manipulation there should be no difficulty in producing a satisfactory emulsion, having the characters to which I have alluded. With regard to the soap, he admits that the presence of a small amount of carbonate, which he found in all commercial samples, though detrimental pharmaceutically, might be of advantage than otherwise from a therapeutic standpoint. He, however, lays great stress on *manipulation*. He stipulates for a certain form of mortar and pestle, and a gradual and careful blending of soap, water and oil to ensure, what he implies is otherwise unattainable, a perfect preparation.

Mr. Martindale, too, is of opinion that it is "chiefly a a question of manipulation;" though it should be noted that he experimented with but very small quantities,—a different matter than when making even the pharmacopœial quantity, to say nothing of still larger quantities.

This particular manipulation I find to be altogether unnecessary for making what *I* call a satisfactory preparation. If the camphor is first dissolved in the turpentine, and to this the soap added, and the bottle shaken occasionally till the soap is in solution, adding the water last; or, better still, if to the camphor dissolved in the turpentine, both the soap and water are added, and the bottle shaken as before, even with the Pharmacopœia proportions, a good emulsion is the result.

But here, unfortunately, the form "blocks the way." For what I have to contend is, that in whatever manner the liniment is made from the form as it stands, it will not be *permanent*. Sooner or later, thickening takes place, and the liniment ultimately becomes gelatinous and unusable.

We have had several suggestions for remedying this defect. The one which seems to have found most favour is that of adding an extra quantity—double the quantity—of water. This, I think, to be decidedly objectionable therapeutically. The presence of an excess of water in such a preparation must, I take it—and I have had medical confirmation on this point—interfere, to a greater or less extent, with the absorbent action of the turpentine, and consequently detract from its rubefacient properties. The mistake, I think, has been in adding, as it is, too much water. What is needed, in my opinion, to make this preparation therapeutically and pharmaceutically satisfactory is *more* soap and *less* water.

On the table will be found samples of the liniment prepared as follows :—

No. 1. . . B.P. proportions.
„ 2. . . 2½ oz. of soap, and 1½ oz. of water.
„ 3. . . 3 oz. „ „ 1 oz. „
„ 4. . . 4 oz. „ „ 1 oz. „

No. 1.—Made about a month ago, was for some little time fairly satisfactory; but you will see it is already in an advanced gelatinous condition, and before long it will be impossible to get it out of the bottle.

No. 2.—Is not much better.

No. 3.—Though a better preparation, is not altogether satisfactory.

No. 4.—Containing 4 ozs. of soap and 1 oz. of water, and made by the latter of the two methods I have mentioned, is, as far as my experience goes, as good a preparation as it is possible to get by a modification of the present formula. It is an elegant, creamy emulsion, readily made, and always "pourable"; and though a slight separation will take place after a time—a property common to all emulsions—the liniment is what may be termed practically permanent.

This then is the form I would venture to suggest might with advantage replace the present one. An additional quantity of soap, in place of a portion of the water, cannot, I think, be objected to, seeing the value that of late has been attached to the action of oleates on the skin; while pharmaceutically the preparation leaves little to be desired.

A vote of thanks was proposed by Mr. Austin and seconded by Mr. Thonger.

A good discussion took place, in which the Chairman, Messrs. Hutton, Asten, Prosser, Austin and Alcock joined.

A paper by F. H. Alcock, F.C.S., on "Tr. Quinine and its Assay" was read next. The author made some

general remarks on the literature of the subject, and concluded by giving a process for the assay which he had found to be easy of application, and to give uniform and fairly accurate results.

A vote of thanks was proposed by Mr. Thompson and seconded by Mr. F. H. Prosser.

The subject was discussed by the Chairman, Messrs. Munns, Perry, Thompson, Liverseege, Thonger and Prosser.

A successful meeting was terminated by a vote of thanks to the Chairman, which was proposed by Mr. Perry and seconded by Professor Elliott, and carried unanimously.

The next meeting will be held in May, and is to take the form of a social and musical evening.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Pharmacy Acts Amendment Bill.

Sir,—I have seen a circular which is stated to have been distributed to Members of the House of Commons in opposition to the Pharmacy Acts Amendment Bill. I quote this circular paragraph by paragraph, and append a few remarks to each.

> "Pharmacy Acts Amendment Bill, 1887.—Before acquiring the legal title of 'chemist and druggist,' or the right to open an ordinary chemist's shop, any person must, under the existing regulations, pass a Preliminary examination, in which Latin is included; *and after having been for three years practically engaged in the translation and dispensing of prescriptions, must then* undergo a severe qualifying examination, both *vivâ voce* and practical, in the following subjects:—Chemistry, botany, materia medica, pharmacy, prescription reading, and dispensing."

The important words printed in italics do not appear as necessary conditions in the present Pharmacy Acts; one of the objects of the proposed Amendment Act is to supply the deficiency.

> "The degrees 'Master of Arts,' 'Doctor of Science,' 'Doctor of Laws,' and others, are granted to students who can pass the respective examinations of the University of London, whether they have obtained the knowledge required by private study or by any other means in their power; and yet the Council of the Pharmaceutical Society are endeavouring, by means of this Bill, to obtain powers to enforce an expensive curriculum on all intending chemists, although the average business produces but a meagre income."

Medical Degrees, however, are *not* thus granted by the London University. For these no one can offer himself for examination until he has fulfilled the prescribed curriculum. The reasons for this difference ought to be obvious, and the Council considers that they apply to the practice of pharmacy as they do to other departments of medicine.

> "Of course, if a monopoly is created it will be an advantage to those who already have the qualification, including the Council and members of the Pharmaceutical Society, who are all chemists.
>
> "Let the stringency of the examinations be increased if necessary, but do not let a costly curriculum be imposed, whereby students of small means, but perhaps large capabilities, will be shut out from a profession for which they are eminently suited."

As regards cost the Council thinks that as much will be saved to the students by the avoidance of repeated failures as will be spent in original preparation. The Council aims to create no further monopoly nor to raise the least additional impediment to the qualified man's approach to pharmacy. It seeks only to devise and carry out a process by which pharmaceutical students shall be *better trained* for their duties than they are at present, and that they may consequently come to the examination room with more confidence of success.

G. F. Schacht.

Concentrated Medicines.

Sir,—Medical men seem to be getting into the way of writing very concentrated and dangerous prescriptions, with the idea, I suppose, of saving their patients the expense of a 6 or 8 oz. mixture. I have just dispensed the following, written by a London consulting physician whose fee I am told was 21*s*.

℞. Tr. cantharides . . . . . ℥ij.

Sign. Five drops in two tablespoonfuls of water twice daily.

Within a very short time I have had the following:—

℞. Liq. arsenicalis . . . . . ℥ss.

Sign. Three drops in ℥i of water three times a day.

℞. Zinci sulph. . . . . ℥j.

Mitte xij.

Sign. Poison, one to be dissolved in half a pint of water and used as a lotion as directed.

℞. Syrup. Eastonii . . . . . ℥j.

Sign. Five drops in a teaspoonful of water three times daily.

Numbers of others I could mention, but do not wish to take up your space unnecessarily.

With the last-mentioned, being told that it was for a young child, and not seeing how an inexperienced person could, with any accuracy, measure 5 drops of syrup, I consider that I was quite justified in advising the customer to let me make it into such a mixture that a teaspoonful might be given for a dose. I think that the attention of the medical profession ought to be drawn to the danger they run in writing such prescriptions. Patients who can afford to pay 21*s*. or 10*s*. 6*d*. for a consultation would surely not object to paying 1*s*. or 1*s*. 6*d*. for the certainty of having a bottle of medicine properly prepared.

I trust that some of your correspondents may be able to suggest a means of mitigating this evil.

Leeds. C. A. J.

Huechys Sanguinea.

Sir,—Permit me to thank Mr. J. O. Braithwaite for his kindly correction *in re Huechys*.

Not being a "bug hunter," a cursory glance tells me only that *Huechys* is an insect, and my fragmentary note was written without any intention of ascribing it to a group. At the last moment I became responsible for the dictum of a naturalist friend. My account with him is not yet settled.

In a private communication received last week, Dr Porter Smith also informs me that *Huechys* is not Coleopterous but Homopterous.

15, *Laurence Pountney Lane.* John Moss.

Autograph Prescriptions.—We have been requested by Mr. Joseph Ince to say that he would be obliged if those who send him collections of autograph prescriptions, which are most acceptable, would forward at the same time name and address. They would invariably be acknowledged with thanks.

J. H. Smith.—'Water and Water Supplies and Unfermented Beverages' (W. Clowes and Sons). 1*s*.

P. H. Marsden.—(1) *Epilobium angustifolium.* (2) The species cannot be determined without the flowers. (3) *Scutellaria galericulata.* (4) *Euphrasia officinalis.* (5) *Trifolium minus.* (6) *Senecio Jacobœa.*

Orphanos.—You are recommended to lay your suggestion before the Benevolent Fund Committee; but meanwhile we do not think it desirable to publish anything that would tend to militate against the success of the dinner.

Progress.—A candidate for a Bell Scholarship must be a registered student or apprentice of the Society, under twenty-two years of age, and have passed not less, or been engaged not less than three years in the pharmacy of a registered chemist and druggist.

Communications, Letters, etc., have been received from Messrs. Crow, Baldock, Jacobi, Elborne, Gerrard, Flückiger, Delchevalerie, Griffin, Hagon, Progress.

LIBRARY

RECENT DONATIONS TO THE MUSEUM.

BY E. M. HOLMES, F.L.S.,
Curator of the Museum of the Pharmaceutical Society.

(*Continued from page* 763.)

Tangkawang Fat or Vegetable Tallow.

The remarkable properties of this important article of commerce were first pointed out in this Journal in 1883; and in 1884 an interesting account of the trees yielding it and of the mode of preparation of the fat was published by H. P. Bakker of Sangau (*Pharm. Journ.*, [3], vol. xv., pp. 407, 428). The trees and fats were then described under their native names only. Since that date excellent herbarium specimens of the Tangkawang trees have been received at the Botanical Gardens at Buitenzorg, and the species have been accurately determined. In a recent *brochure** by Dr. W. Burck, the Assistant Director of the Gardens, botanical descriptions of the Tangkawang trees are given. Several of these prove to be entirely new species. With great liberality, Dr. Burck has kindly forwarded specimens of these plants for the Herbarium of the Pharmaceutical Society, and it therefore appears desirable to place on record in the Journal the diagnostic characters of these species, which are as follows:—

1. *Shorea stenoptera*, Burck.—"Foliis præter costam glabris, e basi late-cordata vel truncata, oblongis vel obovato-oblongis, breviter acuminatis, costulis 14–16; stipulis caducis cicatrices annulares relinquentibus. Calycis fructiferi laciniæ fructu vix vel non longiores."

The ovoid fruit is the largest of any of the Tangkawang trees, being six centimetres long by four broad. The flowers are produced in September and October, and the fruit is ripe in February and March. From the other allied species it differs in the wings of the calyx being not longer than the fruit, and not more than 1½ centimetres broad. It is found in the province of Sintang in North-west Borneo, and is known as the "Tangkawang toengkoel."

2. *Shorea Gysbertsiana*, Burck.—"Foliis præter costam glabris e basi late-cordata oblongis, costulis 15–20; stipulis magnis caulem amplectentibus nonnunquam cito deciduis. Calycis fructiferi laciniæ fructu multi longiores."

The fruit is ovoid acuminate, 5 to 7 centimetres long, but only 2½ broad, and is covered with a dense white down. The wings of the calyx are much longer than the fruit, attaining even a length of 0·15 metre. They are often recurved.

A variety of this species, described by Dr. Burck under the name of *scabra*, differs in the wings of the fruit not being recurved, and in the branches and petioles and the underside of the leaves being covered with tawny stellate hairs. The following is the diagnostic description:—

Shorea Gysbertsiana, var. *scabra*.—"Ramis petiolisque stellato-tomentellis gilvis. Foliis subtus pilis stellatis scabris, in costa et costulis stellato-tomentellis. Stipulis plerumque deciduis; bracteis lanceolatis plurinerviis, glabris, persistentibus. Calycis fructiferi laciniis non recurvatis."

Tangkawang lajar is the native name of the type, and *Tangkawang rambei* and *T. noeron* are not botanically distinct from it. *T. goentjang* is the name given to the variety *scabra*. Between this and the type there are intermediate forms. The fruits of *T. goentjang* are somewhat larger than those of the type. Both these trees occur in the province of Sintang, in N.W. Borneo.

3. *Shorea aptera*, Burck.—"Foliis junioribus stellato-pilosis, glabrescentibus lucidis e basi truncata vel rotundata rariter cordata, oblongis, obtuse acuminatis, costulis 16–20; stipulis caducis cicatrices parvos non-annulares relinquentibus. Calycis fructiferi laciniis brevibus fructum non vel vix superantibus."

This tree is distinguished by its smaller fruits having the calyx wings scarcely exceeding the fruit.

The fruits are ovoid acuminate, and only 2½ to 3 centimetres long. The fat obtained from them is of a yellowish tinge, is softer than that of the previous species and is not considered good to eat. *Tangkawang Madjau*, *T. Saloensoeng* and *T. Soenkasoewoe* are the native names of this tree. It grows in the provinces of Sintang and Sambas, in West Borneo.

4. *Shorea scaberrima*, Burck.—"Foliis supra in costa hirsutis junioribus stellato-villosis, subtus papillososcaberrimis e basi rotundata vel truncata oblongis acutis costulis 18–22; stipulis cito caducis lanceolatis v. falcatis; calycis fructiferi laciniis fructu non vel vix longioribus."

The fruit is ovoid, 3–5 centimetres long, and is covered with a silky pubescence.

The fat of this tree, which is known as *Tankawang babie*, is not mentioned by Bakker, but according to Toorop is exported in considerable quantity from the province of Sambas. The fruit, although much smaller, bears a considerable resemblance to that of *S. stenoptera*.

The name of *Tangkawang babie* appears to be also applied to another new species named *S. compressa*, Burck, but of which the fruit is not yet known, and which Dr. Burck proposes to describe in a forthcoming revision on the Dipterocarpeæ of the Archipelago, which will appear in the Annales of the Buitenzorg Botanic Garden.

In all the above species, except *S. stenoptera* and *S. aptera*, three of the segments of the calyx are larger and longer than the other two.

5. *Shorea Martiniana*, Scheffer.—"Foliis glabris, subinæquilateris e basi rotundata vel subtruncata ovato-ellipticis, breviter acute-acuminatis, costulis 10–12; stipulis late-triangularibus basi caulem amplectentibus, subbiauriculatis. Calycis fructiferi laciniæ fructu non vel vix longiores."

This tree grows in the western part of the Sambas province in Borneo, and, as well as the next, is known as Tangkawang Pinang. The fruit is 3½ to 4 centimetres long and 2½ broad; ovoid, apiculate, and covered with a whitish down.

6. *Shorea Pinanga*, Scheffer.—"Foliis præter costam glabris, basi inæquilatera obtusa, oblongis costulis utrinque 10–12; stipulis caducis; calycis fructiferi laciniis fructu multo longioribus."

This tree is also a native of the western part of the Sambas province. The fruit is 4 to 4½ centimetres long and 2½ broad; elongate-ovoid and acutely acuminate, and covered with a dense white down. The caducous lanceolate stipules and the very long calyx segments of the fruit distinguish it from *S. Martiniana*. Although the fruit is nearly as large as that of *S. stenoptera* the tree is only about 30 feet high. It has long pendulous branches. A fuller description of the tree may be found in a paper by Scheffer in the *Natuurkundig Tijdschrift voor Nederlandsch Indie*, 1870.

* 'Mededeelingen uit 'slands Plantentuin,' iii., Minjak Tengkawang.

7. *Isoptera Borneensis*, Scheffer.—"Foliis lanceolato-oblongis obtuse acuminatis supra lucidis subtus in nervorum axillis scrobiculatis, pallidis. Calycis fructiferi laciniis rotundatis horizontaliter patentibus."

The fruit is small, sub-globose, with an acuminate apex, about the size of a marble, and the wings of the fruit are equal in size, rounded and spread horizontally. The trees begin to fruit when about six years old. The fat has rather a higher melting point than that of the other species. This is stated by Professor Eykman to be 36·5° C.

The tree is known as *Tangkawang terindak*.

For details concerning the fats of the above trees the reader is referred to the above-quoted article by Mynheer Bakker.

Fats derived from Sapotaceous Plants in Sumatra and the neighbouring islands.

Among the specimens recently presented to the Museum of the Society are a series of the Sapotaceous plants yielding vegetable fats in Sumatra and Borneo, etc. Although the produce of several of these trees is well known in the East, and finds a ready market at Singapore, they are still almost unknown in this country. Several of the trees also yield gutta-percha. Dr. Burck has given descriptions of the plants in his 'Mededeelingen uit 'slands Plantentuin' (No. III., pp. 36–43), from which the following account is taken. The majority of them are species new to science. They are as follows:—

1. *Palaquium Pisang*, Burck.—"Foliis obovatis ellipticis, subtus aureo-nitentibus, costulis 12–14; petiolis 1·5 to 2 per cent. aureo-pubescentibus."

This tree grows to a height of 60 to 80 feet, and yields an inferior gutta-percha which was formerly used to mix with gutta-soentei, but is not now collected. The seed is sub-globose, 1½ centimetres long, with a polished testa. It yields the fat called "Balam."

2. *Palaquium oleosum*, Burck.—"Foliis obovato-ellipticis vel elliptico-lanceolatis subtus aureo-pubescentibus ; costulis 20–22 teneris prominulis."

The fat is distinguished by the name of Soentei fat.

It is a somewhat smaller tree than the last, attaining a height of only 50 to 60 feet, but it yields a valuable timber of a reddish colour, that of *P. Pisang* being white and not durable. The seed is 3 centimetres long, and 2 broad, with a large hilum covering the greater part of the seed. Both the trees grow in Sumatra in damp bushy places near the coast, at an elevation very little above the level of the sea.

The seeds of both species are sometimes eaten in times of scarcity, but the greatest part is exported to Singapore, the collection forming no inconsiderable source of income to the natives, as may be gathered from the fact that between November, 1884, and March, 1885, no less than 600 kojangs* of Balam and Soentei kernels were exported from Sumatra, the former being valued at 80 to 100 dollars per kojang, and the latter 60 to 73 dollars, the price sometimes rising to 120 and 100 dollars respectively. The Balam fat is of a yellowish colour, and has a slightly bitter taste; it is as pliable as wax. It is used in sugar refining, artificial flower making and in the preparation of tapioca, being employed to grease the pans (heated to 300°) in which the tapioca is dried. By far the greatest quantity, however, is exported to Europe *viâ* Singapore.

The Soentei fat is of a pure white colour, has a sweetish taste, and is used by the natives for cooking purposes. By the rough process of extraction used a good deal of the fat is left behind, so that 34 to 36 per cent. only of Balam, and 28 to 30 of Soentei fat is obtained. By the European method employed at Singapore, probably 45 per cent. could be obtained from the balam, and 37 from the soentei fruits. The price varies from 7 to 15 dollars per picul in the European market. The industry is probably capable of considerable extension, since the trees will most likely be found in districts where the value of the fat is not known at present. Both the Balam and Soentei fats are known at Singapore as the vegetable tallow of Siak.

3. *Palaquium oblongifolium*, Burck* (*Dichopsis oblongifolia*, Burck, 'Rapport Gutta Percha,' 1884, p. 21).—"Folia petiolata oblonga v. lanceolata oblonga, longe acuminata, nervis lateralibus 20–30 utrinque in folii substantiam immersis."

The tree is found in Borneo, Sumatra, Riouw and Malacca. According to Mynheer Toorop the fat is prized in the Sambas province more than any other fat for cooking purposes, and is even used as butter. It is prepared almost exclusively for home use, and consequently is not quoted in the Singapore trade reports.

This tree is considered by Dr. Burck to be distinct in the form of the leaves and the size and form of the flowers from *P. Gutta*, the species from which gutta percha was originally obtained, and which, with the exception of a tree cultivated at Singapore, and those cultivated in Java, is believed by Dr. Burck to be now extinct, at least in a wild state (*Annales*, *l. c.*, p. 69).

According to Dr. D. de Loos,† it is a hard white fat consisting principally of stearin and olein, and should be very valuable for the preparation of stearin candles. This tree in Borneo, Sumatra and Riouw is the source of the best gutta-percha, and is now planted by the Dutch Government on this account in the Tjitjoeroeg district. It should receive attention at the hands of the British Government, since not only does it yield the best known gutta-percha and a valuable fat from the seeds, but also useful timber.

4. *Payena lancifolia*, Burck.—"Foliis longiter petiolatis e basi acuto-lanceolatis acuminatis, 1–1½ pedaliis, supra glabris, subtus aureo-nitentibus."

The tree grows in marshy land, especially on the banks of the smaller rivers, and the fat is used in the Sintang province of N. Borneo in the same manner as that of *P. oblongifolium* in the Sambas district. The fat at the ordinary temperature of the tropics is a clear fluid, and for kitchen purposes it is not so much esteemed as the Tangkawang fat. It is called by the natives "Kelakki" fat; it is not as yet exported. The wood of the tree is used for making oars.

5. *Payena* (?) *multilineata*, Burck.—"Foliis lanceolatis longiter-acuminatis glabris, subtus pallidis costulis subtilibus densissimis plusquam 60."

This tree grows in the same district as the last,

* At Singapore a kojang consists of 40 piculs (of 133⅓ lbs.), and in various parts of the Dutch East Indies from 27 to 30 piculs.

* See "Sapotacées des Indes Néerlandaises," in 'Ann. du Jard. Bot. de Buitenzorg,' vol. v., p. 25, tab. 5.

† 'Beschrijvende Catalogus van het Kolonial Museum te Haarlem,' vol. ii., pt. i., p. 10. 1884.

and yields an inferior fat, which is only used for lighting purposes. Neither flowers nor fruit have yet been seen, and the tree is therefore referred doubtfully to the genus *Payena*. The native name for the tree is "*Belaban*" *or* "*Melaban*."

6. *Payena Bankensis*, Burck.—"Folia e basi acuta v. subacuta lanceolata, acute acuminata vel apice rotundata glabra, subtus pallida fuscescentia, nervis secundariis circiter 30 utrinque prope marginem arcuatim unitis pertensa ('Ann. du Jardin Bot. de Buitenzorg,' vol. v., p. 54).

The fat of this tree is at the usual temperature in Java a thick fluid; according to Dr. D. de Loos (*loc. cit.*, p. 9) it agrees in colour and purity with almond oil, and is usually soft, and light green in colour. In Sambas province the fat is known as "Tengkawang sangai," but in Banka as "Ketiauw" oil. It does not appear to be exported. The tree affords a gutta-percha of inferior quality, known as gutta katijau or ketiauw.

7. *Payena latifolia*, Burck (*l.c.*, p. 58, t. ix.)—"Folia e basi acuta ovalia acuminata, nervis secundariis prominulis circiter 20 utrinque. Florum fasciculi axillares multiflori."

This tree is a native of Billiton and Riouw; it yields an oil called "*Minjak Bengkoe*." The oil, according to Dr. D. de Loos, is clear, of a yellow colour and a pleasant taste. It has an odour of bitter almonds, and at 4° is perfectly solid. It is insoluble in alcohol, but miscible with fats; is soluble in benzol, and is not a drying oil. In Riouw Archipelago it is used in the preparation of pastry (*Natuurkundig Tijdschrift v. Nederlandisch Indie*, 1862, pt. xxiv., p. 481).

8. *Payena macrophylla*, Burck (*Kakosmanthus macrophyllus*, Hassk.)—"Folia breviter petiolata e basi rotundata vel subcordata oblongo-obovata apice rotundato-obtusa vel breviter acuminata, $1\frac{3}{4}$ pedalia supra glabra lucida, subtus argenteo-sericea. Stipulæ triangulares acuminatæ pubescentes 5 mill. longæ deciduæ."

This tree is a native of the province of Bantam; the oil of the seeds is used for various purposes, W. H. de Vriese, 'Tuinbouwflora' (iii., p. 229, and *l. c.*, p. 51).

9. *Diploknema sebifera*, Pierre (*Archives Néerlandaises*, tom xix., p. 104, pl. iv.).—"Ramuli crassi folia ad apices ramulorum conferta, alterna. Flores polygamo-dioici numerosi ad axillas defoliatas vetustioresque umbellati pedunculi breves ferruginei tomentosi."

The tree was collected at Barabay, in Borneo. The fat is obtained by boiling the seeds. It forms the Minjak Tangkawang of Bandjermassing. Dr. Pierre thinks the tree worth cultivating. The genus *Diploknema* was erected by Dr. Pierre on account of certain differences in the structures of the flowers of the present species, by which it is separated both from *Bassia* and *Payena*. From the former it differs in the short corolla tube, in the stamens being in an indistinct series or scattered, in the hypogynous pulvinate disk, and in the style not being elongated, and from *Payena* in the venation of the leaves, inflorescence, style, and ovary; and from both in the number of sepals and the polygamous flowers, which are of rare occurrence in the Sapotaceæ.

Of all the above Sapotaceæ the Balam and Soentei trees of the east coast of Sumatra seem the most worthy of attention as objects of culture, more especially as the fats have already found uses in European industries. While it is possible some of the other Sapotaceous fats may possess equally valuable properties, there is always great difficuly in introducing unknown and untried products. Thus the Bengkoe oil of Riouw and Billiton, and the Minjak Tangkallah* (*Cylicodaphne sebifera*) of West Java and Banka, have as yet found no entrance into commerce, in spite of strong recommendations.

A NOTE ON SPURIOUS CHIRETTA.

BY WILLIAM ELBORNE,

Assistant Lecturer in Materia Medica and Pharmacy in The Owens College, Manchester.

In January last I received from Messrs. J. Woolley, Sons and Co., of this city, two bundles taken from a parcel of chiretta purchased in London at that time, with the information that the quantity bought contained at least 30 per cent. of the same.

Upon carefully examining the bundles in question I had no difficulty in identifying a portion as the false chiretta described by Professor Bentley† (*Ophelia angustifolia*, Grisebach); the remainder, however, presented a marked difference, inasmuch as it contained a well-developed pith, similar to the official variety, although from its want of bitterness it was evidently spurious. It therefore occurred to me that this latter kind, possessing very much the character described by Bentley (with the exception of the absence of pith) might probably be yielded by a different species.

Upon investigating the matter I find that a writer in "The Month," of April, 1877, appears also to have met with a chiretta free from bitterness, possessing at the same time the well-developed pith of the genuine variety. The British Museum authorities, to whom I submitted for identification the sample in question, have referred it to *Ophelia alata*, Grisebach.

NOTE ON FALSE STROPHANTHUS SEED.

BY E. M. HOLMES, F.L.S.,

Curator of the Museum of the Pharmaceutical Society.

At a recent Evening Meeting of the Pharmaceutical Society, some false strophanthus seeds were shown, which were then doubtfully referred to *Holarrhena africana*. Since then the perfect seeds have been forwarded to me by Messrs. T. Christy and Co., so that it has been possible to identify the species. The seeds present an appearance as if the hairs of the awn of the seed were bent backwards. On careful examination, however, under a lens, it became evident that the seed itself was entire, and presented no point of attachment. On examining the end of the apparent awn, it was observed to present the appearance of having been broken off. It was obvious therefore, that the apparent awn was really the hairy pedicel or funiculus of the seed. This curious feature is alluded to in Bentham's description of the genus in the words "*Semina elongata apice ecomosa, basi aristam longissimam longissime retrorsum plumosam comam simulantem producta.*"

On cutting the seeds across, the cotyledons were found to be irregularly folded or contortuplicate. These features indicate the genus *Kickxia*, of which only three species appear to be known:—*K. africana*, Benth., which has been found on the bank of the

* See *Pharm. Journ.*, [3], xiv., p. 481.

† *Pharm. Journ.*, [3], vol. v., p. 481 (1874).

Bagroo River, flowering in April, at Fernando Po, and at Bonny in open low country. This is the only known African species, and there can be hardly a doubt that the seeds in question belong to this species. The other two species are natives of the Philippines (*K. Blancoi*, Rolfe*) and Java (*K. arborea*, Bl.). Both of these have fewer, but much larger flowers on longer pedicels, the corolla being about two inches across, and furnished with a pedicel about one inch long. The leaves of *K. arborea* are ovate, like those of *K. africana*, but those of *K. Blancoi* are smaller and lanceolate.

The distinctive characters of *K. africana* as given in the 'Icones Plantarum' (vol. xiii., pl. 1276), are as follows :—

"*Cymis densis multifloris, pedicellis brevibus, glandulis calycinis in squamellas subconnatis, antheræ dorso non incrassatæ.*"

I learn from Mr. Christy that the seeds have been examined by Professor Birch, who has established definitely that they contain a toxic substance which he believes to be an alkaloid and not a glucoside. Professor Kickx, after whom the genus and *Coprolepa Kickxii* are named, was the Director of the Botanic Garden of Ghent, and President of the Botanical Society of Belgium, and died quite recently (March 29, 1887).

PERSIAN OPIUM.†

Amongst articles of export from Persia, opium occupies the chief place. The yearly crop in and around Ispahan may be estimated now at about 40,000 shahmans, equal to about 232 tons; and the planting of opium and its getting in gives occupation to a very great part of the population. The poppies are not cut before the beginning of June, and the juice is then brought to the market in copper vessels. As a rule, opium changes hands twice, and even oftener, before it comes into the hands of the exporter, and varies very much in quality, according to the soil in which it is grown—one of the most renowned districts being the village of Kupa, at a short distance east of Ispahan. London and Hong Kong are the chief customers, and the merchants prepare it according to the wants of those markets. Of late years the planting of opium has more and more encroached on the grounds available for cultivation, owing to its yielding heavier profits to the cultivator than corn and other cereals. The quality of Ispahan opium is now much appreciated in foreign markets, and more attention is being paid to its preparation than formerly. We may take the annual exportation now to be about 2500 cases of 10 to 11 shahmans each, which, at an average price of 200 tomans, gives the respectable total of 500,000 tomans, about £170,000. Of course prices vary very much, according to supply and demand. Last year the average price was about 21 tomans, (nearly £7) for 1 shahman (13 lbs.) of prepared opium, whereas at the beginning of this year the price was 17 tomans (£5 10*s*) for 1 shahman (13 lbs.), and now has risen to 19 tomans. The fluctuations in the prices are occasionally enormous. In one particular season (two or three years ago) prices rose from 17 to 25 tomans for the prepared drug, which means about 9 to 13 tomans in the raw or unprepared state. Persian opium now competes successfully with other descriptions (Turkey, Asia Minor, etc.) in London and Hong Kong, and it is a source of great wealth to this part of Persia. From Ispahan opium is also sent to Shiraz and Yezd, where it is mixed with the native drug grown in those parts, and thence exported to India and China. About a quarter of the Ispahan opium is exported by English firms.

* *Journ. Linn. Soc.*, xxi., p. 313.

† From a report by Mr. Herbert, on the Trade and Industries of Persia.

ANNUAL REPORT OF THE COUNCIL,

To be presented at the Forty-sixth Annual General Meeting of the Pharmaceutical Society of Great Britain.

In presenting the Forty-Sixth Annual Report the Council has once more the pleasure of recording the continued satisfactory financial position of the Society.

In conformity with the practice of the Council to assist well organized local efforts for providing pharmaceutical education in the provinces, a grant of £25 was made during the year to each of the three following Associations—The Sheffield Pharmaceutical and Chemical Society, the Leeds Chemists' Association, and the Leicester and Leicestershire Chemists' Association. During the present year, and, therefore, since the period covered by the Financial Statement, a sum of £50 has been voted to the Aberdeen and North of Scotland Society of Chemists and Druggists.

The number of candidates during the year 1886 for the Major examination was 98, as compared with 100 in 1885. The number of candidates for the Minor examination was 1070, and for the Preliminary 1305—showing an increase of 115 and 31 respectively. Sixty-seven certificates were received in lieu of the Preliminary examination. The large number of failures is still an unsatisfactory feature of the examinations, and the numerous failures especially in Arithmetic in the Preliminary examination has formed the subject of special comment by the College of Preceptors, by whom this examination is conducted on behalf of the Society. The Reports for 1885 and 1886 of Dr. Greenhow, the Visitor on behalf of the Privy Council, have been received from that Department, and have been published in the Society's Journal and Transactions.

The amount received on the Journal account for advertisements and sales has been nearly sufficient to meet the expenses of its production, notwithstanding the increasingly large number of copies distributed gratuitously to various public institutions at home and abroad, and local pharmaceutical associations, as well as to the Members, Associates and Apprentices of the Society.

Nearly three hundred volumes and pamphlets have, during the past year, been added by gift and purchase to the Society's Libraries in London and Edinburgh. Of this number about two-thirds consist of new works or new editions, and the remainder are bound volumes of periodicals. The total number of books in both Libraries is now nearly 11,000.

Many large and valuable donations have been made to the Society's Museum in London during the past year through the liberality of the Commissioners of the Colonial and Indian Exhibition, and of several of the exhibitors, some of whom have handed over their entire exhibits. Numerous donations have also been received both from wholesale firms and

private individuals, at home and abroad, to all of whom the Society is much indebted. A valuable series of the gutta percha and fat yielding plants of Borneo and Sumatra have been received from the Botanical Gardens in Java through the kindness of Dr. Burck, accompanied by a complete set of the Ledgeriana barks cultivated in Java. The Herbarium has been enlarged by the addition of about 150 medicinal plants from Mauritius, presented by the Director of Woods and Forests in that Island. Mr. J. W. White, of Clifton, has also presented a second series of 150 specimens for the Herbarium of British plants. The number and importance of the donations have not been exceeded in any previous year. Some of the specimens have been placed in the Society's Museum in Edinburgh, which has been also enriched by gifts from persons interested in the welfare of the Society.

Your Council has the pleasure of recording that a medallion of the late Daniel Hanbury, F.R.S., by Thomas Woolner, R.A., has been presented to the Society by Mr. Thomas Hanbury, and has been placed in the Materia Medica Museum.

The inaugural sessional address in October, was delivered by Sir Henry W. Acland, K.C.B., M.D., F.R.S., President of the Medical Council, now an Honorary Member of the Society.

A series of six lectures on "Galenic Pharmacy" was kindly delivered by Emeritus-Professor Redwood last year.

The Evening Meetings in London and Edinburgh have been well attended, and valuable papers have been read, giving rise to interesting discussions.

During the year upwards of one hundred and fifty cases of infringement of the Pharmacy Acts were reported to the Registrar and dealt with. In thirty-two cases legal proceedings were taken in order to obtain compliance with the law.

In its last report the Council stated that an endeavour was being made to ascertain if a modification of the proposed Bye-Laws would be confirmed by the Privy Council, and it was ascertained that the Department was of opinion that the proposed alterations were not within the powers conferred by the existing Pharmacy Acts. It was, therefore, decided to introduce a Bill into Parliament to obtain the necessary powers, and, under the charge of the Earl of Milltown, it has been carried through the House of Lords. The Bill has passed the first and second readings in the House of Commons, and is awaiting the Committee stage.

The Early Closing Bill has received the consideration of the Council, and steps have been taken to procure the exemption of chemists and druggists from the operation of the Bill.

The ground lease of the premises, 15 and 16, Bloomsbury Square, and of a piece of land in the rear, has been secured; a contract for building premises on the latter has been entered into, and the work is now well advanced. It is intended that the accommodation in the new building shall consist of an Examination Hall, Laboratory and Dispensary, to be used for the purpose of conducting the Society's examinations; and other Laboratories for Chemical and Pharmaceutical research work, and for such other purposes as may be found necessary.

Your Council refers with satisfaction to the arrangements that have been made for the conduct of the Society's business in Scotland, and looks forward with confidence to receive much valuable assistance from the newly-constituted Executive of the North British Branch of the Society, which has presented its first report to the Council.

As compared with the previous year there is a small decrease in the income from subscriptions to the Benevolent Fund, although the expenditure both for annuities and temporary assistance has been larger. Your Council hopes that as a result of the Dinner to be held on the 17th of May at the Freemasons' Tavern in aid of the Fund a substantial sum will be realised, not only in donations, but in new annual subscriptions, since it is by the latter the Council is enabled to expend so large a sum annually in excess of the income arising from investments.

In the last Annual Report, reference was made to a movement that had been initiated by the friends and former pupils of Emeritus-Professor Redwood to found a Scholarship in connection with the Society's School, to be called the Redwood Scholarship. Out of the amount contributed, the sum of £604 2*s*. 6*d*. has been expended in the purchase of Great Indian Peninsula Railway Stock, and a Deed of Trust has been executed vesting the property in the Council of the Society, which is entrusted with the duty of laying down the conditions under which the Scholarship shall be awarded. In addition, a portrait of the Professor has been painted by Mr. Sydney Hodges, which will be presented to the Society by the Testimonial Committee on Wednesday, the 18th of May, after the business of the Annual Meeting, and it is intended that a replica of the picture shall be given to the Professor.

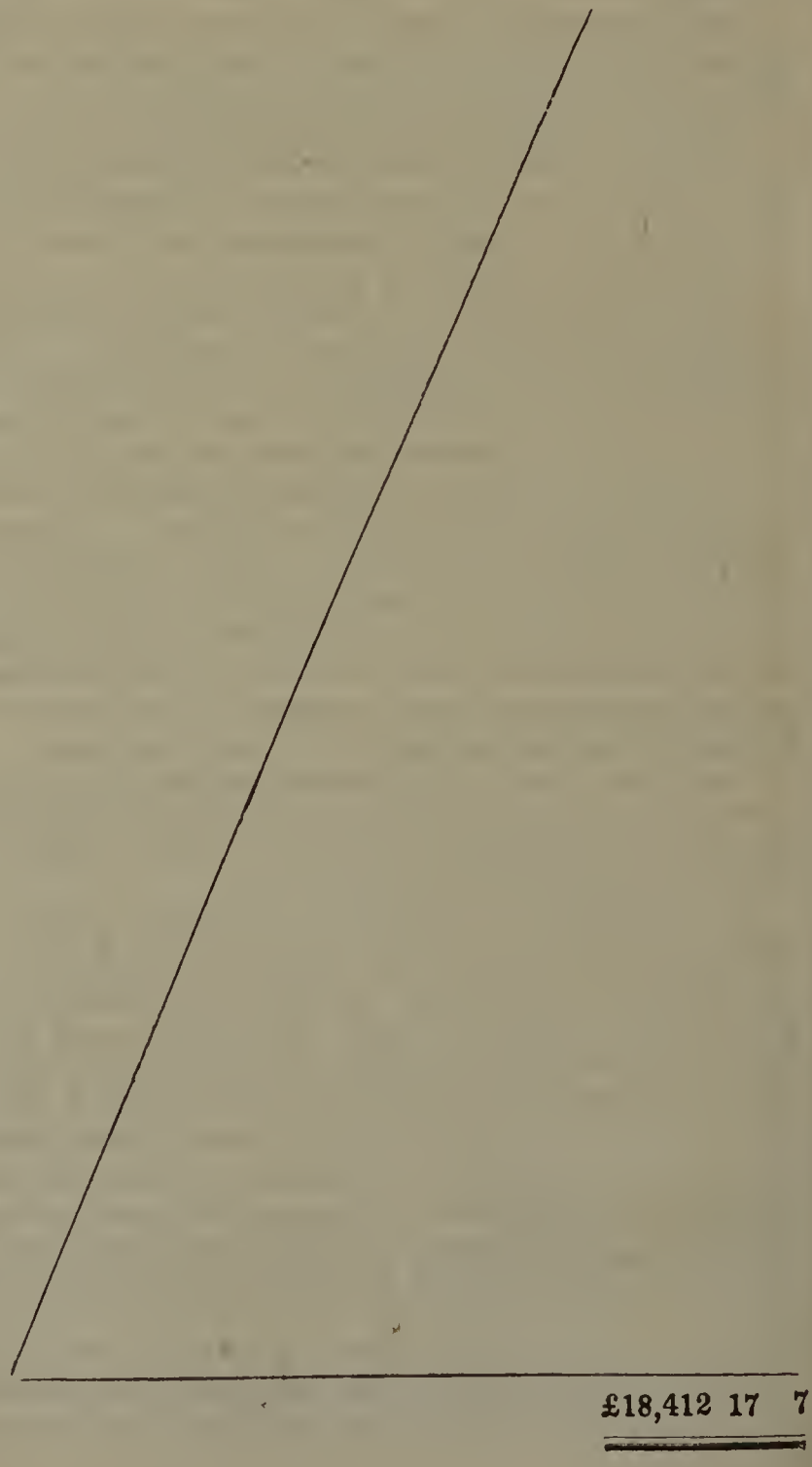
Your President received in February last from Sir Frederick Abel, a communication intimating a hope entertained by H.R.H. The Prince of Wales, that the members of the Society would take part in the foundation of the Imperial Institute, which it is proposed to establish in commemoration of the fiftieth year of the Queen's reign. The communication having been submitted to the Council, it was decided to bring the subject under the notice of the members and associates in business, with the result that, up to the present time, a sum amounting to £160 has been received and forwarded to the Organizing Secretary of the Institute.

The following have been elected to fill the vacancies in the list of Honorary Members:—Sir Henry Acland, K.C.B., M.D., F.R.S., Oxford; Joseph Bosisto, C.M.G., Melbourne; Christian Brunnengräber, Ph.D., Rostock; Thomas Lauder Brunton, M.D., F.R.S., London; Professor A. De Bary, Strassburg; W. T. Thiselton Dyer, C.M.G., F.R.S., Kew; Professor Thomas Fraser, M.D., F.R.S., Edinburgh; Professor A. Ladenburg, Ph.D., Kiel; Professor John Maisch, Philadelphia; C. Méhu, M.D., Paris; Professor Louis Pasteur, Member of the Institute of France, F.R.S., Paris; Anton v. Waldheim, Vienna.

Your Council regrets to have to record many losses by death during the past year: amongst them, Dr. Frederic John Farre and Dr. Louis Mialhe, Honorary Members of the Society; William Southall, of Birmingham, for many years a member of the Board of Examiners for England and Wales; James Baynes, of Hull, a former member of Council; and the following Local Secretaries:—William Cartwright, of Newcastle-under-Lyme, and Henry Davis, of Leamington.

Receipts. GENERAL FUND—FINANCIAL

	£ s. d.	£ s. d.
Balance January 1st, 1886:—In Treasurer's hands	1564 19 0	
In Secretary's hands	138 0 0	
In Honorary Treasurer's hands (Scotland)	31 15 2	
		1734 14 2
Life Members' Fund:—Interest		87 0 0
Interest on Investments		703 7 9
Subscriptions:—1542 Members, Pharmaceutical Chemists	1619 2 0	
692 ,, Chemists and Druggists	726 12 0	
1281 Associates in Business	1345 1 0	
899 Associates not in Business	471 19 6	
1194 Apprentices or Students	626 17 0	
6 Entrance Fees	12 12 0	
	4802 3 6	
Fees paid upon restoration to the Society	20 9 6	
		4822 13 0
Examination Fees:—1403 Preliminary Examination	2511 18 0	
3 Modified ,,	3 3 0	
1087 Minor ,,	2903 2 0	
97 Major ,,	414 15 0	
		5832 18 0
Registration Fees:—19 Fees for Restoration to the Register	19 19 0	
10 Registration Fees as Chemists and Druggists	52 10 0	
		72 9 0
Journal:—Advertisements	4368 6 4	
Sales	427 3 4	
		4795 9 8
Register:—Sales to the Government	147 10 0	
Sundry Sales	8 5 0	
		155 15 0
Calendar:—Sundry Sales		14 18 0
Penalties and Costs for infringements of the Pharmacy Act		183 13 6
Rent of Stable in rear of Society's House, Edinburgh		9 19 6



£18,412 17 7

STATEMENT FOR 1886.

Expenditure.

	£ s. d.	£ s. d.
Annuities:—Professor Redwood		100 0 0
Mr. Elias Bremridge		400 0 0
Carriage of Books, and other Parcels		10 16 7
Certificates of Death		21 6 5
Conversazione at South Kensington Museum	255 8 5	
Evening and other Meetings	61 12 11	
		317 1 4
Examiners, Boards of—	*England and Wales.* / *Scotland.*	
Fees to Examiners	1530 18 0 / 491 8 0	
Fees to Superintendents—Preliminary Examination	207 18 0 / 31 10 0	
Hire of rooms for conducting Preliminary Examination	65 10 6 / 7 3 11	
Travelling Expenses	271 1 3 / 29 18 2	
Refreshments for Examiners	96 6 4 / 17 16 11	
Apparatus, Drugs, and Chemicals for Examinations and sundry charges in connection therewith	89 3 11 / 25 18 8	
	2260 18 0 / 603 15 8	
(*England and Wales*)	2260 18 0	
	2864 13 8	
Fees to the College of Preceptors	170 6 0	
		3034 19 8
Fixtures and Fittings		6 11 9
Furniture		1 14 6
Grants in aid of provincial education		75 0 0
House Expenses:—Gas, Water, Coal, Cleaning Materials, &c.		247 6 11
Journal:—Editor and Sub-Editor's Salaries	677 1 8	
Paper	1026 12 4	
Printing	2179 2 8	
Publishers' Commission	549 2 4	
Contributions (£351 2*s.* 8*d.*) and Engraving (£4 17*s.* 0*d.*)	355 19 8	
Reporting	80 2 0	
Attending Conference and other Meetings	25 3 0	
Parliamentary Papers and Sundry Charges	34 2 6	
		4927 6 2
Lectures:—Emeritus Professor of Chemistry and Pharmacy	100 0 0	
Professor of Botany and Materia Medica—Endowment of Chair	150 0 0	
Professor of Chemistry—Endowment of Chair	150 0 0	
Subscription to Royal Botanic Gardens	21 0 0	
Laboratory:—Professor of Practical Chemistry—Endowment of Chair	150 0 0	
	571 0 0	
Apparatus and Materials for Pharmacy Classes, Prize Medals, Certificates, &c.	41 18 3	
Printing and posting prospectuses	11 4 0	
		624 2 3
Law Costs		408 16 8
Library:—Librarian's Salary	230 0 0	
Purchase and Binding of Books	109 6 4	
		339 6 4
Museum:—Curator's Salary	300 0 0	
Assistant's Salary	91 0 0	
Specimens, Bottles and Sundries	110 4 7	
		501 4 7
Expenses in Scotland:—Assistant Secretary—Salary	156 5 0	
Taxes and Insurance	37 12 3	
Miscellaneous Expenses	106 19 10	
Alterations and enlargement of Stable in rear of Society's House, Edinburgh	147 2 9	
Fitting Bookcases in Library	37 12 4	
		485 12 2
Postage:—General	265 7 10	
Journal (Cost of transmission to Members, Associates and Apprentices)	744 16 10	
		1010 4 8
Register, Printing and Publication		163 5 3
Repairs and Alterations		288 0 2
Rent, Taxes, and Insurance of Plate Glass		396 3 6
Returned Subscriptions to Associates		15 4 6
Stationery, Engraving, Printing, and Office Expenses	234 4 8	
Society's Calendar	117 0 0	
		351 4 8
Salaries:—Secretary and Registrar	450 0 0	
Clerks and Servants	865 12 0	
		1315 12 0
Grant towards Laboratory expenses for Research Work (Professor Dunstan)		50 0 0
Cost of Materials supplied to the Jacob Bell Scholars		10 0 0
Herbarium and Council Medals		7 17 6
Secretary's Expenses attending Conference at Birmingham		4 1 0
Sundries		8 3 6
New Premises, Pied Bull Yard, Purchase Old Materials, etc.		26 3 8
Travelling Expenses:—Members of Council	401 6 6	
Deputation of Scottish Members to the Council	23 5 9	
		424 12 3
Refreshments for Council		42 13 4
Investment:—Purchase of £1500 2½ per Cents.		1331 5 0
Balance, December 31st, 1886:—In Treasurer's hands	1327 14 11	
In Secretary's hands	2 6 9	
In Honorary Treasurer's hands (Scotland)	136 16 7	
		1466 18 3
		£18,412 17 7

BENEVOLENT FUND 1886.

Receipts.	£	s.	d.	£	s.	d.
Balance in Treasurer's hands, Jan. 1st, 1886				110	17	9
Balance in Secretary's hands, Jan. 1st, 1886				7	1	3
London and Westminster Bank, Jan. 1st, 1886				500	0	0
Interest on Invested Capital and Ground Rents				781	14	2
Subscriptions				1451	16	11
Donations	34	13	0			
Legacies	140	0	0			
				174	13	0
Part of a Grant returned				0	14	0
				£3,026	17	1

Expenditure.	£	s.	d.	£	s.	d.
37 Annuitants at £35 per annum	1295	0	0			
7 Ditto at £30 ditto	210	0	0			
1 Ditto { 1 quarter @ £30	7	10	0			
1 Ditto { 3 quarters @ £35	26	5	0			
1 Ditto { 2 quarters @ £30	15	0	0			
1 Ditto { 2 quarter @ £35	17	10	0			
1 Ditto (deceased), 3 quarters at £35 per annum	26	5	0			
				1597	10	0
Casual Grants.						
Members of the Society and Registered Chemists and Druggists (19)	155	0	0			
Widows of ditto (44)	451	14	5			
Orphans of ditto (2)	25	0	0			
				631	14	5
Payment from the Robbins Fund				5	0	0
Printing and Stationery, etc.	27	2	6			
Postage	18	0	1			
				45	2	7
Surveyors' charges in connection with the selection of suitable Ground Rents				15	13	0
Investments :—						
Purchase of £500 Consols				503	15	0
Balance in Treasurer's hands, Dec. 31, 1886				216	3	5
Balance in Secretary's hands, Dec. 31, 1886				11	18	8
				£3,026	17	1

We, the undersigned Auditors, have examined the accounts of the Pharmaceutical Society of Great Britain, as presented in the Financial Statement and Benevolent Fund Account, and find them correct. We have inspected the Deeds relating to the Freehold House and Ground Rents named below, and also find that there was standing to the account of the Society at the Bank of England, and in the hands of the Society's Bankers, on the 31st December, 1886, the undermentioned Stocks, viz. :—

		£	s.	d.	£	s.	d.
General Fund	New 3 per Cents.	14,925	0	0			
	New 2½ ,,	5,500	0	0			
	Freehold Ground Rents at Paddington Green, London, W., cost.				20,425	0	0
					5,551	5	6
	Society's House in Edinburgh, cost.				1,931	10	0
	New 3 per Cents (Life Members' Fund)				3,000	0	0
							30,907 15 6
Benevolent Fund	Consols				2,500	0	0
	Freehold Ground Rents at Strawberry Hill, cost.				1,020	12	6
	Freehold Ground Rents at Battersea, cost.				12,213	0	0
	Freehold Ground Rents at Broomwood Park Estate, Wandsworth, cost.				5,680	18	4
							21,414 10 10
do. (Robbins Fund)	Gas Light and Coke Co. 4 °/₀ perpetual Debenture Stock.						125 0 0
Secretary's Casual Relief Fund.	Consols.						105 0 0
Pereira Memorial Fund	Consols.						100 0 0
Bell Memorial Fund	Consols.						2,050 0 0
Hanbury Memorial Fund	Consols.						400 0 0
Hills Prize Fund	Russian Bonds						300 0 0

W. HODGKINSON,
W. K. HOPKIN,
F. HARWOOD LESCHER,
W. MANNING WATTS,
Auditors.

March 22, 1887.

The Pharmaceutical Journal.

SATURDAY, MAY 7, 1887.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE ANNUAL REPORT OF THE COUNCIL.

THE period has again arrived at which it is customary to give an official retrospect of the Society's work during the past twelve months, in the form of a Report by the Council for consideration at the Annual Meeting, and we are enabled to place this document before our readers in the present number, as its publication has been ordered by the Council. In many respects the subjects referred to in it merit careful attention as being of more than ordinary importance, while others present little deviation from what has now been the experience of many years. Thus the financial position of the Society is very briefly mentioned, as maintaining the satisfactory condition that has been reported on previous occasions. On this point the auditor's report, together with the financial statement of receipts and expenditure, furnishes more detailed information. This opportunity may be taken to point out certain items of expenditure which have formed a constant feature in the accounts for many years, viz., those relating to the School supported by the Society, and amounting in the past year to upwards of six hundred pounds. A similar outlay has been incurred in previous years, and our reason for referring to this circumstance is that in a circular which has been anonymously sent to members of Parliament to induce them to oppose the Pharmacy Acts Amendment Bill now under consideration, one of the statements made with this object is that since the Pharmaceutical Society has a School of Pharmacy of its own, it would be unfair to other schools for the Council of the Society to have the power of recognizing what schools certificates of attendance are to be received from. It is suggested that if this power were given to the Council it would be unfairly exercised, so that the Society's School might be plentifully supplied with students. The facts that we have referred to above as to the expenditure incurred in supporting the School at Bloomsbury Square sufficiently show that the maintenance of this School is not carried out by the Society as a matter of profit or of competition with other schools, if such exist, but that it is, and has been, a source of continued and considerable expense. As a matter of fact, moreover, the Society has for the last fourteen years had no kind of proprietary interest in the School, and the relation of the Council to it has consisted solely in the exercise of control over the system of instruction pursued there, the endowment of the professorial chairs, and the provision of premises, etc., the expenditure thus incurred amounting generally to several hundred pounds annually. It will be evident, therefore, that the statements put forward in the circular above mentioned are entirely unfounded and contrary to fact, while the suggested inferences to be drawn from those statements would be equally erroneous. The real reason for the continued maintenance of the School by the Society is the feeling entertained by the Council of the necessity for keeping up a standard of efficiency in pharmaceutical education, even at considerable expense, until such time as it may be generally recognized that there must be a stronger inducement to obtain adequate education than is furnished by the existing legal demand of mere examination. The work that has been done by the Society during the last forty-five years in providing for and promoting pharmaceutical education is more justly to be regarded as constituting a high kind of vested interest in the right to have the power of regulating and controlling any institutions that may propose to furnish such education. This work has not been confined altogether to London, but so far as circumstances would permit it has also been carried out in the provinces, and the present statement of expenditure contains an item of grants in aid of education in the provinces. Such grants have been made in former years, but there has always been a serious obstacle to the establishment of any such provision for education in the provinces as would justify the Council in contributing more freely to its promotion. This has been the absence of any compulsory influence which would induce the attendance of students, and for this reason most of the attempts that have been made to establish pharmaceutical schools in the provinces have failed. Nor can it now be expected that such attempts will have any sufficient prospect of success until it shall be made a compulsory regulation that apprentices and pupils shall attend specified courses of instruction. The report of the Council makes mention of several places,—Aberdeen, Leeds, Leicester and Sheffield,—where such attempts are being made with some measure of success even at the present time, and it may be expected that if the Bill now before Parliament passes, schools for pharmaceutical education will become numerous in such provincial centres.

The character of the examination results during the past year has been much the same as before. The number of candidates for the qualifying examination has increased, but the proportion of failures has been at least as high as usual, thus proving most conclusively that many of the candidates have not, during the period of their appren-

ticeship, been educated so as to acquire a competent practical knowledge of the business they propose to carry on. It is evident from this fact, that to a very large extent the apprenticeship system, as at present carried out, does not satisfy the requirements of the case. The sixty per cent. of candidates who fail to pass the examinations is made up of apprentices who have not been taught their business, and in this fact there is abundant proof and justification of the preamble of the Society's Bill that it is expedient to further secure that persons intending to become chemists and druggists should be properly educated while apprentices. The results of the Preliminary examination are no less instructive in the same direction, and the continued large proportion of failures in this simple examination has formed the subject of special comment by the College of Preceptors which conducts this examination, and by Dr. GREENHOW, the Visitor of the Examinations on behalf of the Privy Council. His opinion is that it is most desirable that this examination should be passed before apprenticeship, so that full opportunity may be afforded during the period of technical education for paying proper attention to the subjects which should then occupy the time of apprentices. The candidates now rejected in the Preliminary examination, very often after having completed their apprenticeship, would have been more fairly dealt with if it had been necessary to pass that examination before being apprenticed, for then, as Dr. GREENHOW justly remarks, imperfectly educated youths would have ascertained their incompetence for the business before wasting two or three of the most precious years of their life in endeavouring to obtain admission to a calling for which they are entirely unsuited.

The only other legislative matter in regard to which the Council has taken action during the past year is the Early Closing Bill introduced by Sir JOHN LUBBOCK, and steps have been taken to procure the exemption of chemists and druggists from the operation of this Bill. This course was adopted after due consideration of the conditions under which chemists and druggists are placed with regard to the supply of medicines, and although opinions have been expressed in some quarters in favour of the provisions of the Bill being made applicable to chemists and druggists, we cannot but think that such an interference with their liberty of action, and, in some instances, with the requirements of their business, could prove otherwise than irksome and objectionable in practice.

One important matter referred to in the Report is the satisfactory arrangement that has been made for the conduct of the Society's business in Scotland, which has so entirely done away with the previously existing difficulties between the Council and the Scottish members of the Society that it has been possible, even within the short space of time that has elapsed, for the Executive of the North British Branch to lay before the Council at its last meeting a very satisfactory report of the working of the several departments in Edinburgh. The Evening Meetings have been resumed with marked success, and may be expected to have an important influence in maintaining the repute of the Society with the medical profession and other scientific bodies in Scotland and elsewhere. The various branches of the Society's establishments, both at Bloomsbury Square and in Edinburgh, are mentioned in the Report as showing signs of progress. The Libraries have been augmented by the addition of nearly three hundred volumes and pamphlets. The Museums have received many valuable donations, especially through the liberality of the Commissioners of the Colonial and Indian Exhibition, and several of the exhibitors. Donations have also been received from wholesale firms and private individuals, both at home and abroad, as well as from the authorities of the Botanical Gardens in Java. The Herbarium has been enlarged by contributions of about one hundred and fifty medicinal plants from Mauritius, and of a large series of British plants. The increasing demands for space for carrying on the business of the Society have induced the Council to make provision for additional accommodation by building upon a piece of ground at the rear of the present premises. A spacious Examination Hall with a chemical laboratory and dispensing room are in course of construction there for the use of the Board of Examiners, and there will also be accommodation for other purposes.

RETIREMENT OF PROFESSOR BENTLEY.

THE announcement made by the President at the late meeting of the Council that Professor BENTLEY contemplates resigning the active position he has now occupied for so many years in connection with the direct educational work of the Society will, we are confident, be received with very general regret. Not only among the present and past students, who have attended the Professor's botanical classes, will this be the case, but with all who are connected with the Society, and more especially by that smaller number of individuals who can look back to the time when ROBERT BENTLEY was a fellow-student with themselves in the early days of the Society's career. The Calendar of the Society marks the year 1842 as that in which the single prize then awarded was taken by him, and the year 1849 as that in which he succeeded the late Professor ANTHONY TODD THOMSON in the chair of Botany. Subsequently, on the retirement of Dr. PEREIRA, the lectureship of Materia Medica was also confided to Professor BENTLEY, and from that time he has continued to perform the duties of these combined offices. The fact of Professor BENTLEY having been originally a student in the Society's School serves in a marked manner to remind us that the Society is beginning to have a history somewhat more extended that most of its present members have a personal acquaintance with.

Thus, for instance, even among those who were students in the early days of the Society, there are now but three names of persons remaining on the Register of Pharmaceutical Chemists whose certificates of having passed the Major examination bear single numbers. To the surviving founders and older members of the Society it must naturally be a source of regret to see that after the lapse of so many years the leading object they had in view when the Society was formed—the establishment of a uniform system of education—has not yet been achieved. It is, however, to be hoped that this deficiency may now soon be removed, and that Professor BENTLEY and his colleagues may have the satisfaction of witnessing in that result a successful and beneficial issue of the work which their labours have so largely contributed to promote.

The position and prospects of the Benevolent Fund at the present time were so fully described in a recent number of the Journal that it is unnecessary now to do more than remind our readers, that in pursuance of the intention then mentioned, and in accordance with previous practice, the third Decennial Dinner in aid of the Fund will be held on Tuesday, the 17th inst., at the Freemasons' Tavern, Great Queen Street. The chair will be taken by the President of the Pharmaceutical Society, and from the long list of stewards which is published in the Journal this week it may be anticipated that there will not only be a good attendance on that occasion, but that each of the stewards will be enabled to send in such a list of donations as may provide for the present requirements of the Fund, and leave a substantial surplus for meeting further calls upon it.

* * *

In accordance with the intimation made at the last Evening Meeting of the Pharmaceutical Society in Edinburgh, arrangements have been made for holding another meeting at 36, York Place, on Wednesday evening next, at eight o'clock. The titles of the papers to be read on that occasion are "An Accurate Method for Determining Specific Rotatory Power," by Mr. W. Peddie; "Note on Solubilities," by Mr. D. B. Dott; "A Simple Method of Percolation under Pressure," by Mr. T. Maben; "Irish Moss as a Substitute for Gum Arabic in Pharmacy," by Mr. P. Boa; and "Remarks on Sugars used for Syrups," by Mr. P. Boa.

* * *

Mr. Haydon, the Secretary of the Chemists and Druggists' Trade Association, has forwarded us an advance print of a circular which is about to be issued with the object of ascertaining what possibility there may be of reorganizing the Association on a somewhat different basis. It is proposed to raise the subscription to half a guinea, and to reduce the expenditure by decreasing the number of the Executive and altering the arrangements for the Annual Meeting and report. Members of the Association only are to be defended in cases where defence is practicable, and to have the advantage of legal advice and assistance. If the response to this circular does not warrant the conclusion that there is a sufficiently general and widespread desire on the part of the trade that the Association should continue to exist, a special general meeting will be convened for the purpose of winding it up.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

April 20, 21, 22, 26, 27, 28 and 29, 1887.

Present on the 20*th*, 21*st*, 22*nd* and 26*th*—Mr. Carteighe, President; Mr. Gostling, Vice-President; Messrs. Barnes, Blunt, Bowen, Corder, Fletcher, Gale, Gerrard, Greenish, Linford, Ransom, Symons, Tanner, Taylor and Thresh.

Present on the 27*th*, 28*th* and 29*th*—Mr. Gostling, Vice-President; Messrs. Barnes, Blunt, Bowen, Corder, Fletcher, Gale, Gerrard, Greenish, Linford, Ransom, Symons, Tanner, Taylor and Thresh.

Dr. Greenhow was present on the 21st and 22nd on behalf of the Privy Council.

MAJOR EXAMINATION.

20*th*.—*Six* candidates were examined. *Three* failed. The undermentioned *three* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Armitage, John Lister .....Mirfield.
Atterbury, Clive .....Burton-on-Trent.
Black, Hugh Milner .....London.

21*st*.—*Six* candidates were examined. *Two* failed. The undermentioned *four* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Goff, Walter Edward .....Birmingham.
Minchin, William.....Bedford.
Palmer, Frank Thomas .....Cheltenham.
Philp, William John Ignatius London.

26*th*.—*Six* candidates were examined. *All* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Beckwith, Arthur Frederick ...Colchester.
Birkett, John .....Stockport.
Blain, William Rushton.....Bolton.
Daintree, Ernest .....Cardiff.
Smith, George... .....Worcester.
Street, Albert Ernest .....London.

27*th*.—*Five* candidates were examined. *All* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Walker, Arthur Heeson .....Altrincham.
Watson, Frederick Percy .....Lincoln.
Watts, Robert .....Sheffield.
Woolley, Samuel Walter.....Stamford.
Wyatt, Harold .....Bootle.

MINOR EXAMINATION.

20*th*.—*Twenty-eight* candidates were examined. *Eighteen* failed. The undermentioned *ten* passed, and were declared qualified to be registered as Chemists and Druggists:—

Allen, Ernest Edward.....Winchester.
Averill, George.....Stafford.
Bancroft, Charles Frederick ...Great Grimsby.
Baugh, Richard .....Carnarvon.
Beard, Albert Edward .....Haddenham.
Berridge, Oliver Gillett .....Leicester.
Blenkinsop, John.....Carlisle.
Bray, Frank Douglas .....Princes Risboro.
Briggs, Thos. Seth Harwood ...Darwen.
Broad, Henry Reynolds .....Kidderminster.

21*st*.—*Twenty-five* candidates were examined. *Thirteen* failed. The undermentioned *twelve* passed, and were declared qualified to be registered as Chemists and Druggists:—

Allen, Richard .....Ramsey.
Bunn, John Edwin James .....Newent.
Burns, Norman .....Bolton.
Cadge, Chas. Christopher Hume.Alford.
Cairns, Frederic Arthur .....Birkdale.
Carter, Henry Lansdale .....London.
Cowper, Joseph .....Penrith.

Crane, John Hammond .....London.
Cutmore, Frank .. ..Totnes.
Dancy, Ralph .....Turner's Hill.
Davenport, Richd. Cartwright..Talgarth.
Doe, Walter James ....Rochester.

22*nd.*—*Thirty* candidates were examined. *Sixteen* failed. The undermentioned *fourteen* passed, and were declared qualified to be registered as Chemists and Druggists :—

Cooper, John Henry .....Loughborough.
Duplock, Walter .....Petersfield.
Edwards, Edward .....Cardiff.
Evans, Harry .....Leicester.
Everingham, Fredc. Adolphus..Market Weighton.
Filmer, John Honeywood .....Devonport.
Ford, William Crossley .....Dudley.
Fox, Frederick William .....Lincoln.
Franklin, John William .....Gloucester.
Fryer, Edwin .....Market Deeping.
Gabbetis, Thomas Holmes .....Etton.
Glover, Arthur Sandon .....London.
Goodwill, William Ernest .....Darlington.
Gratton, George Edwin .....Conway.

26*th.*—*Twenty-eight* candidates were examined. *Fifteen* failed. The undermentioned *thirteen* passed, and were declared qualified to be registered as Chemists and Druggists :—

Edwards, Walter .....London.
Griffiths, Thomas.....Carmarthen.
Hamlin, Charles Booth .....Crediton.
Hankinson, Alfred William ...Grange-over-Sands.
Harris, Joseph Bastable.....Totnes.
Hindle, Robert George .....Wirksworth,
Hogg, Vincent Hopkins .....Bideford.
Hooper, William Henry.....Okehampton.
Horsey, Herbert Vaughan.....Southampton.
Hubbard, Henry Joseph.....Norwich.
Jackson, Thomas.....Altrincham.
Jeffery, Elias ....Falmouth.
Keen, Walter Henry .....Red Hill.

27*th.*—*Twenty-eight* candidates were examined. *Nineteen* failed. The undermentioned *nine* passed, and were declared qualified to be registered as Chemists and Druggists :—

Davis, John .....Nottingham.
Kittow, Tom.....Launceston.
Mallinson, James Edward .....Oxford.
Milbank, Sydney Thomas .....Bishop's Stortford.
Millard, Edgar James .....Derby.
Miner, Major Thomas.....Walsall.
Morris, Edward Stow .....Sleaford.
Park, Frederick .....Tynemouth.
Pattinson, Hedley .....Haltwhistle.

28*th.*—*Twenty-eight* candidates were examined. *Fifteen* failed. The undermentioned *thirteen* passed, and were declared qualified to be registered as Chemists and Druggists :—

Jones, Ellis ....Portmadoc.
Morris, Henry Charles .....Tamworth.
Phillips, Benjamin .....St. Clears.
Poole, Weston .....Newcastle, Staffs.
Richmond, Alfred Edward.....Great Yarmouth.
Roe, Edwin John... .....Nottingham.
Rose, George Ernest .....Stratford-on-Avon.
Rutter, Clement Thomas .....Birmingham.
Scott, Richard Forder.....London.
Seely, Charles Leman .....North Walsham.
Sharman, Charles Richard.....Towcester.
Smith, Frederick.....London.
Taylor, Arthur Robert .....Rugby.

29*th.*—*Twenty-nine* candidates were examined. *Fifteen* failed. The undermentioned *fourteen* passed, and were declared qualified to be registered as Chemists and Druggists :—

Jones, Eustace Harry.....Dartford.
Smith, Joseph Henry .....Moreton-in-Marsh.
Spanton, John .....Thornton.
Stanley, James.....Bulwell.
Timmis, John .....Silverdale.
Viggars, George Daniel .....Stafford.
Walker, Alfred Ernest .....Mansfield.
West, David Dudley .....London.
Westover, John Turton .....Bridgnorth.
Wildgoose, John Gratton .....Boston.
Wilkinson, George Henry .....Coventry.
Woodland, William.....Selhurst.
Woolley, Edward James.....Manchester.
Wright, John .....Macclesfield.

PRELIMINARY EXAMINATION.

29*th.*—Certificates by approved examining boards were received from the undermentioned in lieu of the Society's examination :—

Belcher, Charles Herbert .....Stafford.
Belcher, James Arthur .....Stafford.
Boreham, Walter Herbert .....Lee.
Burn, David Haitly.....Arbroath.
Coulthard, Wm. Jos. Campbell.Whitehaven.
Davies, Richard .....Kidderminster.
Goode, Chas. Edwd. Adams ...Tunbridge Wells.
Hayward, Walter Edwin .....Pudsey.
Hobbs, Harry .....London.
Islip, Frank .....Dartford.
Kempston, Theodore .....Dublin.
Kendall, George Edward .....Berry Brow.
King, Edwin Harry.....Nottingham.
Mead, Frederick James .....London.
Peers, Thomas Hy. Parkes.....London.
Pérodeau, Edward George .....Plymouth.
Reeve, Walter .....Norwich.
Scott, Joseph Bealey .....London.
Shepherd, James Henry .....Leicester.
Whitmell, John Edward L. ...Watford.
Wiggin, Charles Watkin.....London.

EXAMINATIONS IN EDINBURGH.

April 18, 19, 27, 28 *and* 29, 1887.

Present on the 18*th* and 19*th*—Messrs. Clark, Dott, Gibson, Gilmour, Kinninmont, Maben, Nesbit and Stephenson.

Present on the 27*th*, 28*th* and 29*th*—Mr. Carteighe, President; Messrs. Clark, Dott, Gibson, Gilmour, Kinninmont, Maben, Nesbit and Stephenson.

Professor Sir Douglas Maclagan was present on each day on behalf of the Privy Council.

MAJOR EXAMINATION.

27*th.*—*Two* candidates were examined. *One* failed. The undermentioned passed, and was declared qualified to be registered as a Pharmaceutical Chemist :—

Auchinachie, Peter .....Keith.

MINOR EXAMINATION.

18*th.*—*Eleven* candidates were examined. *Five* failed. The undermentioned *six* passed, and were declared qualified to be registered as Chemists and Druggists :—

Alexander, Adam.....Aberdeen.
Andrew, John .....Catrine.
Begg, Arthur .....Bolton.
Bethune, William John .....Forres.
Dougall, Wm. Robt. Braidwood.Aberdeen.
Young, John.....Arbroath.

19*th.*—*Thirteen* candidates were examined. *Nine* failed. The undermentioned *four* passed, and were declared qualified to be registered as Chemists and Druggists :—

Crawford, David .....Rutherglen.
Fatherly, Robert .....Newcastle-on-Tyne.
Gilchrist, Robert .....Glasgow.
Humphrey, John Thurlbeck ...Sunderland.

27*th.*—*Twelve* candidates were examined. *Nine* failed. The undermentioned *three* passed, and were declared qualified to be registered as Chemists and Druggists:—

Jago, Richard Edwin .....Glasgow.
Kerr, James .....Aberdeen.
Mackenzie, James .....Macduff.

28*th.*—*Thirteen* candidates were examined. *Six* failed. The undermentioned *seven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Neil, John.....Glasgow.
Nielson, Walter .....Blackburn.
Pescod, William .....Newcastle-on-Tyne.
Pirie, James Crichton.....Arbroath.
Robertson, George .....Bridge of Allan.
Stephen, Alexander.....Liverpool.
Stewart, Fergus Ferguson .....Dalkeith.

29*th.*—*Thirteen* candidates were examined. *Four* failed. The undermentioned *nine* passed, and were declared qualified to be registered as Chemists and Druggists:—

Stewart, James .....Kirkintilloch.
Swan, William .....Dundee.
Thomson, John .....Dalbeattie.
Thomson, Marshall .....Banchory Ternan.
Troup, William.....Southport.
Walker, John .....Rothney.
Whaley, Thomas Cope .....Barnsley.
Williamson, Henry .....Bedale.
Wilson, John Grant .....Edinburgh.

PRELIMINARY EXAMINATION.

29*th.*—A certificate by an approved examining board was received from the undermentioned in lieu of the Society's examination:—

Brown, John.....Edinburgh.

MEETING OF THE COUNCIL.

Wednesday, May 4, 1887.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT, IN THE CHAIR.

MR. T. P. GOSTLING, VICE-PRESIDENT.

Messrs. Allen, Atkins, Bottle, Butt, Cross, Greenish, Hampson, Hills, Kadley, Richardson, Robbins, Savage, Southall, Symes and Williams.

The minutes of the previous meeting were read and confirmed.

Diplomas.

The following, being duly registered as pharmaceutical chemists, were respectively granted a diploma stamped with the seal of the Society:—

Armitage, John Lister.
Atterbury, Clive.
Auchinachie, Peter.
Beckwith, Arthur Frederick.
Birkett, John.
Black, Hugh Milner.
Blain, William Rushton.
Daintree, Ernest.
Goff, Walter Edward.
Minchin, William.
Palmer, Frank Thomas.
Philp, William John Ignatius.
Smith, George.
Street, Albert Ernest.
Walker, Arthur Heeson.
Watson, Frederick Percy.
Watts, Robert.
Woolley, Samuel Walter.
Wyatt, Harold.

Elections.

MEMBERS.

Pharmaceutical Chemists.

The following, having passed the Major examination and tendered their subscriptions for the current year, were elected "Members" of the Society:—

Armitage, John Lister .....London.
Auchinachie, Peter .....Keith.
Beckwith, Arthur F. .....Colchester.
Birkett, John .....Morecambe.
Black, Hugh Milner.....London.
Blain, William Rushton .....Bolton.
Coull, George .....Edinburgh.
Daintree, Ernest .....Kings Langley.
Davidson, Peter .....London.
Nurse, James Aldis .....London.
Palmer, Frank Thomas .....Cheltenham.
Philp, Wm. John Ignatius .....Gosport.
Richards, Thomas Coombs .....Cheltenham.
Smee, Walter Wallis .....Southampton.
Street, Albert Ernest .....Ampthill.
Watts, Robert .....Sheffield.
Woolley, Samuel Walter.....Stamford.
Wright, William Charles .....London.

Life Member.

Watson, Frederick Percy .....Lincoln.

ASSOCIATES IN BUSINESS.

The following, having passed the Minor examination, being in business on their own account, and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society:—

Baker, William Ritchie .....London.
Bayley, Joseph Benjamin .....Lichfield.
Blankley, Thos. Ernest Bagshaw.Banbury.
Brisley, George.....Bexhill.
Buckley, George Philip .....London.
Burden, Chas. Henry Brown ...Nunhead.
Chalmers, John .....Newport (Salop).
Clarke, Charles Henry .....Chepstow.
Cox, Frederick.....London.
Deighton, Frank .....Bradford.
Dunn, George Marchant.....Gravesend.
Flett, Arthur .....Uddingston.
Freke, Cecil Henry.....London.
Gant, Robert Richard.....Bushey.
Godsell, Philip George .....Wolverhampton.
Gould Charles William .....Chiswick.
Haynes, Joseph Alfred .....Boscombe.
Heyes, Thomas Harry.....Bolton.
Hopper, James Henry .....London.
Jones, Maurice Howell .....Towyn.
Jowett, William Hall .....Blackburn.
North, Samuel James .....Grimsby.
Owen, Alfred Ernest .....Newcastle-on-Tyne.
Pearson, William Jackson .....Leicester.
Playford, Frederick William ...Norwich.
Rees, Charles Joseph .....London.
Robinson, Richard Fredk. Wm..Seacombe.
Simpson, Alexander Henderson.Forfar.
Thompson, George .....Knaresborough.
Whyte, Joseph Allan Fowlie...New Deer.
Woodman, George .....Odiham.
Woodruff, Albert Edward .....Eastry.
Young, John.....Douglas (I.M.).

ASSOCIATES.

The following, having passed the Minor examination and tendered (or paid as "Apprentices or Students") their subscriptions for the current year, were elected "Associates" of the Society:—

Averill, George.....Stafford.
Bancroft, Charles Frederick ...Great Grimsby.
Baugh, Richard .....Carnarvon.
Beard, Albert Edward .....Haddenham.
Beringer, Heinrich Roland.....Redruth.
Bond, Ernest Greensill .....Liverpool.
Briggs, Thos. Seth Harwood ...Darwen.
Brigham, George .....Hull.
Bunker, Chas. Jas. Garibaldi...London.
Bunn, John Edwin James .....Newent.
Cadge, Chas. Christopher Hume.Alford.
Cairns, Frederic Arthur .....Birkdale.
Coles, Arthur .....Uxbridge.

Cooper, John Henry .....Loughborough.
Cowper, Joseph.....Penrith.
Crane, John Hammond .....London.
Crawford, David .....Rutherglen.
Cutmore, Frank .....Totnes.
Dancy, Ralph .....Turner's Hill.
Davenport, Richd. Cartwright..Talgarth.
Davis, John .....Nottingham.
Dawson, Edwin ....Stamford.
Doe, Walter James .....Rochester.
Dougall, Wm. Robt. Braidwood.Aberdeen.
Edwards, Walter.....London.
Everett, Walter Edes .....Colchester.
Everingham, Fred. Adolphus...Market Weighton.
Fields, Tom William .....Beverley.
Fox, Frederick William .....Lincoln.
Franklin, John William .....Gloucester.
Fryer, Edwin .....Market Deeping.
Goodwill, William Ernest .....Darlington.
Gratton, George Edwin .....Conway.
Green, Herbert .....Hucknall Torkard.
Griffiths, Thomas.....Carmarthen.
Hamlin, Charles Booth ....Crediton.
Hankinson, Alfred William .. Grange-over-Sands.
Hindle, Robert George .....Wirksworth.
Hogg, Vincent Hopkins .....Bideford.
Holyoake, William Wringrose..Leicester.
Hubbard, Henry Joseph.....Norwich.
Hunt, Herbert George.....Newport (I.W.).
Jackson, Thomas.....Altrincham.
Jeffery, Elias .....Falmouth.
Johnstone, James.....London.
Jones, Eustace Harry.....Dartford.
Lynn, John Robert.....Grantham.
McDougall, Allan Murray.....Greenock.
McGillivray, Finlay .....Navin.
Makepeace, Alfred Joseph.....Nuneaton.
Millard, Edgar James.....Derby.
Miner, Major Thomas.....Walsall.
Morris, Edward Stow.....Sleaford.
Morris, Henry Charles .....Tamworth.
Neil, John..... .....Glasgow.
Park, Frederick .....Tynemouth.
Pattinson, Hedley .....Haltwhistle.
Phillips, Benjamin .....St. Clears.
Poole, Weston .....Newcastle (Staffs).
Richmond, Alfred Edward.....Great Yarmouth.
Robson, Robert.....Darlington.
Robertson, George .....Bridge of Allan.
Roe, Edwin John.....Nottingham.
Sharman, Charles Richard.....Towcester.
Smith, Frederick .....London.
Smith, Joseph Henry .....Moreton-in-Marsh.
Spanton, John .....Thornton.
Stanton, Leonard William.....Wolverhampton.
Taylor, Arthur Robert .....Rugby.
Taylor, Wm. Chadwick Coates..Saltburn-by-the-Sea.
Thomson, John.....Edinburgh.
West, David Dudley .....London.
Westover, John Turton .....Bridgnorth.
Whaley, Thomas Cope.....Barnsley.
Williams, John Llewellyn .....Llantrissant.
Williamson, Henry .....South Shields.
Woolley, Edward James..... Manchester.
Wright, John .....Macclesfield.

APPRENTICES OR STUDENTS.

The following, having passed the Preliminary examination, and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Amos, Harry Beard.....Canterbury.
Bilby, Frederic Wm. C. .....Kidderminster.
Blamey, John .....Penryn.
Broome, Bertie .....Cromford.
Collier, Henry William .....London.
Davies, Thomas ..... Aberystwith.
Dunning, James .....Manchester.
Dunsford, Thomas William.....Modbury.
Fagan, Albert Edw. Thorsby...Scarborough.
Frith, John Benjamin.....Coggeshall.
Gough, Ernest William .....Clifton.
Hall, Sydney Charles .....Newark.
Hicks, Frederick Robert.....York.
Huckle, Arthur Hy. Headley...London.
Hunter, Robert..... .....Glasgow.
Hyne, Henry .....Landport.
Jackson, George ... .Leeds.
Jones, Arthur Alderson .....Liverpool.
King, Charles James Draper...London.
Lander, Arthur.....St. Keyne.
Longman, Samuel Hurman.....Wincanton.
Martin, George Hymers .....Gateshead-on-Tyne.
Montgomery, Colin Campbell...Rutherglen.
Murdoch, John Thomson .....Edinburgh.
Parish, Alfred James ... .Kidderminster.
Pattison, Thomas Dowson .....West Hartlepool.
Pennington, John Noble.....Ulverston.
Rees, William Edward .....Llanidloes.
Rippon, Richard Waller .....Leamington.
Shera, William Arthur .....Horncastle.
Tapp, Charles .....Sittingbourne.
Taylor, James .....Eccles.
Thorp, Alfred Wild.....Gildersome.
Warhurst, William Herbert ...Liverpool.
Wellburn, Halder.....Pickering.
Young, Archibald John .....South Queensferry.

Several persons were restored to their former status in the Society upon payment respectively of the current year's subscription and a fine.

HONORARY MEMBERS.

The PRESIDENT said in accordance with the Bye-laws this was the day for the election of Honorary Members, and he had much pleasure in proposing the names of twelve distinguished gentlemen. Most of the members were aware that in the draft Bye-laws that had been recently drawn up and submitted to the Privy Council there were certain provisions with regard to Honorary Membership, which would have had the effect of creating two classes, and whilst there was a hope of these Bye-laws being confirmed the election of Honorary Members had been suspended. The matter might probably come up again at some future time, but in the meanwhile it was thought better that the vacancies in the present list, which was limited to fifty, should be filled up. He had much pleasure in bringing forward the names, which were submitted last month. They were the names of men so distinguished that it would be out of place for him to say anything more about them than that, while they hoped that some little compliment would be paid to these gentlemen by being enrolled Honorary Members, the Society itself would be honoured by having their names associated with the other eminent men on that roll.

The VICE-PRESIDENT seconded the motion, and the following gentlemen were unanimously elected Honorary Members:—

Sir Henry Wentworth Acland, K.C.B., M.D., F.R.S., President of the Medical Council, Regius Professor of Medicine in the University of Oxford, Hon. Physician to H.R.H. the Prince of Wales; Hon. LL.D. Camb., Edin., Durh.; Hon. M.D. Trin. Coll., Dubl.; F.R.C.P. Lond.

Joseph Bosisto, C.M.G., M.P. (Victoria), J.P., past President of the Pharmaceutical Society of Victoria.

Christian Brunnengräber, Ph.D., President of the Deutscher Apotheker-Verein. Rostock.

Thomas Lauder Brunton, M.D., D.Sc., F.R.C.P. Lond. F.R.S.

Heinrich Anton De Bary, Professor of Botany, Strass-

burg University, M.D., Ph.D., Foreign Memb. Roy. Soc., etc.

William Turner Thiselton Dyer, C.M.G., F.R.S., M.A. Oxon., B.Sc. Lond., F.L.S., Fell. Univ. Lond.; Hon. Fell. K.C.L.; Director of the Royal Gardens, Kew.

Thomas Richard Fraser, M.D., F.R.S., F.R.C.P.E., Professor of Materia Medica and Clinical Medicine and Dean of the Faculty of Medicine, University of Edinburgh.

Professor Ladenburg, Ph.D., Hon. M.D., Professor of Chemistry and Director of Chemical Laboratories in the University of Kiel.

Professor J. M. Maisch, Professor of Materia Medica and Botany, Philadelphia College of Pharmacy, and Permanent Secretary of the American Pharmaceutical Association. Philadelphia.

C. Méhu, M.D. Paris, Member of the Academy of Medicine, Paris, Pharmacien de l'Hôpital Neckar, past President of the Pharmaceutical Society of Paris.

Professor Pasteur, Member of the Institute of France, F.R.S. Paris.

Anton v. Waldheim, President of the Gremium of Pharmacists of Vienna; Vice-President of the Austrian Pharmaceutical Society; Chairman of the International Pharmacopœia Commission. Vienna

Reports of Committees.

FINANCE.

The report of this Committee included a recommendation of the payment of the ordinary accounts, and also of a sum not exceeding £1500 to the contractors during the current month, on the architect's certificate.

The President moved the adoption of the report, and explained that the £1500 for the contractors was in lieu of the £1000 authorized last month, and would only be paid in the event of the architect certifying that sufficient work had been done to justify the payment.

The motion was agreed to unanimously.

BENEVOLENT FUND.

The report of this Committee included a recommendation of the following grants :—

£10 to the widow (aged 57) of a member from 1853 to 1885 ; in bad health and without means. Applicant has had one previous grant of like amount. (Lincolnshire.)

£5 to the widow (aged 51) of a registered chemist and druggist. Applicant's husband died in March last, leaving her with three children dependent on her, but with no means. (Norfolk.)

£10 to the widow (aged 57) of a member from 1852 to 1871. The husband died in February last, and her children are not in a position to support her. (Middlesex.)

£10 to a registered chemist and druggist (aged 84), female, has some little means, but is nearly blind and requires an attendant. (Monmouthshire.)

£5 to the widow (aged 47) of a member from 1871 to 1883. Applicant has had two previous grants, has nine children, three dependent on her and two partly so ; three others are in orphan asylums. (Suffolk.)

One case had been deferred for further information, and two others the Committee had declined to entertain.

The Vice-President moved the adoption of the report and recommendations, which was carried unanimously.

BENEVOLENT FUND DINNER.

This Committee had held two meetings, and had approved a circular for distribution amongst members and others ; the arrangements for the dinner had also been approved.

The President, in moving the adoption of the report, reminded the Council that this was an official dinner, and was under the control of the Council as custodians and distributors of the Fund. Most of the members probably had received the circular, calling upon all who were connected in any way with the Society or the trade to remember that this was the usual decennial period when a special appeal was made for donations and subscriptions, and inviting them to send in their donations so that they might be announced at the dinner, He would remind them that this Fund was intended for the relief of necessitous persons who were or had been on the Register of Chemists and Druggists, and to the widows and orphans of such persons, whether they were connected with the Society or not. He would repeat once more that the Society simply acted as trustee of the Fund, and all the money contributed to it from the general funds of the Society, and from the members, was now merged in one common fund, and was distributed by the Council in the most catholic spirit.

The motion was carried unanimously.

LIBRARY, MUSEUM, LABORATORY AND HOUSE.

Library.

The report of the Librarian had been received, including the following particulars :—

	Attendance.	Total.	Highest.	Lowest.	Average.
March	Day . . .	606	32	19	22
	Evening .	223	14	3	9

Circulation of books.	Town.	Country.	Total.	Carriage paid.
March . . .	189	156	345	£2 1 5½

The undermentioned donations to the Library had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors :—

For the Library in London—

Nova Acta Academiæ Cæsareæ Leopoldino-Carolinæ Germanicæ Naturæ Curiosorum, tom. 48, 1886. From the Akademie.

Tarbouriech (A. P.), Des Euphorbiacées, 1886.

Fabre (L. A.), Étude sur l'aloes, 1881.

From Professor Soubeiran.

Middlesex Hospital, Reports for 1885.

From the Hospital.

College of Preceptors, Calendar, 1887.

From the College.

Chemical Society, Journal, 1886.

Deutsche chemische Gesellschaft, Berichte, 1886.

From Mr. Walter Hills.

Smithsonian Institution, Annual Report for 1884, part 2. From the Institution

For the Library in Edinburgh—

Smithsonian Institution, Annual Report for 1884, part 2. From the Institution.

The Committee recommended the purchase of the undermentioned works :—

For the Library in London—

Botany of the Challenger Expedition, vol. 2.

Bentham, British Flora, 5th ed., 1887.

Brunton, Text-book of Pharmacology, 3rd ed., 1887

Lyons, Pharmaceutical Assaying, 1886.

Richards, Aluminium, 1887.

Vogl, Anatomischer Atlas zur Pharmakognosie.

Godfrin and Noel, Atlas manuel de l'histologie des drogues simples, 1887.

Tomes, Dental Surgery, 3rd ed., 1887.

A request from the Kaiserliche Leopoldinisch Carolinische Deutsche Akademie der Naturforscher for the *Pharmaceutical Journal* from its commencement was laid before the Committee.

The Committee recommended that the request be granted.

Museum.

The Curator's report had been received, and included the following particulars :—

	Attendance.	Total.	Highest.	Lowest.	Average.
March	Morning .	534	33	8	14
	Evening .	102	14	1	3

The following donations had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors :—

Transparent Linimentum Terebinthinæ.
From Mr. J. BLAND.

Specimen of Ginseng root.
From Mr. R. M. HOUGHTON, Haslar Hospital.

An original packet of Strophanthus pods.
From Messrs. BURROUGHS and WELLCOME.

Specimens of the Dyak arrow poisons from Borneo.
From Mr. BROOKE LOW.

Kali seeds. From Mr. H. HELBING.

Specimens of *Huechys sanguinea* and of the kernels of *Prunus Mahaleb*.
From Messrs. HODGKINSON, TONGE and STEAD.

Fresh fruits of *Ægle Marmelos*.
From Mr. P. W. SQUIRE.

Eight specimens of the commercial varieties of Turmeric root. From Messrs. HALE and SON.

Specimen of green Olive oil.
From the CHISWICK SOAP COMPANY.

Specimens of *Elaterium* and of fresh Aconite roots.
From Mr. F. RANSOM, Hitchin.

Specimens of fresh Aconite root.
From Mr. J. C. SHENSTONE.

A series of specimens of unidentified drugs from India and the Corea. From Dr. DYMOCK, Bombay.

Specimens of the Tangkawang fats from *Shorea aptera*, Burck ; *S. stenoptera*, Burck ; *S. Gysbersiana*, Burck ; and *Isoptera Borneensis*, Scheff ; and of the fats of the seeds of *Palaquium oleosum*, Burck ; and *P. javense*, Burck ; also a series of the Ledger barks cultivated in Java derived from cuttings and from seeds.

From Dr. BURCK, Buitenzorg Botanic Gardens, Java.

To the Herbarium—

Specimens of *Isoptera Borneensis*, Scheff ; *Shorea stenoptera*, *S. Gysbersiana*, *S. aptera*, *S. Martiniana*, *S. Pinanga*, the plants yielding Tankawang fats in Borneo and Sumatra ; also a series of plants yielding gutta percha, including *Palaquium Borneense*, *P. Gutta*, *P. oblongifolium*, *P. oleosum*, *P. Pisang*, *P. Treubii*, *P. Treubii*, var. *parvifolium* and *Ceratophorus Leerii*.

Specimen of pure Lecithin.
From Messrs. H. C. BAILDON and SON.

The Assistant Secretary, Mr. J. Rutherford Hill, had reported the following donations to the Museum of the Society in Edinburgh :—

Specimen of Caliche, a native sodium nitrate from Bolivia ; specimens of Cinchona barks, including Carthagena, Columbia and New Grenada barks, and mossed Crown bark from Madras ; and a specimen of Cryptopia.
From Messrs. T. and H. SMITH and Co.

A specimen of pure Lecithin.
From Messrs. H. C. BAILDON and SON.

The Professors had attended and reported on their respective classes.

An application from the Chemists' Association of Nottingham for materia medica specimens had been received, which it was recommended should be granted.

Certain painting and cleaning of the premises was recommended.

The draft Annual Report had been considered, and at an adjourned meeting approved.

The PRESIDENT moved the adoption of the report and recommendations.

The Council went into committee to discuss a question raised by one of the members with regard to papers read at the Evening Meetings.

On resuming, the report and recommendations were received and adopted.

THE ANNUAL REPORT.

The Council then went into committee to consider the draft Annual Report.

On resuming, a resolution approving the draft Report, with certain verbal amendments, was unanimously agreed to, and the Report was ordered to be printed and sent out with the voting papers.

The Report will be found on p. 904.

LAW AND PARLIAMENTARY.

This Committee had held two meetings, at which the President had reported the progress and condition of the Pharmacy Acts Amendment Bill, and after discussion it was agreed that he should communicate at such times as he thought fit with the various local associations in order to obtain their active support of the Bill.

This report was considered in committee, and the President explained the position in which the Bill then stood.

On resuming, the report and recommendations were agreed to.

GENERAL PURPOSES.

The report of this Committee included the usual letter from the Solicitor reporting upon cases which have been placed in his hands.

Pidgeon, Grocer, Weymouth,
on proceedings being instituted against him, had paid the penalty and costs into Court, with an undertaking not to offend again.

T. W. Dyball, Ipswich,
had also paid £5 15*s*. into Court, the amount of penalty and costs for which he confessed judgment in March last.

The Committee had considered several cases of alleged infringement of the Act, and recommended proceedings being taken in most of them.

The Council went into committee to consider this report, and one of the cases was discussed at some length.

On resuming, the report and recommendations were unanimously agreed to.

THE NORTH BRITISH BRANCH.

The following interim report of the Executive on the progress of this Branch had been received, and was read by the Secretary :—

Interim Report of the Executive of the North British Branch.

"The time that has elapsed since the election of the Executive of the North British Branch being short, and a report for 1886 having been forwarded to the Council at the end of December, it is not necessary to make any lengthy report at the present time.

"The various departments connected with the Branch continue in a satisfactory condition, as will be seen from the following particulars :—

"*The Examinations.*—Though the number of candidates has, of late, been considerably larger than formerly, the examinations are conducted with ease and comfort, and the premises are found to be conveniently arranged and well adapted to the purpose.

"*Evening Meetings.*—The Executive have been able to resuscitate the Evening Scientific Meetings of the Society in Edinburgh, and, so far, they have been attended with marked success. These meetings are found to be a valuable means of promoting the interests of pharmacy, and to have, also, an important influence in maintaining the dignity and position of this Society among members of the medical profession, and in other scientific circles.

"*Library.*—The Library has been considerably enriched, partly by donation, but mainly by the addition of new and standard works by purchase. These additions have been very generally appreciated, and the circulation of books continues steadily increasing, as will be seen from the following statement.

Number of Volumes circulated in three months.

	1886.	1887.	Increase.
January.....	28	46	18
February	31	69	38
March	34	82	48
Totals.....	93	197	104

"The circulation of books among provincial chemists shows a slight increase, but there is still room for development in this direction. The facilities for having books on loan do not appear to be so well known among country members as they might be.

"*The Museum.*—The Museum continues to be added to from time to time by various firms and private individuals, who take this means of showing their interest in the Society's welfare. It is also enriched by the addition of duplicate specimens sent down from Bloomsbury Square. The Executive observe that the Council have sanctioned the completion of the chemical collection, and they believe this will make a very valuable improvement and supply a want which has been long felt.

"The advantages offered by the Society's Library and Museum in Edinburgh are increasingly appreciated, as is evident from the considerable increase of visitors as shown in the following table.

Attendance of Visitors during first Quarter of 1887.

	Day.	Evening.	Total.
January.....	196	141	337
February	146	118	264
March	209	184	393
Totals	551	443	994
Corresponding period of 1886.	391	214	605
Increase	160	229	389

"In addition to those who take advantage of the Library and Museum by visiting it, a considerable number of provincial chemists derive benefit and receive useful information by correspondence. In this way the local representation of the Society in Edinburgh is calculated to do much good, and cannot fail to strengthen the position of the Society in Scotland.

"*House.*—It has been found necessary to have the stair laid with new india-rubber mats, with cocoa fibre mats on the landings. This has been done at a cost of £7 13*s.*, and has effected a much needed improvement which is expected to be both durable and economical.

"The caretakers having failed to discharge their duties to the satisfaction of the Assistant Secretary, it was found necessary to dispense with their services. After investigation new caretakers have been engaged on the same terms as formerly, and the change has proved very beneficial. It was also found that the caretakers' apartments required painting and papering, and this has been done at a cost of £2 11*s.*

"H. BELLYSE BAILDON, *Chairman.*

"36, York Place, Edinburgh,
"*April* 30, 1887."

It was resolved, on the motion of the PRESIDENT, that the report be received and entered on the minutes.

The PRESIDENT said it was very pleasing to find that so good a report could be furnished of the first three month's work of the new Executive. From observations made by himself last week, when he was present at the examinations in Edinburgh, he was extremely gratified to find not only what a number of candidates came in to consult specimens in the museum, and refer to the library, but that there were a number of earnest students of all ages in Edinburgh who used the library both in the day and the evening. The Council, therefore, had no reason to be otherwise than satisfied with the liberality it showed some years ago in purchasing a house for the use of its alumni in Scotland. Naturally the Executive had not so much to report as it would under ordinary circumstances, but probably it was thought desirable to send a report now, acting on the assumption that the election of a new Executive would take place soon after the election of the new Council. The Executive and its Chairman and Vice-Chairman might be congratulated on the progress which pharmacy was making in the north.

THE REDWOOD TRUST.

A resolution was passed for affixing the seal of the Society to the transfer of the Great Indian Peninsula Stock into its name as trustees of the Redwood Scholarship fund.

A MEMORIAL FROM BRIGHTON.

Mr. SAVAGE said he had been waited upon on Monday last by two gentlemen with a memorial signed by fifty chemists and by twelve medical gentlemen of Brighton, the list of the latter being headed by the name of Dr. Withers Moore, President of the British Medical Association, and it was very gratifying, he thought, to find such evidence that chemists and druggists had the sympathy of medical men. The memorial, which he read, was on the subject of dealing in poisons and medicines by co-operative stores and companies; it drew attention to the anomaly of allowing two or more unqualified men to do that which one was not allowed to do, and suggested that an amendment in the law should be obtained, to make it answer the purpose for which it was intended. Mr. Savage said he had explained to the gentlemen who waited upon him the difficulties which the Council had had to contend with. They seemed to think that the Bill now passing through the House of Commons had been so favourably received, that it was possible, after that had passed, that the present Government might treat chemists more liberally than former ones had done Two important points were made, one was in connection with small companies, and another was that of unqualified assistants being employed in branch establishments. He told them with reference to the first matter, the sale of poisons by companies, that every effort had been made by the Council, but that in the present state of the law it was powerless. Another point mentioned was that some wholesale chemists made up small quantities of medicines, including poisons, which were sold in country places by grocers, stationers, and others. He told them that if evidence of such practice was furnished to the Council, proceedings would be taken, but there was always a difficulty in getting people to take the initiative. The Local Secretary often refused to act because he was so well known, and if a stranger went to make a purchase, he was recognized as a stranger and was refused.

The PRESIDENT said that, in order to prevent any possible misunderstanding, he might say that no one was more conscious than every member of the Council of the unsatisfactory state of the law, or the interpretation of the law by the judges with regard to the Pharmacy Act of 1868. The only answer was that they could not alter the law without satisfying the House of Commons that it was desirable so to do. There was a great deal of difficulty in getting what was considered an unopposed Bill through Parliament in the present state of public business. More power and greater influence in legislation were required before anything could be done, and above all there was needed some certainty that the legislators thought it necessary that this kind of trading should be stopped, and as to that there was some doubt. Some very thoughtful persons were of opinion that the public were sufficiently protected if the sale was effected by a qualified assistant; and though he had no doubt that in many cases even the letter of the law was broken now, no qualified assistant being employed, there was often a difficulty in dealing with the offenders. If evidence were forthcoming the Council would be very glad to deal with such cases, but at present, there was no evidence that the Legislature would be willing to amend the law in the direction desired by the memorialists. When the Government itself proposed an amendment of the Act of 1868 with regard to the sale of poisons, the proposal was that in the case of a corporation the name of the manager should appear on the label, and that he should be responsible, and that seemed to be as far as the Government was prepared to

STATEMENT OF ATTENDANCE OF MEMBERS OF COUNCIL ON COMMITTEES FOR THE YEAR 1886-87.

	Committees held Once a Month or Oftener.		Committees held Occasionally.		Special Committees.	Total Number of Attendances.
	Finance.	Library, Museum, Laboratory, and House.	Benevolent Fund.	General Purposes.		
Number of Committee Meetings held.	11	13	10	10		
Allen (*London*)	11	11	*	10	16	48
Atkins (*Salisbury*)	*	11	9	9	7	36
Baildon (*Edinburgh*)	8	*	*	8	4	20
Borland (*Kilmarnock*)	*	*	6	6	7	19
Bottle (*Dover*)	*	10	8	7	7	32
Butt (*London*)	*	13	8	10	17	48
Carteighe (*London*)	11	13	0	10	30	64
Cross (*Shrewsbury*)	*	*	10	10	8	28
Gostling (*Diss*)	0	7	9	8	14	38
Greenish (*London*)	*	5	5	8	*	18
Hampson (*London*)	*	7	*	3	0	10
Hills (*London*)	8	13	*	9	15	45
Radley (*Southport*)	*	*	10	10	*	20
Richardson (*Leicester*)	*	*	5	5	5	15
Robbins (*London*)	*	13	10	8	15	46
Savage (*Brighton*)	9	12	*	8	*	29
Schacht (*Clifton*)	9	2	*	8	7	26
Southall (*Birmingham*)	*	*	9	9	*	18
Symes (*Liverpool*)	*	3	5	5	3	16
Williams (*London*)	*	7	8	9	6	30
Woolley (*Manchester*)	5	*	*	6	2	13

* Not appointed on this Committee.

NUMBER OF ATTENDANCES OF MEMBERS OF COUNCIL AT COUNCIL MEETINGS FOR THE YEAR 1886-87.

Allen, Charles Bowen	11	Cross, William Gowen	11	Robbins, John	10
Atkins, Samuel Ralph	10	Gostling, Thomas Preston	10	Savage, William Dawson	11
Baildon, Henry Bellyse	9	Greenish, Thomas	11	Schacht, George Frederick	10
Borland, John	7	Hampson, Robert	9	Southall, Alfred	10
Bottle, Alexander	11	Hills, Walter	11	Symes, Charles	11
Butt, Edward Northway	11	Radley, William Valentine	11	Williams, John	10
Carteighe, Michael	11	Richardson, John George Fredk.	10	Woolley, George Stephen	9

Number of Meetings during the year, 11.

go. He could only say that, while conscious of all these difficulties, the Council deeply sympathized with the memorialists.

Mr. WILLIAMS remarked that Brighton was not the only place which suffered from this kind of thing.

PHARMACEUTICAL SOCIETY OF SOUTH AUSTRALIA.

An application from Mr. Harrison, President of the Pharmaceutical Society of South Australia, for certain specimens, was referred to the Library and Museum Committee.

LEICESTER CHEMISTS' ASSOCIATION.

An application from the Leicester Chemists' Association for a copy of the Register, as published, was agreed to.

APPROACHING RETIREMENT OF PROFESSOR BENTLEY.

The PRESIDENT read a letter from Professor Bentley, intimating his intention to resign his professorship at the termination of the present session. He said he deeply regretted that the Professor had felt called upon to adopt this course, but at the present moment, especially as several of the members of the Council had left, he thought it better not to make any comments on the letter, but to refer it to the Library and Museum Committee to be considered and reported on at a future meeting, when there would be a better opportunity for him and others to express what they felt with regard to the long services which Professor Bentley had rendered to the Society and to pharmacy. The Committee should also be instructed to report what steps, if any, should be taken with regard to the teaching of botany and materia medica in the future.

A resolution to the above effect was carried unanimously.

REPORT OF EXAMINATIONS.

April, 1887.

ENGLAND AND WALES.

	Candidates.		
	Examined.	Passed.	Failed.
Major (20th)	6	3	3
,, (21st)	6	4	2
,, (26th)	6	6	0
,. (27th)	5	5	0
	—23	—18	—5
Minor (20th)	28	10	18
,, (21st)	25	12	13
,, (22nd)	30	14	16
,, (26th)	28	13	15
,, (27th)	28	9	19
,, (28th)	28	13	15
,, (29th)	29	14	15
	—196	—85	—111
	219	103	116

SCOTLAND.

	Candidates.		
	Examined.	Passed.	Failed,
Major (27th)	2	1	1
Minor (18th)	11	6	5
,, (19th)	13	4	9
,, (27th)	12	3	9
,, (28th)	13	7	6
,, (29th)	13	9	4
	—62	—29	—33
	64	30	34

Preliminary Examination.

	Candidates.		
	Examined.	Passed.	Failed.
12th	420	222	198

29th. 22 certificates by approved examining bodies were recieved in lieu of the Society's examination.

Proceedings of Societies in London.

ROYAL INSTITUTION.

THE ROLLING CONTACT OF BODIES.

On Friday, the 29th ult., Professor Hele Shaw delivered a lecture at the Royal Institution upon "The Rolling Contact of Bodies." He commenced by putting forward the proposition that when a carriage wheel is rolled along, any particular point upon the tyre of the wheel always reaches and leaves the ground in a perpendicular direction. In order to demonstrate this, attention was drawn to the fact that on revolving a wheel from which the tyre had been removed, the central point at the extreme end of a spoke always reached the ground, and remained there only whilst the spoke itself was in a perpendicular position. Further, in order to make the truth of his statement more apparent to his audience, the lecturer had recourse to a small solid wheel, to one side of which near the edge was attached a small brush, so that as the wheel rolled along a level surface, the brush accurately marked upon a suitably adjusted screen the direction of the course taken by that portion of the wheel upon which it was fixed. The diagram so obtained proved to be a representation of a series of cycloidal curves, the lowest points of which were reached in a perpendicular direction. Similarly, by causing the solid wheel to travel in a curved path, any point upon it reached its lowest point in a direction perpendicular to a tangent drawn to the curve at that point. From these results it was therefore deduced that in the rolling contact of bodies, points always approach each other in a perpendicular direction. But, beyond the mere rolling contact, there is also a sliding motion, which may be brought about from various causes and is regarded as the effect of tangential force. Thus in a railway train the wheels of the carriages have merely a rolling motion, but the wheels of the locomotive, besides the rolling motion, exert a considerable amount of tangential force, due to the function of the locomotive in drawing the train. In the case of the wheels of the railway carriages, where there is a mere rolling contact, there should therefore be no expenditure of energy; but, as a matter of fact, even with the most highly polished surfaces there is always a certain amount of energy lost, due to a sliding of the surfaces to a greater or less extent. But in such a great measure is this loss of energy overcome that Professor Shaw quoted a case in which, by means of a system of wheels rolling upon each other, a turn-table weighing fourteen tons, when once set in motion, only requires a force of three and a half pounds to keep up its revolutions. The same principle is applied in a number of swing bridges, and in other cases where heavy weights are required to be moved with little power. The lecturer then went on to explain the application of rolling contact in the employment of machines for measuring distances, and in other instruments, such as Sir W. Thompson's harmonic analyser for computing the state of the tide at any place for any time. But in all these instruments Professor Shaw pointed out certain corrections had to be made to allow for the tendency of the wheels to slip over each other. In order to illustrate this tendency the lecturer referred to an experiment in which he had made two wheels revolve round each other ten thousand times, and found then that they had slipped one thirty-second of an inch from their original position, or about one inch in three hundred thousand revolutions. Though this tendency may no doubt be reduced with more perfect instruments, yet to a slight degree it always remains. At the same time Professor Shaw remarked that a minute force exerting itself in a lateral direction would soon have an appreciable effect upon a revolving wheel, although it might be quite imperceptible in its action when the wheel was stationary. This point the lecturer also well illustrated by means of experiment. He then drew attention to a phenomenon which is observed

during the rotation of a ball by means of a revolving cylinder. If a polished wooden ball be placed upon two polished wooden rollers, one of which is kept stationary while the other is made to revolve, a rolling motion is communicated by contact to the ball; but besides the mere rolling motion a lateral movement of the ball along the roller is also observed, and the curious part of the phenomenon is, that although the roller may be turned in either direction, the lateral movement of the ball is always in the same direction. This lateral movement appears very remarkable and difficult to explain, if it be accepted that the ball is a perfect sphere and that the wooden cylinders are mathematically correct and placed in a perfectly horizontal position. If the wooden ball be replaced by one of harder material, or a ball of iron, the lateral motion is perceptibly increased; but the greatest effect is obtained when the wooden rollers are either substituted by rollers of india-rubber, or else covered with a sheet of that material. This phenomenon has never been satisfactorily explained, but Professor Shaw now thinks that he has been able to do so, although he only arrived at the solution of the problem which he put forward as recently as the previous afternoon. Of course when a ball is placed upon a body its weight causes a certain amount of distortion in the surface of that body, and causes forces to be exerted, acting on the ball from all sides. But when a ball is in motion the direction of these forces is considerably altered. The direction of the force in the surface of the body in front of the ball during its passage is maintained, and its power is intensified; but the direction of the force in the surface behind the ball is reversed, owing to the release of pressure from the weight of the ball in that spot. To these changes in the direction of the forces Professor Shaw ascribes the cause of the phenomenon.

Provincial Transactions.

TORQUAY CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting was held on April 20, at which there was a small attendance. Mr. Drayton in the chair. It was announced that Mr. F. March had been awarded the prize for the best essay on pill making and pill coating. Mr. E. H. Farr delivered a lecture treating of the different ways of taking melting points and specific gravities of substances, and of the introduction to organic chemistry. The usual votes of thanks concluded the proceedings.

Obituary.

Notice has been received of the death of the following:—

On the 11th of April, Mr. Henry William Hills, Chemist and Druggist, Leyton. Aged 54 years.

On the 19th of April, Mr. Henry William Hern, Pharmaceutical Chemist, St. Austell, Cornwall. Aged 67 years. Mr. Hern became a Member of the Pharmaceutical Society in 1845, and for several years filled the office of Local Secretary.

On the 22nd of April, Mr. Felix Robert Clarance, Chemist and Druggist, Clarendon Road, Notting Hill, W. Aged 50 years.

On the 22nd of April, Mr. William Ekins, Pharmaceutical Chemist, Huntingdon. Aged 62 years. Mr. Ekins became a Member of the Pharmaceutical Society in 1853.

On the 23rd of April, Mr. John William Best, Pharmaceutical Chemist, Darlington. Aged 32 years. Mr. Best became a Member of the Pharmaceutical Society in 1876.

Correspondence.

**** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

A Memorial from Brighton.

Sir,—By the report of this week's Council meeting your readers will see that the chemists of Brighton and Hove have addressed a petition to the Council of the Society urging it to take such steps as it may deem necessary to prevent unqualified persons conducting the business of a pharmacist (whether employing qualified assistants or not) to the detriment of the public, the medical profession and the body pharmaceutic.

Now as this petition is supported by the signature of the President of the British Medical Association, and many other leading medical practitioners of the borough (time did not permit of ascertaining the views of all), each one of whom expressed his entire sympathy with the chemists, it may not unreasonably be argued that it has a claim to the consideration of the Council; and we think that if the chemists of other towns would follow the initiative of Brighton in petitioning the Council and obtaining the support of their local medical men in so doing, that doubtless the eminently worthy directorate of our Society would ultimately endeavour to accomplish the object of the petitioners, and perhaps even to once more proceed with the very excellent Pharmacy Bill of two or three years ago, which after all the trouble bestowed upon it came to such an untimely end. We are emboldened to think thus by the very marked degree of success which up to the present has attended the "Curriculum" Bill.

Brighton. "The Originators of the Petition."

Concentrated Medicines.

Sir,—I hope the letter of C. A. J. will be copied into the medical journals, such as the *Lancet*, etc., where the faculty would be likely to see it. We are suffering from a similar grievance in our town, where a physician, who has an extensive practice, very rarely prescribes any other but very concentrated medicines, *i.e.*, 6 ounce and 8 ounce into tablespoonfuls, and sometimes into one or two teaspoonfuls, with often 4 or 5 ounces of tincture in each; and this is not our only misfortune, for he occasionally varies his prescriptions with Fellows' Syrup ℥iv., Davis's Cascara Sagrada, and other American remedies, and liq. arsenic., syr. ferri phosph., Squire, and he will even go so far as to inform his patient that he ought not to pay more than so and so for it, naming, of course, a minimum price. It really seems, nowadays, that even our friends the physicians are combining to prevent the poor chemist from getting a reasonable profit. Pharmacist.

A Caution.—Mr. Griffin, of Birmingham, wishes to publish a caution in respect to a man who is endeavouring to obtain a situation by means of a forged testimonial, which shows the desirability of making inquiries as a rule before accepting documentary evidence as to character.

Erratum.—Dose of Ammonium Picrate.—In reporting the discussion following the reading of Mr. Dymond's paper on "The New Antipyretics," Mr. W. G. Blackham was, on p. 897, erroneously represented as giving the dose of ammonium picrate as "less than one gram," instead of "less than one grain."

A. E. Lomax.—Cryptandra, 27; Stenandrium (Acanthaceæ), 58; Isanthus, 130; Heliocharis, 6; Breweria, 19; Dichromena, 7; Elsholtzia, 27; Ampelodesma, 210; ? Lophosciadum, DC., 91; Stylidium, Lour. (Cornaceæ) = Marlea, Roxb., 2.

Fairplay.—We think the view you have taken of the matter referred to is entirely a mistaken one.

W. Moore.—Considering the long hours during which you are engaged you might reasonably urge the allowance of some time for study.

W. J. Thomas.—The Bill will be found in the Journal for February 5 last, p. 631, and copies may be obtained from Messrs. Spottiswoode.

Communications, Letters, etc., have been received from Dr. Trimen, Messrs. Shillinglaw, Macaulay, Thompson, Segg and Co.

CHEMICAL NOTES ON COFFEE.

BY DR. B. H. PAUL AND A. J. COWNLEY.

(*Continued from page* 821.)

3. Coffee Testing.—Though many persons are of opinion that for ordinary domestic use coffee is improved by the admixture of a certain proportion of roasted chicory, it is evident from the essential differences in the components of these materials that chicory cannot be in any way a substitute for coffee. Chicory yields to boiling water a larger amount of soluble extract than coffee does, and the infusion has a darker colour than that of pure roasted coffee; but it is quite destitute of the essential characteristics of coffee. The practice of mixing chicory with coffee has also been advocated on the ground of economy, for as coffee in the roasted and ground state cannot be sold for less than about 1*s.* or 10*d.* per pound, while chicory costs only 4*d.* a pound, a mixture furnishes a cheaper article of consumption. For both these reasons the sale of such a mixture cannot be regarded as a case of adulteration, when the nature of the article is plainly declared, and the proportion of chicory in it does not exceed a due relation to the price at which it is sold. But neither of these conditions is strictly observed in practice. Mixtures of chicory and coffee are frequently sold under the name of coffee in direct violation of the provisions of the Food and Drugs Act, and what is probably still worse, as a matter prejudicial to the purchaser, the article sold as a mixture varies so considerably in the amount of chicory it contains, that taking into account the difference in the price of chicory and coffee, its real value is often not more than one-half of the price at which it is sold. The results of a very extended examination we have lately made of samples purchased in the ordinary way showed that the admixture of chicory varied from 25 per cent. to as much as 93 per cent., though the prices paid were not less than pure coffee could be sold for, and ranged from 10*d.* to 1*s.* 4*d.* per pound. Some of the mixtures sold at 10*d.* a pound really contained less than three-pennyworth of coffee, with at the most three-pennyworth of chicory, and the profit thus obtained upon them must have been very much —to the prejudice of the purchasers—in excess of that realizable by the sale of pure coffee. These facts clearly prove the necessity of requiring a declaration of the extent of admixture, or even a limitation of what is to be admissible without making the vendor liable under the Food and Drugs Act, for at the present time the objects of that Act are in many cases virtually defeated, so far as regards the supply of coffee to the public. In the report made on this subject by Drs. Carpenter and Swaine Taylor to the Board of Inland Revenue in 1853 the admixture of chicory with coffee was held to be admissible both on the ground of economy, and also for the purpose of satisfying the demand of a class of consumers by whom a mixture was preferred. For these reasons it was recommended that the sale of a mixture should be permitted, but at the same time it was pointed out that the proportion of chicory in it ought never to exceed one-third at the utmost, and that it would be better confined to one-fifth. The reporters considered that the deterioration of coffee by any larger admixture of chicory would be sufficient to prevent dealers from exceeding these limits, and therefore anticipated that it would not be desirable to exercise any supervision or control over the proportions of the mixture. Subsequent experience has proved that these anticipations have not been realized, and that, in the absence of restrictions, the admixture of chicory with coffee is practised in many cases to an unjustifiable extent. Another reason given by the reporters for thinking restrictions undesirable was that they could not satisfy themselves that the proportions of coffee and chicory in a mixture could be ascertained by any method then known, so as to admit of the Government laying down restrictions the enforcement of which could only be effected under the guidance of precise determinations.

In the report by Graham, Stenhouse and Campbell the same difficulty was referred to, and it was considered that for the purpose of ascertaining whether roasted and ground coffee contained admixtures, the characteristic constituents of coffee were less immediately available than certain properties of the infusion of a physical character. For this reason they recommended the method of testing coffee which has hitherto been in use for the purpose of ascertaining its purity and detecting admixtures. It is based upon the fact that, as compared with coffee, chicory and other materials likely to be used as admixtures yield to boiling water a much larger amount of soluble extractive, and consequently give infusions having a greater specific gravity than that of pure coffee. In Dr. Bell's work on 'The Analysis and Adulteration of Food' the application of this method is described, as well as the supplementary tests based on the determination of the amounts of sugar and of fat. With the aid of the microscopical examination of the samples these have been the only means of testing available. The results thus obtained are open to objection on the ground that the substances determined and taken as the standard of purity and the measure of adulteration are not specific constituents of coffee. The test based on the specific gravity of the infusion is also open to objection, because in the case of coffee adulterated with chicory the results thus obtained would be influenced by the kind of chicory that had been used for the purpose, as will be seen from the following statement of the amounts of soluble extract yielded by different kinds, and as it would not be possible to ascertain this point there would be a corresponding degree of uncertainty as to the actual proportions of coffee and chicory in any sample under examination.

Belgian chicory	60 per cent.
German „	59 „
English „	49 „
French „	47 „

By making a 10 per cent. decoction with pure coffee 20·5 per cent. of solid material is extracted, but with Belgian chicory the quantity extracted will be 60 per cent. of solid material. A mixture yielding a decoction that contains 32·98 per cent. of solid material will therefore consist of—

Coffee	68·4	yielding	14·02	extract.
Chicory	31·6	„	18·96	„
	100	„	32·98	„

French chicory yields less soluble extract, according to our observation only 47 per cent., and therefore the proportions will be different in a mixture of it with coffee which yields the same amount of extract, as shown below.

Coffee	52·9	yielding	10·84	extract.
Chicory	47·1	„	22·14	„
	100	„	32·98	„

Consequently when the amount of extract obtained from a mixture of chicory and coffee amounts to 32·98 per cent., or when the liquor has a proportionate specific gravity, there will be that degree of uncertainty as to the amount of chicory present which is indicated above; it may be either 31·4 per cent., if Belgian chicory, giving 60 per cent. extract, has been used, or 47·1 per cent., if French chicory, giving 47 per cent. of extract, has been used. This uncertainty as to the proper interpretation of the results obtained from observation of the specific gravity of decoctions or from the amount of extract yielded to boiling water renders these methods very unsatisfactory for detecting adulteration or the admixture of chicory in undue proportions.

In the report by Graham, Stenhouse and Campbell the determination of caffeine, as the specially characteristic constituent of coffee, was mentioned as a possible means of ascertaining the purity of a sample and detecting adulteration, but the experiments they made with that object led to the conclusion that such a method would be both difficult and tedious. It was also considered that as there was then reason to believe the proportion of caffeine varied considerably in different kinds of coffee, the determination of caffeine in a sample would not show exactly the proportion of pure coffee present in it. Our recent experiments have shown that neither of these objections is well founded, but that on the contrary the amount of caffeine in coffee may be taken as a sufficiently constant quantity to admit of its being made a criterion of purity, and a means of ascertaining the proportion of admixtures, while at the same time the determination of caffeine can be easily and accurately performed both in pure roasted coffee and in mixtures. The method of carrying out this determination has already been described,* and in order to satisfy ourselves that the result obtained in operating upon mixtures of coffee and chicory may be relied upon we have since experimented with a mixture prepared by ourselves of equal parts of coffee and chicory. The amount of caffeine obtained in this case was 0·67 per cent., and as the coffee used in the experiment yielded 1·3 per cent., that result indicated the presence in the mixture of 51·5 per cent. coffee and 48·5 of chicory. This is, we think, a sufficiently close approximation to the exact proportions taken in preparing the mixture to satisfy the requirements of any case in which a question as to adulteration would have to be decided.

It will be seen that the quantity of caffeine obtained in the above mentioned experiment was slightly in excess of the quantity that would be contained in 50 grams of roasted coffee containing 1·3 per cent. of caffeine, and thus the indicated proportion of coffee in the mixture is made to be 1·5 per cent. more than it actually was. The slight excess in the weight of the caffeine obtained in the experiment, amounting to 0·02 gram, was due to the presence of a small quantity of impurity in the shape of a brownish waxy substance that is soluble in alcohol and in chloroform. It is difficult to get rid of this without more seriously affecting the accuracy of the result by causing loss of caffeine, but with careful manipulation its presence ought not to influence the ultimate result to the extent of more than 2 per cent. This deviation from precision in the result of the test when applied for ascertaining the amount of admixture, would operate in favour of the vendor by making the amount of coffee appear to that extent greater than it really was, and as the error thus arising is in itself small for such a case, and in a direction that the vendor could not complain of, it may, we think, be disregarded for all practical purposes. It may, however, be got rid of by a further treatment of the caffeine obtained in an experiment, as the brown substance is but little soluble in benzol, so that by dissolving the product in that menstruum with heat, filtering the solution and evaporating off the benzol, the exact weight of the caffeine may be ascertained more correctly. This operation is, however, troublesome, and it may easily be attended with loss of caffeine, so on the whole we consider that it is not in fact worth having recourse to, except for the sake of obtaining in an isolated instance satisfactory proof that the results of this method of operating are trustworthy.

Some further trials were made with samples of so-called "French coffee," and the results obtained are given in the following table, together with the corresponding amounts of coffee as compared with those calculated from the amounts of extract yielded to 10 per cent. decoctions, in each case on the assumption that Belgian chicory had been used.

No. of sample.	Caffeine found.	Amount of Coffee Calculated on the basis of pure roasted coffee containing 1·3 p.c. caffeine.	Amount of Coffee Calculated on the assumption Belgian chicory had been used.
	Per cent.	Per cent.	Per cent.
1	0·52	40·0	38
2	0·68	52·3	60
3	0·54	41·6	48·6
4	0·08	6·2	7·6
5	0·24	18·8	24·4
6	0·71	55·0	76·0

The practical advantages of the proposed method of analysis, as applied to the detection of adulterants in coffee, are that the results obtained by it give at one and the same time an indication of the actual amount of coffee present in the sample examined, and also an indication of the amount of admixture independently of its actual nature, which is, for the purpose in view, a matter of comparatively little importance. By the application of this method of testing there is no difficulty in ascertaining the amount of real coffee present in any sample of ground coffee, whether sold as such or as a mixture. It will, therefore, furnish a means of detecting not only the presence of an admixture of chicory or other adulterant, but also be a means of ascertaining whether the proportion of such admixture is limited consistently with the price charged for the article, or whether it is so much in excess of that proportion as in fact to constitute an adulteration that may fairly be held to be to the prejudice of the purchaser. We, therefore, confidently commend this method of testing to the notice of public analysts for carrying out the objects of the Food and Drugs Act in regard to an article of domestic consumption which has been up to the present time subjected to systematic and injurious adulteration.

Analytical Laboratory,
13, *Fenchurch Avenue.*

* *Pharmaceutical Journal*, p. 565. We have found it advisable to dry the mixture of coffee and lime before extracting with alcohol, especially when dealing with a mixture containing chicory. The caffeine obtained should also be dissolved in a small quantity of water and the solution filtered to separate a little resinous substance before it is weighed.

STROPHANTHUS AND STROPHANTHIN.

BY A. W. GERRARD, F.C.S.

Like Elborne and Helbing (*Pharm. Journ.*, March 12), I have recently given some time to a study of the pharmacy of strophanthus, and as our experiments have been in many ways parallel, the results I obtained may have some value in confirming, or otherwise, those of the above authors.

A most liberal supply of strophanthus seed was placed at my disposal by Messrs. Burroughs and Wellcome; it agreed in characters with the seed doubtfully ascribed by E. M. Holmes to *Strophanthus Kombé*, also with the drawing figured by Elborne in his paper of March 12.

Ten ounces of seed was crushed to a fine meal, then exposed in a thin layer for four hours at a temperature of 140° F.; it thus lost 5·5 per cent. of weight, a result obtained by Helbing. The meal was now treated by slow percolation with 100 fluid ounces of light petroleum ether, and the percolate distilled. I thus obtained a residue of green fixed oil which on drying showed a yield of 31 per cent., calculated on the original seed; again practically confirming Helbing. The meal of the previous operation having been dried was further percolated with 100 fluid ounces of 84 per cent. alcohol; on distilling the alcoholic percolate there remained a pale brown resinous product weighing 5·2 per cent. of the original seed. Attention may here be drawn to the fact that Elborne, using absolute alcohol as his solvent, and under slightly different conditions as to preliminary treatment of the seed, obtained only 1·6 per cent. of a similar extract. Submitting my extract to examination, absolute alcohol was found to dissolve 92 per cent. thereof, which circumstance seemed to show that there was too great a difference between Elborne's and my results to be explained by the differences in our processes.

To settle the foregoing point another experiment was made, in which I exactly followed Elborne's method of extraction, viz., exhausting the seeds consecutively with petroleum ether, ether, and absolute alcohol; again I found that the alcoholic portion gave, on evaporation, 5 per cent. of extract. The same experiment was repeated on such other samples of seed as could be obtained, and with practically the same result. I am, therefore, satisfied that strophanthus seed, after removal of its oil, yields 5 per cent. of extractive to alcohol.

An experiment was made to find what solvent power boiling alcohol would have on the constituents of strophanthus seed. For the purpose 100 grains of seed was boiled three times with three different portions of alcohol; the solution gave, on evaporation, 36·2 grains of residue, found to be composed of 31·2 grains of oil and 5 grains of hard extract. This result shows that boiling alcohol completely removes both oil and extract from strophanthus seed at one operation. It was noticed that the oil could be easily poured from the extract, and adhering traces washed away with a very little ether. A practical result of the foregoing experiment is to show that an alcoholic extract of strophanthus seed can be made without the costly process of removing the oil by ether percolation.

Hardy and Gallois mention they obtained from the comose hairs of strophanthus seed an alkaloid; they named it ineine. Elborne found no trace of such a body in the hairs he examined. I made a number of experiments in the same direction, and am able to confirm Elborne's conclusions, so that we have good reason to doubt the correctness of Hardy and Gallois' statement.

Strophanthin.—This, the active principle of strophanthus seed, was discovered by Professor Fraser, who showed it to be a glucoside possessed of great therapeutic activity. As no precise method has been published for its extraction, and its physical characters have not been well defined, it was thought desirable these matters should be worked out. For this purpose the following experiments were made.

Ten grammes of alcoholic extract of strophanthus seed was dissolved in water, then filtered from the small amount of insoluble residue. To the solution tannic acid was added in excess, and the grey precipitate it gave collected, washed with warm water, and whilst still moist mixed with an excess of basic lead acetate. The mixture was now carefully dried and exhausted with warm alcohol; then through the filtered solution was passed a stream of sulphuretted hydrogen. On filtering from traces of lead sulphide and evaporating off the alcohol, strophanthin was left as a scaly residue. Some colouring matter being present, it was removed by resolution of the strophanthin in warm water, digestion with pure animal charcoal, filtering and evaporating.

Made as above strophanthin is a pale yellowish amorphous substance, burns without leaving a residue, and is easily reduced to powder, having some tendency to re-adhere, perhaps from absorption of moisture. It is freely soluble in water and alcohol, insoluble in pure ether or pure chloroform, but if ether or chloroform contain traces of alcohol a small portion of strophanthin dissolves. If to a strong alcoholic solution of strophanthin pure ether be added in considerable volume the strophanthin is thrown out as a fine white, somewhat flocculent precipitate, soon aggregating to a soft deposit, the whole of the strophanthin, however, cannot be separated in this way, as the alcohol always retains a portion in solution. Elborne and others have noticed that when ether is mixed with tincture of strophanthus opalescence ensues; judging from the previous observation it is most probable that the opalescence is due to separation of strophanthin.

Strophanthin has well-marked glucosidal characters. Boiled with dilute sulphuric acid, followed by Fehling's solution, cuprous oxide readily separates. Its watery solution when shaken gives much froth, a character agreeing with digitalin, senegin, and many other glucosides. Strong nitric acid does not appear to have any action on it, but a few drops of strong sulphuric acid placed on a few particles of the powder develops a green colour passing to black. With ferric chloride, acetate or sub-acetate of lead, there is no reaction; neither with silver nitrate in the cold, but on warming the silver salt is reduced. With tannic acid it gives a white precipitate soluble in excess of the strophanthin.

Professor Fraser obtained strophanthin in crystals, but a large number of experiments I made with the same object proved failures. For the purpose all the best-known solvents were tried, alone, and as mixtures; evaporation was carried out under various conditions, but no crystals appeared, therefore I fear some difficulty will be experienced in getting this active principle in a well-defined form.

To prove beyond doubt that the substance I had prepared was strophanthin, $\frac{1}{60}$ of a grain was given to a dog and proved fatal.

REACTION OF STROPHANTHIN.

BY H. HELBING,
Apotheker of the German Hospital.

Some months back I published in the *Pharmaceutische Zeitung* the statement that concentrated sulphuric acid dissolves strophanthin, changing the colour to a dark green, which soon turns to dark reddish-brown. I was able to verify this reaction in various preparations of strophanthin, which had been manufactured by three different firms. Dr. T. F. Hanauseck, of Vienna, employs it for the microchemical investigation of seeds of strophanthus for the detection of strophanthin, which is affirmed to be contained in considerable quantities, especially in the embryo (*Pharm. Post*, May 8, 1887).

I now propose the following exceedingly pronounced reaction with strophanthin:—A trace of strophanthin is to be dissolved in a drop of water and a trace of liq. ferr. perchlorid. to be added, after which a little concentrated sulphuric acid. A reddish-brown precipitate is formed, which, after a while, sometimes not before one or two hours, turns to an emerald-green or a little darker green body, which remains unchanged for a long time. Very minute traces of strophanthin may be detected in this manner.

NOTES ON CHINESE MATERIA MEDICA.*

BY CHARLES FORD, F.L.S.,
Director of the Botanical Gardens, Hong Kong,
HO KAI, M.B. ABERD., ETC.,
AND WILLIAM EDWARD CROW, M.P.S.,
Government Analyst, Hong Kong.

PRELIMINARY NOTE.

The fragmentary and often unreliable information which Europeans possess of the uses and origin of many interesting substances used in medicine by the Chinese, presents obstacles in whichever way we turn in the study of Chinese materia medica.

Besides the want of accessible information, which the authors have felt so keenly in their own personal investigations, numerous inquiries which are addressed to them individually, from time to time, point out the necessity of the subject being taken in hand earnestly by those near to, or in, the Chinese Empire. For various reasons, the authors have come to the conclusion that these investigations should be systematically taken in hand by themselves, and locally published. They trust that their efforts will be successful in awakening an interest all over China, in a study offering such immense chances for original research. They cordially invite a sharp criticism of their own work; and will gratefully receive, and thankfully acknowledge, any information given, either in correction of their own observations, or towards promoting an advance in securing the identification of drugs which have so long remained undetermined.

In the present state of our knowledge, it is impossible to adopt, with success, any natural system of classification in dealing with the various *vegetable* substances used in medicine by the Chinese. For the same reason an alphabetical arrangement is not wholly satisfactory.

The authors have been engaged for a considerable time collecting data, which, it was hoped, when grouped with the researches of other investigators, would have enabled them to have published the results of their own labours in a form accessible for easy reference, similar to that adopted by Dr. Dymock in his 'Vegetable Materia Medica of Western India;' but they have been compelled to abandon the idea. Dr. Soubeiran and M. Dabry de Thiersant, in their 'Matière Médicale chez les Chinois,' have, it is true, resorted to a classification based on a natural system. This work appeared in 1874, and, as pointed out by Dr. Bretschneider,* is simply a compilation from Dr. Porter Smith and M. Debeaux. Since the publication of these works, some further light has been thrown on the subject, and grave doubts, to say the least, are now entertained as to the source of many drugs heretofore ascribed to a particular genus or order.

Another reason why "Notes on Chinese Materia Medica" should appear in an irregular order is that a prominent position may be given at once in this Journal, to certain drugs which have of late excited some interest amongst botanists and pharmacologists in Europe.

As often as possible the drugs of a single natural order will be dealt with together. The authors in every case will affix their own number, and in addition add the number originally awarded to the 'Pên ts'ao' drugs by the late Daniel Hanbury, F.R.S. This latter step has not only been taken to facilitate reference—each of Hanbury's numbers refers to a corresponding number of an illustration† in the 'Pên ts'ao kang mu;' but is also intended to serve as a tribute to the zeal displayed by this scientist in the field of Chinese materia medica. It is to be regretted that other European investigators have not followed in the steps of Hanbury as regards numbering; it would have saved much trouble and confusion.‡

Whenever a chance occurs, a bibliographical note will be inserted with the description of each drug; it is only right that due acknowledgments should be made wherever we have benefited by the experience of others. Correspondents and those interested in Chinese materia medica will also be able to trace the source of the information in every instance. Only in special cases will a full botanical description of the plants be given.

The authors will also be happy to send to any person who may be desirous of making inquiries, specimens of drugs of doubtful origin, together with details of the information needed, in order to set at rest any point now in dispute.

1.—GELSEMIUM ELEGANS, BENTH.§ N. O. Loganiaceæ. 'Pên ts'ao,' No. 378.‖ (I.) Kou min, (II.) Yeh ko, (III.) Tu kên, (IV.) Hu mêng ts'ao, (V.) Twān ch'ang ts'ao, (VI.) Hwang t'êng, (VII.) Hwo pa hua.

The above names¶ are taken from the 'Pên ts'ao.' In the Kwangtung province it is commonly designated by the fifth of this series, and also by the name Ta ch'a yieh têng.

Gelsemium elegans has not been alluded to in any previous contribution to Chinese materia medica.

*Description.***—A glabrous, woody, evergreen twiner; stem, near the root, of a greyish-brown colour, having on the surface several warty processes; the upper part of the stem green. Leaves, opposite, 2 to 4½ inches long, ovate lanceolate, very acute at apex, entire, somewhat rounded at base on a petiole three to six lines long. Stipules, minute, fugitive, easily observed on young branches. Flowers, small, on stalks three to nine lines long, bright yellow, arranged in rather dense terminal and lateral cymes; bracts, few, linear. Calyx, small, persistent, very

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* Reprinted from advance sheets of the *China Review*, communicated by the authors.

* *Journal of the N.-China Branch of the Royal Asiatic Society*, vol. xvi., part i., p. 129.

† "This series of numbers does not exist in the original. When added in MS. it affords a convenient and ready means of reference to any particular figure."—'Science Papers,' by D. Hanbury, F.R.S., Ed. J. Ince (1876), p. 214.

‡ Seven hundred and forty-two plants are figured and described in the 'Pên ts'ao.'

§ Syn. *Leptopteris sumatrana*, Blume. *Medicia elegans*, Gardn.

‖ Figured, also, in the Chinese botanical work 'Shih wu ming shih t'u kao' (1848), No. 751.

¶ The authors are greatly indebted to the Rev. Dr. Chalmers for much valuable assistance. The romanized renderings of the Chinese sounds will always be given in the manner described by this eminent sinologue in the *China Review*, vol. xv., p. 158.

** On account of the notoriety of this plant as an agent in criminal poisoning, both in Hong Kong and Canton, full botanical characters are here given.

deeply cleft; sepals, about one line long, acute, imbricated. Corolla, rotate, eight to nine lines diameter, tube three to four lines long, surmounted by five equal lobes two and a half to three lines long, inner surface of tube marked with red spots. Stamens five, inserted on base of corolla tube and alternate with the lobes of the corolla, exserted, but shorter than the lobes; filaments equal; anthers lanceolate. Ovary stalked, on a short gynophore, tapering into a style three lines long, two-celled, containing many ascending ovules in each cell; style bicleft, each division being again slightly divided into two spreading stigmas. Fruit, a brown, dry, oblong, inflated, membraneous capsule, about half an inch long, having two opposite deep furrows running from base to apex; dehiscence, septicidal. Seeds, very small, furnished with reddish-brown, reniform and imbricated wings.

The above characters were observed on a specimen gathered on the hills overlooking Mirs Bay, at the back of the city of Kowloon in the Kwangtung province, and on another growing on Mount Gough, on the island of Hong Kong; the description of the fruit is taken from specimens gathered on the Canton West River.

Gelsemium elegans may now be seen growing in the Hong Kong Botanical Gardens.

Habitat.—This shrub grows sparingly in Hong Kong, but more abundantly on the hills of the neighbouring mainland of China.* (Champion, Wright, Wilford, Hance, etc.) In November, 1885, Mr. Westland found a large number of specimens in full flower, climbing round trees to a height of about 12 feet near the eastern base of Tai Mo Shan.† It has also been observed growing luxuriantly on the banks of the West River, about one hundred and twenty miles from Canton (Ford), near the district of Lo ting, and in ravines on the island of Lan tao, opposite the mouths of the Canton River (Westland). In the 'Pên ts'ao' (chap. xvii.) it is declared a native of the provinces of Chekiang, Kwantung, Kwangsi, Sze-chuen and Yunnan. According to Bentham, this poisonous plant also grows in Sumatra, being probably identical with *Leptopteris sumatrana*, Blume. It flowers in October, November and December, and matures its seeds in April and May.

It differs from the North American species‡ of this genus in having smaller, scentless flowers, larger leaves and smaller fruits and seeds.

Parts used, etc.—The root is the only part of the plant used in medicine. As met with in the native drug-shops in Hong Kong under the name Hu muan ch'iang; it consists of thick pieces of the underground stem with or without portions of the *true root* and rootlets attached.

A piece of the *root* in our possession exhibits the following characters. Cortical layer, thick, easily removed from central woody portion, externally of a brown colour, wrinkled, marked at intervals of from half to 1 inch by transverse cracks, extending about half way round, and as far as the meditullium. A section of the latter shows the medullary rays stretching through the yellow woody portion in a manner similar to that displayed by the root of *G. nitidum*.§ When cut with a sharp knife, the central woody part shows a waxy section.

* 'Flora Hongkongensis,' p. 229.

† This is the loftiest (about 3000 feet) of the hills on the coast of China, immediately opposite the island of Hong Kong.

‡ In the Southern United States, *G. nitidum*, Michaux (the source of the eclectic remedy *Gelsemin*) is known as wild yellow jessamine or false jasmine. We prefer to avoid the use of the terms jasmine or jessamine in the case of the China species. These names ought to have distinct generic significance, and should be applied only to plants of the genus *Jasminum*, with which *Gelsemium* was formerly classed. The value of botanical names will be seriously limited, if their indiscriminate use becomes general.

§ Syn. *Bignonia sempervirens*, Linn.; *G. sempervirens*, Aiton; *G. lucidum*, Poir. This species is figured in Bentley and Trimen's 'Medicinal Plants' (1880), vol. iii., No. 181.

There is every reason to believe that in the majority of instances, supplies of this drug are brought from the hill sides only as they are wanted. In but few shops can specimens be seen. This fact will possibly account for the scarcity of the plant on the island of Hong Kong; the careless collector doubtless destroys a shrub each time he gathers the drug, the root being the only part sought for.

Chemical Composition.—The active principle of this drug is due to an alkaloid which was first isolated in the Government Laboratory, in the course of an inquiry ordered by Her Majesty's Coroner in the early part of 1884. This alkaloid is new to chemical science, and its discovery* adds one more to the list of the strychnine or tetanus-producing group of alkaloids. Its most characteristic reaction is the production of a deep violet coloration when in contact with oxidizing agents. If the alkaloid is present in very small quantity, an observer might confound the colour with that displayed by strychnine and gelsemine under similar circumstances. In such a case the observer should apply side by side the same reagents to the alkaloids of *Strychnos nux-vomica* and *Gelsemium nitidum*—a practised eye will at once note the difference.

The following table shows at a glance the different colours produced when manganic oxide and sulphuric acid are applied to—

The alkaloid of Gelsemium elegans.	Gelsemine.	Strychnine.
A deep purplish-violet coloration, changing to one of a rich purple hue.	A damask-red colour, changing to a rich green, which latter tint is more marked at the edges.	A deep violet coloration, changing rapidly to purple, and finally assuming a cherry-red tint.

These colours are all evanescent, but that displayed by the first-mentioned alkaloid is more lasting than the others. The alkaloid of *G. elegans* is *not* associated with *gelseminic acid*, and unlike strychnine and gelsemine (?)† it will *not* bear the action of sulphuric acid at a temperature of 100° C.

The publication of other chemical features of this alkaloid is reserved for a future paper.

Toxicological Note.—In cases of poisoning by any preparation of the root of *G. elegans*, no difficulty should be experienced in detecting the active principle in the contents of the stomach, provided, first, that the victim had not vomited to any extent after receiving the dose, and second, that death had ensued within a few hours of the administration of the poison. The method adopted in the laboratory of the Government Civil Hospital is a modification of Stas's alkaloidal process. The viscera is treated with about twice its weight of absolute alcohol, acidified with tartaric acid, and digested for a few hours in a flask at a temperature of about 70° C., cooled and filtered. The filtrate is evaporated to the consistence of a soft extract, and treated with successive quantities of absolute alcohol and water, so as to free the alkaloid, if present, from as much extraneous matter as possible. The necessary evaporations may be conducted at a temperature of 100° C. The extract, after the last alcoholic treatment, is now dissolved in a little water and filtered, and the solution (acid) after being well washed with ether‡—until nothing further is removed—is made slightly alkaline with ammonia, and immediately shaken with a suitable volume of ether. The ethereal layer, which now contains the alkaloid, is removed; and this

* *Pharmaceutical Journal*, [3], xvi., pp. 95 and 496; also Hong Kong Government *Gazette*, vol. xxxi., p. 344.

† *Pharmaceutical Journal*, [3], xiii., p. 642.

‡ This washing of the acid solution with ether ought never to be omitted.

treatment having been repeated, the ethereal solutions of alkaloid are mixed, and divided into two parts. The first half should be evaporated by degrees in a small porcelain basin, and the residue after the addition of a few drops of very dilute hydrochloric acid and water, and being cautiously neutralized with ammonia, may be used for hypodermic injection into small animals, mice or guinea-pigs. The second half should be carefully evaporated to dryness on the inverted covers of three or four porcelain crucible lids and tested, in the manner already described, with sulphuric acid and manganic oxide. In practice it will be found that a small quantity of organic contamination does not interfere with the delicacy of the reaction. If the process has been conducted with that scrupulous care which should invariably accompany toxicological investigations, the *life-test* will most probably furnish confirmatory evidence, in support of that derived from the application of chemical reagents.

Uses, etc.—The author of the 'Pên ts'ao' states* that this drug is never used internally as a medicine, although preparations of the root are recommended to be applied in the treatment of boils and ulcers. According to the Rev. E. Faber, the root is sometimes secretly used internally in the Kwangtung province in certain forms of disease. The evidence of Chinese doctors in Hong Kong corroborates this statement. By some it is regarded as a specific in ringworm and leprosy.

It is, however, to its use as an agent in criminal poisoning that this plant owes its notoriety. It seems to have perplexed coroners in repeated cases that occurred in this colony between 1867 and 1871.

In 1872, application was made to the Director of the Botanical Gardens, by Dr. Richard Young, the then Superintendent of the Government Civil Hospital, for the identification of a plant—said to have been used in a case of poisoning—which, on examination, turned out to be *Gelsemium elegans*.

We have details of four well-authenticated cases since that date; three of which occurred in Hong Kong, the fourth in Canton. The three former are dealt with by Dr. Wharry in an appendix to this paper. The 1874 case is of special interest from the fact that at the coroner's inquest evidence was given to the effect that four mace (=½ an ounce avoirdupois) of the root had been used in the preparation of the decoction, which caused the death of an adult male in two hours. The instance in 1884 possesses historical interest, from the fact that the alkaloid to which the activity of the root is due was first isolated in the laboratory of the Government Civil Hospital, and found to possess characters distinct enough to allow of its detection by chemical means in toxicological investigations.

The following particulars of the Canton tragedy, and of the fate that met the female who was alleged to have poisoned four people, are taken from a translation of the Chinese narrative of the affair by the Rev. E. R. Eichler.† The woman appears to have collected from the hills the root of the Tün ch'eung ts'ō (cut bowels grass) or Tai ts'a yip tang (great tea leaf creeper), and to have put it in a hamper in the kitchen, pending a favourable opportunity for boiling it with her *husband's* rice. While her back was turned a relative seems to have taken the root and boiled it together with some spinach in the *family* congee. With the exception of the accused all (four in number) partook of the meal and died. The woman was tried by the authorities in Canton, found guilty, and condemned to death by the Ling ch'i process, which in this instance consisted in cutting the body of the criminal into a number of pieces, four cuts being made—two on the forehead and two on the breasts—previous to piercing the heart.

* 'Pên ts'ao kang mu,' chap. xvii.

† *China Mail*, Sept. 9, 1886; see, also, letter of Government Analyst in issue of Sept. 12.

PHYSIOLOGICAL NOTE.

At Mr. Crow's request I have jotted down my experience of the Tün ch'eung ts'ō.

When I arrived in Hong Kong in February, 1873, to take charge of the Civil Hospital, I was called on to perform almost the whole of the medico-legal work of the colony, and thus speedily became acquainted with one of the uses or abuses of this plant.

In 1873, I had to examine the bodies of several women who had committed suicide with it, and I learned that the plant was well known to the Chinese, especially to the women who cut grass on the hill sides.

Having no previous knowledge of the plant, and finding no mention of it or its properties in works on materia medica or toxicology, I procured specimens and administered a fresh extract of the leaves, stem and root, to several dogs.

They all died; the poison rapidly taking effect, and producing giddiness, loss of power in the hind legs, convulsions and death.

Early in 1874 a Chinese *soi-disant* doctor was convicted of manslaughter for having with fatal effect administered a decoction of Tün ch'eung ts'ō to a Chinese shopman aged about thirty years.

It appeared from the evidence at the inquest that deceased ate a hearty breakfact at 10 a.m. and took a decoction of Tün ch'eung ts'ō at about 3.30 p.m., became giddy, with dimness of sight, loss of power in limbs, irregular breathing, and died in about two hours.

The body was examined eighteen hours after death. "Face somewhat livid; expression disturbed; pupils of fair size, conjunctivæ injected; lips and gums purple; bloody froth running from nose; under surface of body livid.

"Heart, both sides nearly empty; containing a little dark fluid blood, no clots, healthy; lungs slightly congested, trachœa and bronchi containing bloody froth. Kidneys much congested. Stomach and intestines congested. Brain-vessels full of dark fluid blood, otherwise normal. Spinal cord not examined."

In January, 1884, a Chinese (engineer of a launch), aged about thirty-five years, and his daughter aged about six years, were poisoned, presumably by the wife. At the inquest the wife stated that after partaking of tea, etc., which she had prepared, her husband and daughter became giddy and fell down insensible.

About five hours after death, the man's pupils were dilated, and there was considerable congestion of the dependent side of the head and neck: the lower side of the trunk was less congested, and the legs not at all: the conjunctivæ were injected, the lower one most. I was not present at the *post-mortem* dissection in this case, and no record of it was kept.

Mr. Crow obtained an alkaloidal extract from the tea prepared by the wife, and I tried this on two guinea-pigs, weighing 5¼ oz. and 5½ oz. respectively, with the following results:—

12.35 p.m. About eight drops injected under skin of abdomen; disinclination to move; loss of power in hind legs; inability to hold the head up; convulsions; laboured respiration; partial paralysis of all limbs, with occasional convulsions; convulsions and convulsive breathing.

1.40. Apparently not so feeble; for some time past has kept on his belly; always returning to that position when turned over; almost continuous tremors; (removed to a warmer position), tremors still the same.

1.50. Tremors violent.

1.55. Appears stronger; less tremulous; from this time he improved and recovered completely.

In the second case, at 3.9 p.m. About twelve drops injected under skin of abdomen.

3.20. Began to lose power in extremities.

3.21. Strong convulsions; turned over nearly on to his back; stiffened out; lies on side convulsed.

3.26. Strong convulsions, continuous; (tetanic spasms).

3.35. A few feeble expiring spasms.

From my experience of this plant so far, I judge that in its physiological action it differs somewhat from *Gelsemium sempervirens*, and more nearly resembles *Strychnos nux-vomica*. With further observation, the extent of these differences may be determined, but there is no facility for this at present in the Civil Hospital.

C. J. WHARRY, M.D.

Government Civil Hospital,
Hong Kong, February 22, 1887.

2.—STRYCHNOS (NUX-VOMICA?) N.O. Loganiaceæ. 'Pên ts'ao, No. 387. Fan mu pieh, Ma chien tzŭ, K'u shih pa tou,' 'Hwo shih k'ê pa tu.

The above characters are taken from the 'Pên ts'ao.' The second appears to be the most common name in Hong Kong.

In the Chinese drug shops are to be found, under one or more of the above names, the seeds of a species of *Strychnos* which are indistinguishable from the nux vomica seeds of western pharmacies. The native merchants of Hong Kong state that the supply comes from Sze chuen.*

These seeds are much larger than those furnished by the fruits of the only two species† of *Strychnos* actually known to grow in China, and although the information given in the 'Pên ts'ao' as to the plant yielding ma chien tzŭ having been introduced—the date is not given—from some Mahommedan country, points unquestionably to *S. Nux-vomica*, we must decline to ascribe it to this particular species in the absence of more precise information.

It may not be out of place to mention here, that *S. Nux-vomica* is a widely distributed plant, being found‡ in N. Australia, India, Ceylon, Burmah, Siam, and, according to Loureiro,§ in Cochin China, where it is known as *Cay cu chi*, a name which is not unlike the Hindustani term for this plant *kuchila*.‖

The Chinese do not appear to be aware of the poisonous action of these seeds on man. In the 'Pên ts'ao,'¶ contrary to expectation, we find the plant placed in the climbing group, and not in the poisonous section, as in the case of *Gelsemium elegans*. The writer states, however, that they are reputed to have a poisonous effect on dogs, and that the tree yielding them grows in Chung Chow, in the province of Sze chuen. They are recommended to be used in colds, fevers and throat affections; also in certain cases of abdominal swellings and tumours. It appears also to have been used as a remedy in diseases of the eye, and as an agent in procuring abortion.

Among the Chinese in Canton and Hong Kong this drug finds but little favour as an internal remedy. It is mostly used externally, mixed with other drugs, in the form of powders, ointments and other preparations in the treatment of sores and skin diseases.

The authors will be glad to examine the flowers and fruit of the Sze chuen variety of strychnos yielding these seeds; the *flowers* and *leaves*, should be sent either dried between folds of bibulous paper or preserved in spirit; the *fruit* should be forwarded carefully bottled in spirit or brine.

(*To be continued.*)

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* See also F. Porter Smith, 'Contributions towards the Mat. Med. and Nat. Hist. of China' (1871), p. 156.

† *S. paniculata*, Champ., Hong Kong and adjacent continent; and *S. angustifolia*, Benth., Hong Kong.—'Flora Hongkongensis' (1861), p. 232. The seeds of these two species will be again referred to in a future paper.

‡ 'Pharmacographia' (1879), p. 428. This species is figured in Bentley and Trimen's 'Medicinal Plants' (1880), vol. iii., No. 178.

§ 'Flora Cochinchinensis' (1793), Ed. Willdenow, p. 154.

‖ Dymock, 'Materia Medica of Western India' (no date), p. 437.

¶ 'Pên ts'ao kang mu,' chap. xviii.

NOTES ON ESSENTIAL OILS.

(*Concluded from page* 870.)

Specific Gravity of the Principal Essential Oils, etc., of Commerce, according to Examination of Normal Pure Qualities.

Name of essential oil.	Temperature.			Remarks.
	10° C.	15° C.	20° C.	
Anise	—	0·985	0·980	
Anise, extra pure anethol . . .	—	—	0·985	At 25° (m. p. 21–22°)
Angelica root. .	0·860	0·858	0·853	
Valerian . . .	0·947	0·945	0·940	
Bergamott, I[a] Reg.	0·887	0·883	0·880	
Bitter almond .	1·063	1·060	1·055	Av. 1·060
Cajeput (green) .	0·927	0·925	0·922	
Calamus . . .	0·961	0·959	0·957	
Carvol	0·967	0·963	0·958	„ 0·962-0·965
Cassia (cinnamon flowers) . . .	1·073	1·068	1·063	
Cassia (rect.) . .	1·058	1·055	1·052	„ 1·05-1·06
Cedar-wood . .	0·948	0·945	0·940	
Cardamom (Ceyl.)	0·902	0·900	0·897	
Citronella (E. I., melissa . . .	0·900	0·896	0·893	
Lemon	0·856	0·854	0·851	
Cumin	0·925	0·922	0·918	
Cubeb	0·918	3·915	0·912	
Coriander . . .	0·872	0·867	0·864	„ 0·860-0·870
Eucalyptol p. alb.	0·935	0·931	0·928	
Eucalyptus (glob.)	0·925	0·922	0·918	
Dill	0·905	0·900	0·896	
Fennel seed, rect.	0·975	0·970	0·965	„ 0·965-0·975
Ginger	0·885	0·882	0·878	
Spearmint, German, rect. . .	0·930	0·925	0·922	
Caraway, double rect., from Germ. field caraways .	0·905	0·900	0·896	
Caraway, double rect., from Dutch caraways . . .	0·911	0·908	0·905	
Mace	0·858	0·855	0·852	
Mirbane . . .	—	—	1·200	
Clove stalks . .	1·065	1·061	1·057	„ 1·060-1·065
Cloves	1·065	1·062	1·059	„ 1·060-1·065
Peppermint, F. S. and Co. .	0·906	0·903	0·901	„ 0·900-0·910
„ Mitcham . .	0·905	0 900	0·898	„ 0·900-0·905
Safrol	1·109	1·104	1·100	
Sassafras . . .	1·068	0·065	1·060	„ 1·05 1·07
Mustard, gen. ess.	1·030	1·025	1·020	
Mustard, artificial	1·025	1·020	1·016	
Sandal-wood (super. E. I.) .	0·978	0·975	0·973	
Star-anise . . .	0·990	0·985	0·980	
Juniper (db. rect.)	0·863	0·858	0·855	
Wintergreen (nat.)	1·189	1·185	1·182	
Wintergreen (art.)	1·192	1·187	1·183	
Cinnamon, Ceyl. .	1·035	1·030	1·027	„ 1·03-1·035

Variations in the above figures may occur in the third place of decimals, without suspicion of sophistication being justified on that account, but greater deficiences are excluded.

The following paragraphs refer to some new essential oils:—

Asarum Oil.—A distillate from the root of *Asarum Europæum*. Three hundred and fifty-two kilos gave 3·8 kilos of essential oil, containing a considerable quantity of asarum camphor (asaron), which partially separated at the ordinary temperature. It has recently been investigated by Professor Poleck, of Breslau (*Pharm. Journ.*, [3], xv., 82).

Poplar-buds Oil (*Ol. gemmæ populi*).—A distillate from dried poplar buds. Yield of oil about one-half per cent. A light yellow ethereal oil, having a beautiful odour, somewhat recalling that of chamomiles. It boils almost constant between 255° and 265° C., and has a sp. gr. at 15° C. of 0·900.

Southernwood Oil (Ol. Artemisiæ).—Distillate from the herb of *Artemisia Abrotanum.*

Southernwood Root Oil (Ol. Rad. Artemisæ).—Distillate from the root of *Artemisia Abrotanum.*

Cloverroot Oil (Ol. Rad. Caryophyllatæ).—Distillate from the root of *Geum urbanum.* This is described as an oil having an extremely fine and agreeable cinnamon-like odour, and a spicy taste, from which crystalline constituents separate. It is thought that if it can be prepared at a low price it would prove practically useful.

Pimpinella Oil (Ol. Rad. Pimpinellæ).—Distillate from the root of *Pimpinella Saxifraga.* Has the taste and odour of the root.

From Japan have been received the two following essential oils :—

Kiku Leaves Oil.—A colourless oil, having a camphoraceous odour, somewhat recalling that of eucalyptus oil. It would not appear, however, to be specially useful, since this kind of odour is already exceedingly well represented. Sp. gr. 0·885 ; boiling point 165–175° C.

Kiku Flowers Oil.—A colourless oil, with a not unpleasant odour, which might find use if obtainable at a low price. The first portion that distils over at 180° C. has a fragrant agreeable odour ; the further fractions which pass over up to 220° C. are camphoraceous and not specially pleasant. The botanical name of the plant from which these two oils are derived is not yet known.

Massoy Oil.—Messrs. Schimmel have also received from New Guinea a specimen of the aromatic massoy bark, which is very rich in an essential oil having an odour recalling those of cinnamon and sassafras. It has recently been pointed out by Professor Flückiger that although this bark was known to Rumphius in 1680, it is at present forgotten in Europe. The tree from which it is derived is one of the Lauraceæ, and grows in southern New Guinea. It has deen described by Beccari, under the name *Massoia aromatica*, the new genus standing between *Cryptocarya*, *Ravensara* and *Sassafras.*

Borneol.—According to experts borneol may find employment in perfumery. Its odour is said to have some resemblance to that of ambergris. Should it come into demand it could be produced cheaply, the artificial borneol not being distinguishable from the natural.

Coumarin.—Each kilogram of coumarin is said to represent the aroma of 60 kilos of fine tonka beans, and the compound is claimed to present advantages over all other coumarin drugs. Next to tonka beans in strength of aroma comes the "wild vanilla," consisting of the leaves of *Liatris odoratissima.*

Eucalyptol.—This compound has been used during the last few months, especially in France, as a subcutaneous injection in the treatment of phthisis (see before p. 803), a purpose for which a pure preparation is essential. It may be purified by Wallich's method, which consists in passing into the crude eucalyptol, placed in a freezing mixture, a current of hydrochloric acid gas ; this causes it to solidify to a crystalline paste, which when pressed, dried, decomposed with water, and rectified yields a product with a constant boiling point at 176° C., and a specific gravity of 0 930 at 15° C. By the use of a freezing mixture it can be obtained in beautiful long needles, melting at about −1° C., and this property is recommended as the best evidence of purity. It is colourless, has a pure camphoraceous odour, and should dissolve without residue in the liquid paraffin, which would indicate its freedom from water.

Heliotropin.—This synthetic compound is affirmed to be superior to all mixtures for imitating the delicate and unstable odour of the heliotrope, and to be comparable to the flowers. Among other uses it is introduced into mouth washes, in which it is said to act as an antiseptic.

Thymol.—It is reported that thymol is now used in the United States in the preparation of dry plates for photographers.

MEDICATED TABLETS.*

BY G. H. DUBELLE, PH.D.

Medicated tablets enter largely into the stock of the druggist, and contribute in no small degree to the general profits of his business. I have thought it to be expedient, therefore, to publish in the following certain directions for their manufacture, which, when strictly followed, can be relied on.

I shall first commence with the ingredients which enter into their composition, with some hints as to their proper selection when not well known as to quality ; their making, mixing and working, and afterwards will give a number of formulas for the production of various kinds of tablets.

Sugar.—As sugar is the basis in the making of these tablets, it is essentially necessary to study carefully and observe the difference in its qualities, the changes which it undergoes, or effects, when combined with other ingredients in the process of manufacturing medicated tablets. The best refined sugar should be white, dry and of a brilliant appearance when broken, and as close in texture as possible.

Chocolate.—The French vanilla chocolate is, in general, the most esteemed. Good chocolate should be of a clear red brown. As the colour is paler and darker, so is the article more or less good. The surface should be smooth and shining. If this gloss comes off by touching, it indicates an inferior quality, and it is probably adulterated. When broken, it ought to be compact and close, and not appear crumbly. It should melt gently in the mouth when eaten, leaving no roughness or astringency, but rather a cooling sensation, on the tongue. The latter is a certain sign of its being genuine.

Extract of Liquorice.—It is of the greatest importance that this should be strictly pure and of the finest quality. For preparing the same refer to any pharmacopœia.

Extract of Malt.—In establishments where this is manufactured on a large scale, the liquid extract of malt (1-5) is made by water-bath percolation, at a temperature of 170° F. The percolate is filtered and evaporated as quickly as possible.

Flower Conserves.—Convert 1 part of fresh leaves of any flower into paste by rubbing same with a marble pestle in a marble mortar, and then work 2 parts of powdered white sugar into it. Place in jars with air-tight covers. Fruit conserves are made in the same way.

Mucilage.—Dissolve, by the aid of heat, 1 part of gum arabic in 2 parts of water, and when solution is effected add 1-16 part of glycerin.

Drugs and Essences.—It is hardly necessary to mention that only first class goods should be used ; therefore great care must be taken in the selection.

Mixing the Ingredients.—In making the medicated tablets the different ingredients should be well mixed with the sugar, in order that each tablet may have its due portion. If this is not attended to the perfect distribution of the compound parts cannot be depended upon, and one tablet may contain double or treble the quantity of medicinal matter it ought to have, whilst others contain comparatively none ; therefore those that have the greatest portion may often prove injurious by acting contrary to what was intended.

Making of Tablets.—Make a "bay" with the prepared sugar (medicated, fruit, conserve) on a marble slab, into which pour the mucilage by degrees, and mix thoroughly into a paste, flavouring the mass with the flavouring extract. Some makers prefer mixing the mucilage and

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* From the *Druggists' Circular*, March.

prepared sugar together at first in a mortar, but as it is indifferent which way is pursued, that may be followed which is most convenient. Roll out the paste on a marble slab until it has the required thickness, using starch powder to dust it with to prevent the sticking to the slab and pin. Before pressing them out strew or dash over the surface with powder, mixed with sifted sugar, and rub it over with the heel of the hand, which gives it a smooth face. This operation is termed "facing up." Brush this off and again dust the surface with starch powder, cut out square tablets of 15 grains and place in wooden trays. Put them in the hot closet to dry. All tablets are finished in the same manner.

Hot Closet.—This is a useful and indispensable appendage in manufacturing tablets, etc.; it is generally constructed like a cupboard in the recess of a wall. The walls or sides should be composed of bricks or wood lined with tin or sheet iron to retain the heat, with pieces of wood nailed or fastened in the sides, about four inches asunder, to form a groove for trays or boards to rest on, which is necessary for the drying of tablets, etc.; there should be a few shifting shelves, and the door must be made to shut close, with a small door at the top to let out any excess of heat. It may be heated by means of many of the modern gas stoves.

Almond Blossom Tablets.

	Parts.
Powdered double-refined sugar	600
Almond blossom conserve	300
Mucilage	70
Extract of almond blossom	30

Asthma Tablets.

	Parts.
Powdered double-refined sugar	600
Extract of grindelia robusta	150
Extract of yerba santa	150
Mucilage	70
Tincture of tolu	30

Bronchine Tablets.

	Parts.
Powdered double-refined sugar	600
Extract of liquorice	220
Powdered cubebs	80
Mucilage	70
Tincture of tolu	10

Catarrh Tablets.

	Parts.
Powdered double-refined sugar	600
Extract of liquorice	120
Mucilage	70
Powdered senna leaves	60
Powdered anise seed	60
Flowers of sulphur	60
Essence of fennel	30

Catechu Tablets.

	Parts.
Powdered double-refined sugar	700
Powdered catechu	120
Mucilage	70
Powdered orris root	60
Powdered vanilla	20
Triple extract of roses	10

Cachousin Tablets.

	Parts.
Powdered double-refined sugar	400
Powdered vanilla chocolate	400
Powdered willow charcoal	100
Mucilage	70
Tincture of cinnamon	20

Cherry Blossom Tablets.

	Parts.
Powdered double-refined sugar	600
Morella cherry fruit conserve	300
Mucilage	70
Extract of cherry blossom	30

Citrine Tablets.

	Parts
Powdered double-refined sugar	600
Powdered citric acid	300
Mucilage	70
Essence of lemon	30

Coca-Malt Tablets.

	Parts
Powdered double-refined sugar	600
Extract of coca	120
Extract of malt	120
Mucilage	70
Rose conserve	60
Extract of orange flower	20
Triple extract of roses	10

Constipation Tablets.

	Parts.
Powdered double-refined sugar	300
Powdered vanilla chocolate	300
Calcined magnesia	300
Mucilage	70
Tincture of vanilla	20
Essence of cinnamon	10

Digestive Tablets.

	Parts.
Powdered double-refined sugar	600
Subnitrate of bismuth	120
Saccharated pepsin	90
Pancreatin	90
Mucilage	70
Essence of aromatic spice	30

Dyspepsia Tablets.

	Parts.
Powdered double-refined sugar	600
Powdered fennel seed	200
Powdered calamus root	100
Mucilage	70
Essence of peppermint	30

(*To be continued.*)

MEDICAL INTERESTS CONCERNED IN THE PROPOSED LEGISLATION FOR CHEMISTS.

The following article on the Pharmacy Acts Amendment Bill appeared as an "editorial" in the *British Medical Journal* for May 7: –

"We print in another column the Bill which is being promoted in Parliament by the Pharmaceutical Society of Great Britain for the better instruction and training of pharmaceutical chemists. The Bill is a short one, and is much to the point; in its general objects there is much which the medical profession will approve, and by the realization of which the public will benefit. But, as we shall presently point out, there is some need of amendment and some reason for caution in accepting the Bill in the shape in which it is now put before the House of Commons.

"It will be well first to review the present position of pharmaceutical education and examinations, and to explain the operation of the proposed measure, and the good results which it is intended to produce.

"The chief object of the formation of the Pharmaceutical Society in 1841 was the promotion of the technical education of chemists and druggists; but, though its work has since been always in that direction, the establishment of a uniform educational system still remains unaccomplished. The Society's expenditure in maintaining courses of instruction in London by lectures and practical laboratory work has amounted to many thousands of pounds; and, in addition, considerable assistance has been rendered to educational organizations in the

provinces; but from the absence of any compulsory regulation requiring that persons intending to pursue the calling of a chemist and druggist should go through a suitable course of scientific education and technical training, the opportunities thus provided have not been very generally taken advantage of; and, as regards the provinces, it has been impossible to maintaiu pharmaceutical schools, because students could not be obtained.

"The only approach to a provision for technical training which now exists is the apprenticeship; but, for various reasons, that has proved to be insufficient for insuring the requisite education. This is most conclusively proved by the fact that out of the candidates who present themselves for examination to obtain legal qualification to carry on business, no fewer than 60 per cent. fail to pass, although they must have all been engaged for not less than three years as apprentices or pupils. The subjects of this examination are prescriptions, practical dispensing, pharmacy, materia medica, botany and chemistry. It is specially provided by the Pharmacy Act, 1852, that these examinations shall not include the theory and practice of medicine, and they are conducted under the supervision of an officer appointed by the Privy Council. Hence it is evident that systematic and efficient pharmaceutical education—the chief object of the incorporation of the Pharmaceutical Society—has yet to be provided for, and past experience shows that there is but slender reason for expecting its realization so long as the mode of attaining it remains a matter of option.

"Under this view of the subject the Society's Council has for several years past been engaged in formulating an educational scheme, and has devised Bye-laws by which it was to have been put in force. Those Bye-laws have, however, been held by the Privy Council to exceed the present powers of the Society, and consequently it has become necessary to go to Parliament for such an extension of power as will admit of an educational system being established. Should this be accomplished it is believed it would favour the establishment in various parts of the kingdom of schools at which the necessary scientific and technical instruction would be obtainable with facility and at no great expense. The present action of the Council is but a natural and necessary sequence of the policy followed by the Society from the time of its incorporation, and sanctioned from the point of view of the public interest by existing Acts of Parliament. It in no way seeks to establish a monopoly beyond that which naturally appertains to competence for the exercise of a business which so closely affects the public health and safety.

"So far, good; but when the wording of the Bill is scrutinized, certain objections occur which involve questions of great importance, such as the medical profession and the medical corporations would do ill to disregard. All the members of the pharmaceutical trade and profession are by no means so free from unjustifiable pretensions and usurpations as the members of the Council of the Pharmaceutical Society; nor do the opinions or practice of the members of that Council, which we assume to be immaculate in respect to counter prescribing, medical practice and medical visiting, either govern or even influence a very large proportion of the members. In this respect, indeed, the Council has never attempted, we believe, to exercise, even if it possess, any restraining powers; nor is it likely that it ever will attempt to do so, or that the majority of its members would allow it to do so if it wished. It follows, that any step must be viewed with great suspicion which gives a parliamentary or public sanction to the extension of quasi-medical teaching to a body of men who, without medical training, are in fact inclined only too largely and too frequently to usurp medical functions to the grievous danger and injury of the deluded persons who are already too much disposed to identify every druggist's blue and red bottles as the insignia of "a doctor's shop," and to flock there accordingly, for a little cheap and perilous doctoring. If now we examine the clauses of this well intentioned Bill, we see that it proposes to require certificates of a curriculum including courses of chemistry, botany, and materia medica. Materia medica is a very elastic term; it frequently includes, and may easily be made to include, a large mass of medical and therapeutic principles and details; very useful and essential additions to the anatomical, physiological, pathological, and clinical basis of a medical education, but very useless, and even very dangerous, to a person who has not received that basis of instruction, and who is not intended for the medical profession. In the Pharmacy Act of 1852, to which the Bill is an amendment, it is, as we have said, provided that the examinations of the Pharmaceutical Society shall not include the theory and practice of medicine, and an inspecting physician is appointed by the Privy Council whose business it is, among other things, to see that this restriction is not infringed. It seems to us obviously necessary that a like restriction be introduced into the provisions as to the curriculum of education in preparation for that examination which this amending Bill proposes to lay down and to make compulsory.

"Moreover, the use of the word materia medica in such a connection is likely to be ambiguous, and therefore misleading. We assume that what is meant by the promoters of the Bill is instruction in the physical, chemical, and pharmaceutical characters of the drugs. This is, we believe, more correctly expressed by the word Pharmacognosy; but it would probably be better to use words defining and stating in plain English the character and scope of the instruction to be given.

"There is one other point to which attention should be given. Unrestricted and unqualified power is given to the Council of the Pharmaceutical Society to dispense with the whole or any part of the curriculum which the Bill declares to be necessary, and purports to make obligatory. This is a little too sweeping.

"Assuming, as is involved in the premisses of the Bill, that such a curriculum is necessary and of public utility, the body which will hereafter regulate the curriculum, conduct the examinations, and receive the fees, should not possess this large power of uncontrolled dispensation. It is obvious that the Privy Council should retain and exercise the powers, first, of approving the details of the scheme of lectures and of the curriculum; and secondly, of revising the discretion of the Council in exercising its dispensing and annulling powers.

"Under all these headings, representations will be made to the Privy Council and to the General Medical Council by the Chairman of the Parliamentary Bills Committee of the British Medical Association, and Mr. Ernest Hart is already in communication with the authorities on the subject, in accordance with the views of that Committee. The General Medical Council, which is a "Council of education and registration," is very shy of going outside its dry official duties; but possibly it may think that the introduction of a Parliamentary Bill for the construction of what may easily be converted into a system of imperfect and quasi-medical education of a class of gentlemen already too much disposed to presume mischievously on their supposed medical knowledge may be fairly held to come within their purview as the guardian of medical education. We commend the subject to their notice and to that of the profession. The Apothecaries' Society has a direct interest and duty in relation to this matter, and it might, we think, add to its usefulness to the profession and the public by assisting us to take measures in this matter *ne quid medicinæ respublica detrimenti capiat.*"

The Pharmaceutical Journal.

SATURDAY, MAY 14, 1887.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE PHARMACY ACTS AMENDMENT BILL FROM A MEDICAL POINT OF VIEW.

CONSIDERING the intimate relations existing between the practice of pharmacy and the medical profession it is, in a general way, satisfactory to find pharmaceutical affairs receiving attention from a medical point of view, as it appears, from a leading article in the *British Medical Journal* of last week, is the case with regard to the Pharmacy Acts Amendment Bill before Parliament. As this article offers many points of interest for the consideration of our readers we have reprinted it in order that it may not escape their attention. In referring to the object and principle of the Bill they are described as presenting much that will be approved of by the medical profession, and that would be beneficial to the public. The general position of the Pharmaceutical Society in regard to the promotion of education is fairly stated in a *résumé* of the work that it has done with that object, of the degree of success already achieved, and of the necessity that has been found to exist for bringing more direct influence to bear upon pharmaceutical students to ensure their better instruction and training. We feel sure that all members of the Society who take an active interest in its work and progress will read this portion of the article with a grateful sense of satisfaction that the Society's position has been so justly appreciated by a representative of the medical profession. But in other parts of the article it will be seen that there is some danger of misunderstanding as to the real intention and possible effects of the measure before the House of Commons. While recognizing that the chief object of the formation of the Society was the promotion of the technical education of chemists and druggists, and that the present action of the Council in seeking increased powers to that end is but the natural sequence of the Society's previous work, the opinion is expressed that there is some reason for caution in accepting the Bill in the shape in which it is now put before the House, and that, as judged from a medical point of view, it requires some amendment. The reasons assigned for this opinion are, we think, to a very great extent, not such as will be found on consideration to support it as far as the Society is concerned, but they merit attention inasmuch as they throw a light upon the causes of that feeling of jealousy which in this country too frequently stands in the way of harmonious relations between medical men and pharmacists. In the first place it is urged that by no means all the members of the pharmaceutical body are free from liability to be charged with what are described as unjustifiable pretensions and usurpations, and under these terms there is no difficulty in recognizing reference to the practice of counter prescribing and medical visiting. So far as the members of the Society are concerned it is indeed assumed by our contemporary that they are immaculate in these respects, but at the same time this admission is qualified by the remark that a very large proportion of those in the trade are not governed or even influenced by the opinions or the practice of the Council. Whatever amount of justice there may be in these remarks we may at least point out that the mischief wrought by the "doctor's shop" cannot be laid at the door of the pharmacist; but red and blue bottles, which are its delusive insignia, are in no small degree a cause of heartburning to chemists and druggists, and even a potent provocation to engage in practices they might otherwise be willing to avoid. But it is unnecessary here to refer more particularly to the confusion of pharmaceutical and medical functions which is the source of so much discontent on both sides, except for the sake of pointing out that on this occasion again it has given rise to a feeling of suspicion as to the Bill now before Parliament.

The most important of the suggestions offered by our contemporary as to the need for amendment of the Bill is founded upon this basis of suspicion, that the measure might pave the way to interference with the functions of medical men, and that if passed, its provisions might be made use of in order to justify practices which medical men regard as unjustifiable, and that have never been defended or upheld by the Pharmaceutical Society. Fortunately, that basis is as shadowy and unreal as suspicion commonly is—materia medica is the term which has served to create this alarm. It figures in the list of subjects for the study of which the Pharmaceutical Society now seeks to obtain power to lay down regulations. True, this subject has always formed a part of the course of study required of pharmaceutical students, and in the regulations of the Board of Examiners, published in the Society's Calendar, the definition of its scope is sufficiently precise to make it evident that it is a natural and indeed necessary part of the competent practical knowledge which the Pharmacy Act declares that persons known as chemists and druggists must possess. But our contemporary, looking at the term materia medica from a medical point of view, not unnaturally remembers that in the medical schools attached to hospitals it comprises—if it does not specially denote—therapeutics. At any rate, he

considers materia medica a very elastic term that might easily be made to cover the teaching of many matters appertaining to the practice of medicine. It is for this reason only that it is held that any step giving parliamentary sanction to an extended system of teaching a body of men, some of whom are inclined to usurp medical functions, must be viewed with suspicion. As we have shown already, this is a purely imaginative reason, and that to some extent that has been perceived would appear from the subsequent reference to the provisions of the Pharmacy Act, 1852, that the Society's examinations shall not include the theory and practice of medicine, surgery or midwifery. Those provisions would, we apprehend, govern any regulations to be made in accordance with the terms of the Bill now before Parliament, just in the same manner that they apply now to the examinations held under the Act of 1868. It may therefore be taken as certain, that so far as the article in the *British Medical Journal* has in this respect pointed to any need for amendment of the Bill, it has been under misapprehension of the real facts of the case.

We understand that some members of the medical profession entertain the opinion that the Society's Bill would have the effect of creating a monopoly in pharmaceutical teaching, and would impose upon young men the necessity of coming up to London or going to some large town where they would have an opportunity of attending courses of instruction and lectures. We fail to perceive in what respect this necessity, if it existed, could be urged as an objection to the powers which the Society now seeks to obtain. If it be admitted that the knowledge of certain subjects specified in the present Pharmacy Acts is necessary for chemists and druggists, and we have not yet heard this disputed, it is clearly expedient that persons who seek qualification under the Act should have adequate opportunity of obtaining the required knowledge. At the present time they either have not had such opportunities or they have not taken advantage of them. This is demonstrated by the failures in the examination, and apparently the only natural inference is that the attendance of courses of instruction must be made compulsory. If it could be shown that the persons presenting themselves for qualification possessed the necessary knowledge it might be contended that it was of secondary importance how it was acquired; but experience has proved just the contrary, that with the majority there is neither a sense of the need for instruction nor the desire to obtain it in any way, the only idea being to obtain qualification. It is under this state of things that young men are subjected to the hardship of being mulct in expenses of repeated examination and continued renewal of that superficial preparation for it which now does duty in the place of real instruction. One of the first consequences of the passing of this Bill may be expected to be the provision of opportunities for instruction all over the country, and those who place their sons as apprentices will naturally take care to ascertain that they do so where the necessary opportunities for instruction can be obtained. Under existing conditions, there can be no hope of such opportunities for instruction being provided at all in very many places, and even in large towns it is almost a matter of accident that this can be done. In most instances where it has been attempted the result has been failure, and these undoubted facts constitute an argument in favour of the Society's Bill, to which there has not as yet been any kind of valid objection raised.

This being the last opportunity we shall have before the dinner to be held in aid of the Benevolent Fund, we have been requested to state that up to the present time the number of donors who have announced their intention to contribute to the Fund amounts to only 161. If the collection of a sum comparable with the previous decennial collections is to be realised on the present occasion, the contributions already sent in to the Secretary will require to be largely supplemented, and as it is desired to prepare a list of donors and donations to be read at the Dinner, those who intend to contribute should do so without delay.

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A meeting of the Subscribers to the Redwood Testimonial Fund will be held on Wednesday next, May 18, at 4 p.m., at 17, Bloomsbury Square, when the portrait of Emeritus-Professor Redwood, painted by Mr. Sydney Hodges, will be presented to the Pharmaceutical Society on behalf of the Subcribers by Dr. A. B. Garrod, F.R.S., F.R.C.P.

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The discussion in the House of Commons on the motion to go into Committee on the Pharmacy Acts Amendment Bill has been further adjourned until Tuesday, the 14th of June.

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Attention is directed to the official announcement on page 934 respecting the Silver Medal which will be awarded next year for the best herbarium collected by an Apprentice or Student of the Pharmaceutical Society, in any part of the United Kingdom, between the first day of January, 1887, and the first day of July, 1888.

* * *

We have received a letter from a correspondent requesting to be permitted to advocate the claims of one of the candidates for membership of the Council, on the ground of his especial fitness for redressing the crying grievances which pharmacists labour under. Although it is assumed by our correspondent that "the present venerable Council is either incapable or unwilling to consider" these grievances, we cannot depart from the established rule of this Journal never to take any part in the endeavour to influence the Council elections. The power to do that is in the hands of the members, and if they abstain from or neglect the exercise of their constitutional privileges in this respect the fault is their own. But we may add that it seems absurd to assume that a body constituted, as the Council is, of members

from all parts of the kingdom, would ignore any grievances affecting their constituents with which there is any reasonable prospect of being able to deal successfully. Notwithstanding occasional vague talk of combined and sustained effort to redress certain grievances, such as that of the unfair competition of bogus companies and stores, there is still a total absence of any clear indication of the means by which such a result is to be effected. At any rate the idea that protective legislation can be looked for because the spirit of the Pharmacy Act of 1868 is assumed to establish a claim to protection, is one that we cannot perceive any ground for.

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In reference to the possibly impending dissolution of the Chemists and Druggists' Trade Association, a suggestion has been forwarded to us that the Pharmaceutical Society might take in hand to continue the work of the Association as a distinct department, and charging non-members a five-shilling subscription. The reasons assigned for this proposition are the assumption that the work could be done cheaper at Bloomsbury Square than by a totally independent organization, and the belief that such a course would tend to make the Society much more popular with the trade. Though we believe this view has been expressed with all sincerity, we are quite unable to concur with it, for apart from the great difference between the work of the Society and that properly appertaining to such a body as the Trade Association, the experience of the latter body has not been so favourable as to excite any keen desire to assume its functions. Though the Pharmaceutical Society has itself much reason to complain of deficient support from members of the trade, the fact of its appealing to higher sentiments than immediate regard for direct trade interests may be a reason that this is the case; but it is most discouraging to observe that an association which lays itself out especially for the protection of trade interests should have met with at least an equal want of support from more than a mere fraction of the trade. If it were not that this has been the case in such a marked degree it might probably have been the most feasible plan for the officers of the Association to continue the work of that body on the basis of a limited liability company. With the general support of the members of the trade and a five-shilling subscription that ought to be possible with a body numbering probably ten thousand individuals actually engaged in business.

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By the courtesy of the Registrar to the Medical Council we are in receipt of copies of "The Medical Register" and "The Dentists Register" for 1887, which are now ready. Both of the Registers, we are informed, have been subjected to the most thorough revision, and no effort has been spared to make them complete. In the introductory part of the Medical Register the Medical Act of 1886 has now been added to the earlier Acts, and there is also a table showing the qualifications in Sanitary Science which have become registrable under this new statute. It also includes the usual statistical information, from which we learn that the total number of names on the Medical Register at the beginning of the year was 26,452, or an increase of 454 on that of the previous year. A new table has been introduced, showing the number of practitioners resident in each division of the United Kingdom. The Dentists Register now contains 5207 names.

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According to Mr. Consul Sharpe, the adoption in Costa Rica of the decimal metric system, which came into force in July last, has been effected without trouble, the country people having readily accustomed themselves to the new weights and measures.

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The camphor trade in Formosa, which had almost become extinct, has recently been taken under the protection of the Chinese authorities as a government monopoly. Mr. Consul Giles states that for some years the collection has been so scattered that it has been impossible to obtain camphor in Formosa in remunerative quantities; the Government has therefore now undertaken to establish fixed depôts for receiving the scattered supplies, which will be paid for at a certain rate and resold at a fair profit for export.

* * *

The controversy on the subject of the testing of quinine sulphate which has of late been so actively carried on has just received a further addition in the shape of an article by Dr. O. Hesse, which is published in the current number of the *Pharmaceutische Zeitung*. In this article Dr. Hesse reviews the several methods of testing which have been suggested by de Vrij, Paul and Schafer. We hope soon to have an opportunity of publishing a translation of the article in this Journal.

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At the next meeting of the Chemical Society, to be held on Thursday, May 19, papers will be read on "The Formation of Hyponitrites," by Wyndham R. Dunstan and T. S. Dymond; "Ozone from Pure Oxygen," by W. A. Shenstone and J. T. Cundall; "Thermal Results of Neutralization, and their Bearing on the Nature of Solution and the Theory of Residual Valency," by S. U. Pickering; and "The Action of Metallic Alkylates on Mixtures of Ethereal Salts and Alcohols," by Professor Purdie.

* * *

An extra meeting of the London Section of the Society of Chemical Industry will be held in the Chemical Society's Rooms, Burlington House, on Monday, the 16th inst., when the papers under consideration will be a "Note on the Action of Zinc Chloride on Castor Oil," by Dr. C. R. A. Wright; "New Methods of Estimating Moisture in Superphosphates and Similar Fertilizers," by Mr. J. Ruffle; and "Further Notes on English grown Tobacco," by Mr. A. Wingham.

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The next meeting of the School of Pharmacy Students' Association will take place on Thursday, May 19, when a paper will be read on "Butyl-Chloral Hydrate," by Mr. J. J. Thomas, and Mr. J. G. Tingle will give a Report on Analytical Chemistry.

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A botanical excursion, in connection with the Manchester Pharmacy Students' Association, to the neighbourhood of Blackstone Edge and Hollingworth Lake, has been fixed for Saturday afternoon next, the 21st inst.

Transactions of the Pharmaceutical Society.

BOTANICAL PRIZE FOR 1888.

A Silver Council Medal is offered for the best Herbarium, collected in any part of the United Kingdom, between the first day of January, 1887, and the first day of July, 1888; and should there be more than one collection possessing such an amount of merit as to entitle the collector to reward, a second prize, consisting of a Bronze Medal, and also Certificates of Honour and Merit, will be given at the discretion of the Council. In the event of none of the collections possessing sufficient merit to justify the Council in awarding medals or certificates, none will be given.

Competitors must be Apprentices or Students of the Society, and under twenty-one years of age.

The collection must consist of phanerogamous plants and ferns, arranged according to the natural system adopted in some work on British Botany (such as that of Babington or Hooker), and be accompanied by lists arranged according to the same method.

Each collection must contain not less than 300 specimens, and the name of each plant, its habitat, and the date of collection must be stated on the paper on which it is mounted.

Each collection must be accompanied by a note, containing a declaration, signed by the collector, and certified by his employer, or a pharmaceutical chemist to whom the collector is known, to the following effect:—The specimens which accompany this note were collected by myself, between the first day of January, 1887, and the first day of July, 1888, and were named and arranged without any other assistance than that derived from books.

The merits of the collections will be estimated not so much by the number of plants as by the correctness with which they are named, and by their being typical specimens. The manner in which they are preserved and mounted will also be taken into account.

The collections must be forwarded to the Secretary of the Society, 17, Bloomsbury Square, so that they may be received by him not later than the first day of July, 1888, indorsed "Herbarium for Competition for the Prize." After the Prize Distribution in October collections will be retained one month, under the care of the Curator of the Museums, and then returned to the collectors, if required.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly meeting of the Council was held on Wednesday, the 4th instant, at the Society's Rooms, No. 4, Harcourt Street, Dublin, at three o'clock.

The President, Mr. William N. Allen, in the chair.

The other members of the Council present were Messrs. Brunker, Hodgson (Treasurer), Pring, Grindley, Wells, Ray, Simpson, Dr. Evans, Professor Tichborne and Dr. Collins.

The first business on the paper was the adjourned discussion on the following motion which had been proposed by Mr. Brunker and seconded by Mr. Wells on the last day of meeting:—"That the regulations laid down for attendance on a course of practical chemistry be amended as follows:—For the words 'been present at least three-fourths of the working days of said course,' read 'actually worked at the bench for one hundred hours during said course.'"

The President said that as it was admitted that the length of time spent in working at the bench should be increased, the discussion might now be fairly confined to the extent to which that should be done.

Dr. Evans: Would it not be well to go on with some of the other business on the paper first, in order to give members time to come in?

The President: We have a rule that the business must be taken in the order in which it appears on the paper.

Mr. Wells: We should not forget that members ran away on the last day. They ought to be here now.

The President ruled that the discussion of the motion should go on.

Mr. Grindley observed that at the time the existing regulation was made the Council was not aware that a certificate in practical chemistry could be taken out by the student in the short time that it was now known it could be done. The Government Visitor had also reported very strongly that some alteration should be made in the existing rule.

Dr. Evans said that in the Caermichael School the summer course consisted of thirty-six days of two hours each, and it lasted three months; and if any candidate attended three-fourths of the course he got his certificate.

The President: Mr. Pring, can you give us any information?

Mr. Pring said there was a very good evening school in Belfast—that of Mr. Barclay. He examined his pupils very carefully, and as a rule they passed very fair examinations in chemistry. He could not tell the number of hours they had to put in.

Mr. Wells said a statement of his that young men in Belfast attended six nights in the week at practical chemistry had been contradicted. He was in a position to state that Mr. Speers, in Holywood, near Belfast, had a laboratory open on five nights of the week from six o'clock until ten. On those nights he attended himself; and on the remaining sixth night any pupil could get the key and work in the laboratory. He (Mr. Wells) spoke from the experience of a young man in his employment.

Professor Tichborne rose to order. He appealed to the good taste of Mr. Wells whether it would not be better to discuss this question on its own merits, without going into the merits of individual schools.

The President: I think Mr. Wells is perfectly in order. What he has been saying is in reply to a question of mine as to what rule has been observed in different schools.

Mr. Wells said the school of the gentleman he had named was not one of those recognized by the Society: but several young men who learned their chemistry in it had passed very creditable examinations.

Professor Tichborne: Why did we not recognize it?

Mr. Wells: He never asked us.

Mr. Pring: I rather think he did, and that we refused him.

The President said it was not the Society, but the Privy Council that refused to recognize the school.

Mr. Wells said the school which the Society did recognize in Belfast, namely, the Workman's Institute, was open on three nights in the week from seven till ten o'clock, for three months. It had been said that it would not be possible for a young man to put in the number of hours required by the resolution unless he had longer than three months. But that was not the question. The real question was, could a young man learn his chemistry in the time now prescribed? If not, let him spend six months at it if necessary. He had found from the examination papers that the young men from Belfast were well up in chemistry. That could not be said with respect to young men from other parts of the country. In two years eleven men came up from Belfast, and every one of them passed in chemistry, while only about half of the men with Dublin addresses passed in that subject during the same time.

Professor Tichborne said Mr. Brunker had stated that under the present regulation it was possible for a young man to obtain a certificate after twenty-seven hours' work. If so, it was desirable to define a different time

but it was a serious thing to spring from a minimum of twenty-seven hours to a hundred hours. A very undesirable result of such a change would be to impose greater expense and difficulty on students, and oblige them to spend a longer time in the large towns, where they would have to study, and make them gravitate more towards Dublin than they should. The object of the Society's Act of Parliament, as appeared by its preamble, was to increase the number of persons qualified to compound prescriptions throughout the country, though not to undertake the functions of the apothecary. There were at present 300 licentiates on the Register of the Society. Of these 98 were in Dublin, 38 in Belfast, and 11 in Cork. Deducting all these from the 300 there remained 153. A great many qualified men became assistants, or took other appointments. Taking the second page of the Register at random he found that of the 39 names in it only 14 kept open shops of their own; and on the whole he found that leaving out the men settled in Dublin, Belfast and Cork there remained only 60 men for the 1920 post towns in Ireland, which gave the proportion of one qualified man to every 32 post towns. Therefore it was not desirable that they should increase the time to be spent at chemistry too much. He believed that at present Dublin was overdone. Again, the examinations were not paying. At the last examinations the Preliminary produced about £12, and that for the licence about £15. That would not pay their working expenses.

The President: It would be objectionable to allow any pecuniary considerations to weigh with us.

Professor Tichborne: I only allude to the matter incidentally.

Dr. Collins was in favour of some number of hours intermediate between one hundred and the present requirement.

Mr. Simpson said he agreed to a great extent with Professor Tichborne. If a young man attended a course of twelve weeks for three nights each week at two hours a night, that would be seventy-two hours; and if he could not in that time learn as much chemistry as the Society required, his previous education would have been very defective. He (Mr. Simpson) thought seventy hours would be long enough.

Mr. Hodgson said he considered chemistry one of the most important branches of examination, and there was no doubt that students ought to be well grounded in it. But, on the other hand, if the Council had hitherto been satisfied with a minimum of twenty-seven hours for chemical studies; and to spring from that to one hundred would be a very large increase, of which he very much questioned the prudence. But that any candidate could pass a satisfactory examination after twenty-seven hours' work was simply impossible. He would suggest seventy or seventy-five hours.

Mr. Wells said he knew of a man getting a certificate on twenty-four hours' work.

Mr. Simpson: He might have studied chemistry before he attended that course. We should not deter young men from coming to our business. We shall find it difficult to get them if we make the time too long.

Mr. Wells: I think the men coming to it are quite enough. We are overrun with chemists.

Professor Tichborne: Perhaps so in Dublin.

Mr. Wells: You would not get a man to go to a country town where he cannot get a living. How many of the post towns alluded to would support a chemist?

Mr. Brunker said the pith of the matter had not been touched in the discussion, except within the last few minutes by Mr. Simpson. When he brought this motion forward at the last meeting he said that he was not committed to one hundred hours. He was now, because he had not since heard a single good argument against that number. All the arguments that they had heard were based on the convenience of candidates or the convenience of teachers, the latter having been regarded as the most important. At the time he voted for the existing regulation he was under the impression that the student would work at practical chemistry on at least five days in the week. Now it appeared that he only worked on three days. He (Mr. Brunker) would not confine the course to three months. If the student could not put in his hundred hours in three months let him take five or six to do it. When the one hundred hours were decided upon the schools would arrange their days and hours accordingly. He had felt bound to bring this resolution forward in consequence of what the Visitor of the Privy Council had reported as to the cramming of candidates. The Council could not control men when once they were licensed; but he believed that a great many young men were acting foolishly in settling down in towns instead of seizing upon good openings in the country. The facts mentioned as to the pecuniary results of the examinations were really in his favour, because in consequence of young men not being able to pass at once they were examined twice over for the same fee. If they knew their business they would pass at the least expense to themselves and the Society. A change to one hundred hours would not be so great a jump as was represented, because the certificate on twenty-seven hours' work was only an extreme case, and he believed that the majority of young men under the present regulation put in from fifty to sixty hours.

Mr. Ray: Will this Society be the only one to fix one hundred hours?

Mr. Brunker: The English Society are trying heaven and earth to get powers to do what we have been doing for some years. Their requirements will be greater than ours, because their students will have to put in courses of materia medica and botany.

Mr. Wells: All the licensing bodies are moving in the same direction.

Mr. Simpson said it should be recollected that a considerable time was spent by the student, not at the bench, but in receiving theoretical instruction.

Mr. Wells: A young man is supposed to learn theory before he goes to the bench.

Mr. Simpson: I have never seen a case of it yet.

Mr. Wells said he himself was first taught elementary chemistry in the school in which he worked.

The President: They have it in nearly every school now.

Mr. Simpson: I would like to see the young man that will spend one hundred hours at the chemical bench before his examination.

Mr. Wells: If you come to my place I will show you a young man who spent three years at it.

Mr. Brunker: Some candidates come up with certificates of one hundred and forty and one hundred and sixty hours' attendance at practical chemistry.

Professor Tichborne moved an amendment that the time to be spent at the chemical bench be fixed at seventy-five hours. It would be enough, having regard to all the other subjects that the student had to learn.

Mr. Simpson seconded the amendment.

On a show of hands there were five for and five against the amendment.

The President gave a casting vote against it.

The original motion of Mr. Brunker was then put and carried.

Mr. Brunker moved that all certificates issued after July 1, 1887, shall be subject to the amended regulation.

Dr. Evans seconded the motion, which was unanimously agreed to.

Letters were read from the Secretaries of the Smithsonian Institution, Washington, and the Pharmaceutical Society of Great Britain, acknowledging the receipt of copies of the Society's Calendar for 1887.

A letter was read from Mr. Alfred Bride, L.P.S.I., asking for a duplicate licence in place of the one issued to him after he had passed his examination, which he said had been accidentally burned. He mentioned that the licence was absolutely necessary to him, as he was going to Australia.

The President: We cannot issue a second licence, but the Registrar can give him a letter stating that he is a licentiate, and that his licence was lost.

Dr. Evans: And stamped with the stamp of the Society?

The President: That can be done.

On the motion of Dr. Evans, seconded by Mr. Hodgson, it was ordered that a stamped letter be issued to Mr. Bride on payment of a fee of 10*s.* 6*d.*

A letter from Mr. Charles Ottagan explaining irregularities in connection with his applications for leave to present himself at the Preliminary examinations of April, 1885, and April, 1887, was pronounced satisfactory and ordered to be marked "read."

A letter was received from Messrs Wills and Wootton, of the Westminster College of Chemistry and Pharmacy, asking that that college might be placed on the list of those recognized by the Society. A number of high testimonials were enclosed.

Mr. Brunker: The only reply that can be given to that letter is that we shall not be in a position to increase our lists of recognized schools until the amended regulation as to the study of practical chemistry which has been passed to-day has been approved of by the Privy Council.

On the motion of the President, seconded by Mr. Grindley, Mr. Henry Boyers, of 1, Rathmines Terrace, County of Dublin, was elected a member.

Some financial business having been disposed of, the Council adjourned.

Proceedings of Societies in London.

CHEMICAL SOCIETY.

At a meeting of the Chemical Society on Thursday, May 5, Mr. William Crookes, F.R.S. (President), in the chair, a number of certificates were read for the first time, and the following papers were read :—

A *Contribution to the Study of Well Water.* By R. Warington, F.R.S.—The proportion of chlorine in the rain water at Rothamsted is 2 per million; the proportion of total combined nitrogen about 0·7 per million. Of 31 inches of rain, annually falling on a bare clay soil, 17 inches have evaporated and 14 inches percolated below 5 feet. Drainage chiefly occurs between October and February. The quantity of chlorine in the drainage from 5 feet of soil is the same as that in the rain, but the proportion is doubled in consequence of evaporation. The proportion of nitrogen as nitrates in the drainage water from 5 feet of bare clay soil has averaged 10·7 per million. The production of nitrates in the soil is chiefly during summer; the principal discharge of nitrates as drainage is in the autumn. When land is covered with vegetation evaporation is increased, and the winter drainage commences at a later period. Evaporation being increased, the chlorine in the drainage water may also be increased. The drainage from the Rothamsted unmanured wheat land contains 6 per million of chlorine; the drainage from the plot manured with farmyard manure, 7·3 per million. While vegetation is active no nitrates are found in the drainage water from the unmanured wheat; the nitrates reappear in autumn, after harvest. The average proportion of nitrogen as nitrates in the drainage from unmanured wheat is 3·4 per million; from wheat receiving farmyard manure, 5·8 per million. These are minimum numbers. With rain containing the amount of chlorine found at Rothamsted, the average proportion of chlorine in drainage water can hardly exceed 8 per million. The pure well waters of Harpenden contain a minimum of 4·4 of nitric nitrogen per million; this, therefore, is the average amount in the drainage water of the district. The deep wells in the chalk of Harpenden derive their main supply from a flow of underground water proceeding from north-west to south-east. Each well has besides its own local drainage. The pure well waters contain about 11 per million of chlorine; this amount does not sensibly vary throughout the year. Wells contaminated by sewage are generally at their maximum purity in October. They may show a commencement of a rise in chlorides one or two months after active autumn drainage has commenced. All through the drainage season, the effect of one month's drainage is not manifested in the well water till the following month. The maximum of chlorides in the contaminated wells occurs after the end of the drainage season—usually in March. The nitrates and chlorides increase at a nearly equal rate during the early months of the drainage season. If active drainage continues for three months, a great increase in the proportion of nitrates will usually then take place, and this relative excess of nitrates is maintained for some months. The proportion of nitrates to chlorides varies considerably in different contaminated wells. The sewage for poorly fed population yields a high proportion of chlorides to nitrates. Stable sewage furnishes apparently a high proportion of nitrates to chlorides. The old sewage contamination of deep wells is generally more or less chloric, chlorides being more permanent than nitrates. The well waters of Harpenden contain the nitrifying organism in small proportion; it is probably derived from surface soil which has fallen in. In the contaminated waters the quantity of silica is not increased, and the quantity of carbonates but little increased. Lime is considerably increased, and magnesia still more. Nitrates, chlorides and sulphates are largely increased. On comparing the low proportion of chlorine found in the pure chalk waters of Harpenden, near the edge of the London basin, with the amount found in other chalk waters, and especially with the chalk waters beneath the London clay; and considering further the proportion of chlorides which can possibly be contributed by rain: it appears highly probable that a portion of the chlorides in chalk water, and probably in the water of other strata, is derived from a residue of sea-salt remaining in the rock. The proportion of nitrates found in the waters of uncontaminated wells and springs in the permeable strata of England is fairly constant; it indicates an average loss to the soil of about 7 lbs. of nitrogen per acre per annum.

Crystals in Basic Converter Slag. By J. E. Stead and C. H. Ridsdale.—The authors describe a variety of crystals found near the centre of blocks of basic-converter slag, weighing 40–50 cwts. each, which had cooled slowly. No. 1. Large, well-formed, flat square crystals of a faint yellowish colour, consisting essentially of the phosphate $4CaO{\cdot}P_2O_5$. No. 2. Blue crystals, apparently a double calcium silicate and phosphate, $CaO{\cdot}P_2O_5$,$CaO{\cdot}SiO_2$. Vanadium protoxide was present to the extent of 1·64 per cent. No. 3. Feathery or fern-like crystals; remarkable as containing under 4 per cent. of acid oxides and over 95 per cent. of basic oxides—chiefly of calcium, magnesium, iron (protoxide and peroxide) and manganese. No. 4. Hexagonal, needle-shaped, lemon-coloured crystals, which appear to consist of about 86 per cent. $4CaO{\cdot}P_2O_5$ with 10–11 per cent. of silicates of metallic oxides. Nos. 5 and 6. Two varieties of flat black needles, the one magnetic, the other not. No. 5 consists of about 10 per cent. $CaO{\cdot}Al_2O_3$, 45 per cent. $3CaO{\cdot}Fe_3O_4$ and 33·5 per cent. $3CaO{\cdot}Fe_2O_3$. No. 6 contained about 15 per cent. $CaO{\cdot}Al_2O_3$ and 73 per cent. $3CaO{\cdot}Fe_2O_3$.

Note on the Influence of Temperature on the Heat of Dissolution of Salts in Water. By William A. Tilden, D.Sc., F.R.S.—This was a criticism of a paper by Mr. Pickering, published in the April number of the Transactions, in which that gentleman formulated his conclusion on the subject in the proposition that "the heat of dissolution of a salt increases uniformly with the temperature up to a certain point, when the rate of increase is suddenly lowered, and this fresh rate continues uniform till lowered again at some higher temperature,"

etc. The object of Dr. Tilden's paper was to show that all the probabilities, in addition to Mr. Pickering's own results, indicate that the heat of dissolution of a salt in water is a continuous function of the temperature.

The Distribution of Lead in the Brains of two Factory Operatives Dying Suddenly. By A. Wynter Blyth.—At a certain lead factory in the east of London five cases of more or less sudden death at different dates have been attributed to the effects of lead. In two of the cases the author had an opportunity of making a toxicological investigation. In the one case 24·25 mgrms. of lead sulphate was separated from the liver and 5·4 mgrms. from one kidney; there was also lead in the brain. In the second case investigated, occurring about a year after the first, the brain was more exhaustively examined, the cerebrum and cerebellum being treated separately and divided up by suitable means into white matter, kephalin, ether extract, substances soluble in cold alcohol and albuminoid residue, and the lead determined in each.

	Cerebrum, 460·8 grams.	Cerebellum, 156·2 grams.
Aqueous extract . . .	1·1 mgrms	0·4 $PbSO_4$.
White matter (kephalin-free)	—	5·0 „
Kephalin	1·5 „	6·0 „
Ether extract (from which kephthalin had been precipitated) .	—	—
Substances soluble in cold alcohol. . . .	—	—
Albuminoid residue .	40 0 „	6 0 „
	42·6	17·4

Calculated on the whole cerebrum this would amount to 99·7 mgrms., or a possible total for the whole brain of 117·1 mgrms. $PbSO_4$. There has hitherto been no reasonable hypothesis to explain the profound nervous effects of the assimilation of minute quantities of lead; but if it is allowed that lead forms definite compounds with essential portions of the nervous system, it may then be assumed that in effect it withdraws such portions from the body; in other words, the symptoms are produced, not by poisoning in the ordinary sense of the term, but rather by destruction—a destruction it may be of important nerve centres.

Researches on Silicon Compounds and their Derivatives. II. A New Chlorobromide of Silicon. By J. Emerson Reynolds, M.D., F.R.S.—In purifying a large quantity of silicon tetrabromide prepared by means of crude bromine, the author has separated a portion boiling at 140–141°, of the relative density 2·432, which analysis shows to be the chlorobromide of the formula $SiO(SiBr_3Cl)BrCl$.

ROYAL INSTITUTION.

Recent Additions to our Knowledge of Sponges.

As the last of a course of lectures upon "Recent Scientific Researches in Australasia," Dr. R. von Ledenfeld delivered a lecture at the Royal Institution on Saturday, the 7th inst., upon "Recent Additions to our Knowledge of Sponges." The lecturer did not confine himself to the sponges of Australia alone, but gave a *résumé* of the results of recent investigations on sponges, together with several new interesting details observed more especially in studying the growth of Australian sponges. With a passing reference to some peculiarities of the lower marine animals of the Australian coast, Dr. Ledenfeld remarked upon the preponderance of sponges over other forms of marine life in that part of the world. It has long been a point of discussion as to whether sponges belong to the Vegetable or Animal Kingdom, but naturalists are now generally agreed in regarding them as animals, a conclusion, the lecturer remarked, that Aristotle had also arrived at. Sponges grow in a variety of more or less irregular shapes, but it has been observed that the most regular structures occur in the calcareous species. As to colour, Dr. Ledenfeld remarked that some of the Australian sponges are of exceptionally brilliant hues, whilst others range from the black of the common sponge (*Euspongia officinalis*) to a pure white. Also it may be remarked, the sponges growing in deep water are of less decided colour and more elastic in character than those living in shallow water, and from the last-named quality are more valuable in commerce. The irregular honeycombed appearance of the sponge is due to a most complicated canal system, consisting of a series of chambers through which the water is drawn by the animal in always the same direction. The inhalent pores are very minute, and open into small subdermal cavities which communicate by means of interradial tubes with the ciliated chambers, the latter being very small ramifications of the interradial channels and in them the movement causing the current of water is maintained. From hence all fæcal and other matter is discharged through the oscula, the larger openings observed on the surface of the sponge. Dr. Ledenfeld showed the different parts of sponges by means of microscopic slides thrown on to a screen, and also the shape and arrangement of the chambers in different species. The ciliated chambers especially attracted attention. They are very small and circular, and the interior is clothed with cells very similar to the cilia cells in higher animal life. These cells are arranged around the ciliated chambers in the form of a collar, and from each cell flagella protrude which are in continual motion. These flagella, like bats' wings, are capable of being bent in only one direction, so that, in the course of their pendulum-like motion, in the movement one way the flagella are bent, whilst in the return movement they remain stiff, thus causing a current of water always flowing in one and the same direction. These ciliated chambers are easily detected in the sponge by means of a microscope, as they appear more highly coloured. After the lecturer had thus given a general outline of the structure of the sponge, he drew attention to the character of its food and its method of digestion. It is not known exactly what the sponge lives upon, but if upon other animals they must be necessarily very small, owing to the size of its inhalent pores. The sponge, like the tape-worm, has no stomach, but must absorb its food through the outer skin from matter in a soluble state, similarly to the roots of trees. This process of absorption is probably accomplished in the interradial or ciliated chambers, more probably in the former, as the latter are generally considered excretory in function. Lime or silica must also be absorbed from the water by most sponges in order to make up the skeleton. The skeleton of calcareous sponges consists of a number of spicules composed of carbonate of lime. These spicules are of very varied though regular shape, but ordinarily assume a rod-like needle shape or else a stellate form. In siliceous sponges the spicules are composed of silica, and are generally deposited around axial rods in concentric layers. The spicules are joined together and cemented by a body that has been named "spongin," which has much the same chemical composition as silk, and, like silk, is very elastic. In some varieties of sponges, especially in the kinds which come into the market, the skeleton is almost entirely composed of fibres of pure "spongin." These fibres are so close together as to draw up water by capillary action, and indeed a great deal in the value of a sponge depends upon the fineness and tenuity of these fibres. Dr. Ledenfeld again illustrated this stage of his lecture by means of a number of microscopic slides in which the variety of shape and size of these spicules and "spongin" fibres were shown. The spicules are some crutch-like, others spined or echinated, whilst the deep-sea sponges appear to grow long thick spicules which attach the sponge to the ground by means of grapnel-like ends. In some cases the skeleton seems to be more or less replaced by sand, the small grains of which are cemented together by the "spongin." Dr. Ledenfeld

then drew attention to the presence of more highly developed organs in the sponge. Muscles pervade the whole tissue of the sponge, but are found more particularly in the superficial parts. One set of muscles affect the size of the inhalent pores, causing them to contract or expand, whilst another set are able to close the pores altogether, thus acting as a protection from the attack of an enemy. All these muscles are composed of spindle-shaped cells, which are capable of spasmodic motion, but recently in an Australian sponge, the *Euspongia canalicula*, the lecturer said he had observed muscles approaching very nearly in character those of the human frame. That sponges have nerves, is a discovery of recent date by a member of the Royal Microscopical Society. Dr. Ledenfeld also about the same time found indications of the presence of a nervous system, but the form in which he observed the nerves at first apparently differed from those observed simultaneously. This difference, however, he afterwards found to be due to the manner in which the section had been prepared for observation. The nerves consist of two cells at the base of a cone-like projection on the epidermis, and from each cell a fibre runs to the point of the cone, besides several others connecting them with the interior of the sponge. It is remarkable that here again Aristotle has predicted that sponges have a nervous system, basing his statement on the fact that ancient Greek mariners foretold storms by the alleged contraction of the sponge. The reproductive organs of sponges are also very highly developed and both ova and spermatozoa are found throughout the sponge, though more concentrated in the interior. The ova consist of spherical cells, whilst the spermatozoa resemble an arrow-head in shape. It has not yet been ascertained whether two sexes exist in sponges, or whether the ova and spermatozoa are produced at different periods by the same sponge. When the embryo has become partly developed it detaches itself from the parent sponge, and, issuing from the oscula, propels itself through the water by means of a number of flagella. Silicious spicules next appear in its structure, and it then attaches itself to a rock and assumes its mature form. Sponges are most numerous in the waters of the temperate and sub-tropical zones, and the salt-water varieties are by far more numerous than the fresh water. Thus whilst there are not more than ten fresh-water species known, Dr. Ledenfeld remarked that about one thousand species of salt-water sponges had been recognized. Each species of the salt-water sponge is, however, generally found only in limited areas, and very few, all of which inhabit deep water are cosmopolitan. This is the more remarkable as Dr. Ledenfeld asserts that all the sponges inhabiting the rivers of Australia are identical with the fresh-water sponges of Europe, and in order to explain this fact he put forward a rather interesting theory. He assumes that sponge life in rivers has been originally generated by the introduction of a single, or at most two or three, germs by means of aquatic birds. The inbreeding consequent upon this paucity of sponge life has produced a certain fixity of character in fresh-water sponges, and is in direct opposition to the effects of hybridization in the salt-water sponges, by which they have acquired the capacity of adapting themselves to local circumstances.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting was held on Thursday, May 5, Mr. E. J. Woolley in the chair.

Miss Buchanan read the following paper:—

The Quantitative Application of the Reaction between Nitrates and Ammonium Salts.

BY MARGARET E. BUCHANAN.

A method for estimating nitrates, which would be quick and easy to perform, and would at the same time give practically accurate results, was thought to be a desirable object, more especially in connection with the analysis of ordinary inorganic salts, and the estimation of medicinal chemicals.

It was suggested that the decomposition of NH_4NO_3 by heat into N_2O and H_2O might be made use of quantitatively, so the following few experiments were made with a view of seeing if this reaction could be relied upon when nitrates of other metals were heated with ammonium salts.

A weighed quantity of KNO_3 was first taken, mixed with an excess of AmCl, and heated in a bent tube over mercury to about the boiling point of Hg (300°–400° C.), till the first strong effervescence ceased, the whole allowed to cool, and the temperature and length of column of mercury taken. A mark was then affixed at the level of the mercury, the tube emptied, and water from a burette run in up to the mark. The volume of the gas (N_2O) thus obtained when corrected gives by calculation the weight of KNO_3 taken. Free NH_3 was discovered in the first two or three experiments, so a little dilute H_2SO_4 was passed into the tube to absorb it. Ultimately the use of AmCl was abandoned, as free chlorine given off in one instance spoiled the result (probably $N_2O + 2HCl = N_2 + H_2O + Cl_2$). Ammonium sulphate was then used, and a few good results also obtained, *e.g.*—

		Heated with	Gave by calculation
KNO_3 taken	·0549 grm.	Am_2SO_4	·05501 grm.
KNO_3 „	·086 „	„	·0754 „
KNO_3 „	·046 „	AmCl	·0485 „
KNO_3 „	·0405 „	„	·0412 „

Finally Am_2SO_4 was abandoned also in consequence of a statement in Watts's 'Dictionary of Chemistry,' to the effect that Am_2SO_4 heated above 280° C. decomposes into NH_3, N, H_2O and NH_4HSO_3, probably according to the equation—

$$3(NH_4)_2SO_4 = 3NH_4HSO_3 + NH_3 + N_2 + 3H_2O.$$

However, I may say in passing that on heating Am_2SO_4 in a tube over mercury to about the same temperature as was used in the experiment with the nitrates, much higher than that mentioned, a good deal of gas was given off, readily absorbed by a little dilute acid; and on repeating the experiment and decanting the gas it was found to be all dissolved by water, indicating that all the gas given off was NH_3. The residual salt gave no traces of sulphite by the nascent hydrogen test. I then heated Am_2SO_4 in an open dish till acid vapours came off freely, and still no sulphite could be found in the remaining salt, the only decomposition being apparently into NH_3 and NH_4HSO_4. But although I have not found confirmation of Watts's statement, still it was thought better to use ammonium phosphate in all the later work done, as the NH_3 given off readily recombines on the withdrawal of heat, and there cannot be any secondary decomposition.

The simple bent tube was found inconvenient, from the liability to lose salt from particles running down with the descending column of mercury, so a modification was suggested, which was found to answer admirably. An ordinary burette was taken, connected by a foot or so of strong india-rubber tubing to a large funnel (or a large pipette is more convenient), and the whole, having been fixed in a couple of burette-stands, was filled with mercury up to within two or three inches of the top of the burette, avoiding the use of more mercury than was necessary to do this. A few c.c. (three or four) of strong acetic acid was then poured on the mercury in the burette, to absorb any NH_3 which might be given off. The apparatus being now ready for use, a weighed quantity of the nitrate is taken, mixed with $(NH_4)_2HPO_4$, and introduced into a piece of combustion-tubing, five or six inches long, and closed at one end. This is then connected by means of a cork and bent tube to the top of the burette; water is poured on the mercury in the funnel to form a column balancing the acetic acid in the burette, and the funnel is gently moved up and down until the surfaces of the mercury in both parts coincide,

and this level is then read off and noted. It will be seen that the pressure inside is the same as that of the atmosphere, the height of the barometer should therefore be taken, and the temperature. After seeing that all points are perfectly secure, the small tube is heated, gently at first, afterwards more strongly, till all effervescence ceases, the whole then cooled to its original temperature, the funnel again moved up and down till the levels of the mercury coincide, the increase in volume read off, and from this volume of N_2O the amount of nitrate calculated.

A 50 c.c. burette is convenient for quantities of salt from ·01 to ·1 gram. It will be seen that the results with this form of apparatus come out almost uniformly well, the decomposition taking place equally well when nitrates of alkaline earths and metals, such as barium, mercury, lead and aluminium, are fused with Am_2HPO_4, but care has to be taken to thoroughly fuse these, for they require more heat than nitrates of the alkali-metals. Barium nitrate takes as long as ten minutes to decompose entirely.

A few experiments were then made to see if the presence of a third salt affected the result, and it was found that sulphates of potassium and other metals did not interfere ; and nitrites also, if the percentage is known, give no trouble, for the amount of nitrogen given off by them ($NH_4NO_2 = N_2 + 2H_2O$) can be deducted from the total volume of the gas. It should be noticed here that the total volume of the gas must be reduced to normal temperature and pressure before this deduction is made.

The apparatus may in fact be used for the estimation of nitrites alone.

It was found that the presence of chlorides of the fixed alkalies introduces considerable error into the result, chlorine being liberated.

Oxalates also cause the volume of the gas to be too great, probably because some CO is oxidized by N_2O, and thus a result cannot be obtained by subtracting the volume of CO (theoretically obtainable) from the total volume of gas, for it seems that the gas evolved bears no constant ratio to the amount of salt employed. Possibly the reactions as expressed by the following equations may take place :—

(1.) $K_2C_2O_4 + 2(NH_4)_2HPO_4 + 2KNO_3 = 2K_2HPO_4 + (NH_4)_2C_2O_4 + 2NH_4NO_3$.

(2.) $(NH_4)_2C_2O_4 + 4NH_4NO_3 = 5N_2 + 2CO_2 + 12H_2O$.

The results of these few experiments in the "burette apparatus" are tabulated below.

Salt used.	Quantity.	Ammonium Salt used.	Amount of salt calculated from volume of gas.
	Grm.		Grm.
KNO_3	·0551	AmCl	·0725 } all contaminated with chlorine
$Ba(NO_3)_2$	·1063	AmCl	·1152 } all contaminated with chlorine
KNO_3	·0569	$Am_2HPO_4 + NaCl$	·0739 } all contaminated with chlorine
KNO_3	·0519	Am_2SO_4	·062
KNO_3	·056	Am_2SO_4	·0586
KNO_3	·05	$Am_2HPO_4 + Na_2SO_4$	·0523
KNO_3	·0851	$Am_2HPO_4 + Na_2SO_4$	·0884
KNO_3	·0855	Am_2HPO_4	·093
KNO_3	·0614	Am_2HPO_4	·056
KNO_3	·0775	Am_2HPO_4	·0769
KNO_3	·0559	Am_2HPO_4	·0555
KNO_3	·0719	Am_2HPO_4	·0727
$NaNO_2$	·0549	Am_2HPO_4	·056
KNO_3 ·06 / $NaNO_2$ ·0324		Am_2HPO_4	·0543 calculated as 100 per cent.
$Ba(NO_3)_2$	·105	Am_2HPO_4	·113
$Ba(NO_3)_2$	·1841	Am_2HPO_4	·1823
$Pb(NO_3)_2$	·171	Am_2HPO_4	·1712
$HgNO_3$	·384	Am_2HPO_4	·3832
$Al_2(NO_3)_6$	·103	Am_2HPO_4	·1093

The paper gave rise to a discussion, in which the Chairman, Secretary, Miss Munro, Messrs. Millard, Eastes and Bird took part.

The next paper was a Report on Botany, dealing with the subject of the—

Structure of the Flower of the Petaloid Monocotyledons.

BY E. G. BAKER.

The object of the paper was to trace out the relationship of some of the aberrant and irregular types to the regular typical central forms. The author pointed out that in the petaloid monocotyledons, the central type from which the others radiate is represented by the polyphyllous Liliaceæ, examples of which are the well-known genera, Allium, Scilla and Lilium. In these there are six segments of the perianth free, six stamens opposite the perianth segments, and either hypogynous or slightly attached to the base of the perianth segments, and a superior ovary with three carpels with axile placentation. Perhaps the first stage of deviation to be noticed is in the gamophyllous Liliaceæ, the segments of the perianth being united instead of free and the stamens epiphyllous. The transition can be traced by most gradual stages. For instance compare Scilla, Chionodoxa, Hyacinthus and Muscari. Amaryllidaceæ differs from Liliaceæ in that the ovary is united to the perianth (*i.e.* is inferior), but the difference between a superior and an inferior ovary is often included within a single natural order (examples, Rosaceæ, Bromeliaceæ and Saxifragaceæ), and the transition is often very gradual.

As intermediate forms between Liliaceæ and Amaryllidaceæ may be mentioned Tecophilæa, Conanthera and Coningia, in which the bottom of the ovary adheres to the perianth and the top is quite free. In Iridaceæ we have essentially the Amaryllidaceous structure, but three of the stamens are suppressed. In Pauridia, an Amaryllidaceous genus, there are only three stamens. Iridaceæ comprises quite a variation of forms. These are the regular flowers, such as ixia and crocus ; then the flowers in which the outer row of the perianth is different from the inner (ex., iris) ; then the irregular flowers, such as gladiolus. But the most complex natural order among the Petaloideæ is Orchidaceæ, comprising almost every variation in form conceivable. The perianth consists of six segments, rarely the segments are nearly uniform (ex., Thelymetra), generally one of the six is much differentiated and is called the labellum.

To understand the labellum it is necessary to go back a stage. Occasionally irregularity occurs in Amaryllidaceæ (ex., Amaryllis) ; when this does occur, the segment of the perianth that is irregular is always the one corresponding to the labellum in Orchidaceæ. The labellum is differentiated to the greatest extent in Cypripedium ; this, however, is arrived at from the nearly regular forms by progressive stages.

The majority of the Orchidaceæ have one stamen, Cypripedium has two, and Thelasis three stamens, and occasionally in cases of abnormal growth in this order more occur ; we are therefore justified in referring this to the normal monocotyledonous type in which five and sometimes four stamens are suppressed. The ovary in Orchidaceæ is usually one-celled with three parietal placentas. Selenipedium, a genus of Orchidaceæ closely resembling Cypripedium, has, however, a three-celled ovary, and this is a connecting link between Orchidaceæ and Iridaceæ. The genus Neuwiedia also affords an interesting connecting link. The segments of the perianth are similar, the ovary three-celled and the stamens three, and thus only differs very slightly from Iridaceæ, although it is included by Hooker and Bentham in Orchidaceæ. But the above is sufficient to show that there is not, as is often supposed, an abrupt line of demarcation between one natural order and another, but that it is often extremely difficult to define the exact limits of a natural order, and that a natural order

must be looked upon as a group containing a certain variation in structure and not as a type from which there can be no deviation.

A discussion followed, in which the Chairman, Secretary, Messrs. White and Millard joined.

The Secretary announced that the Executive Committee had made a grant of 11*s.* 6*d.* from the Research Fund to Mr. A. Smith to meet the expenses of his work on the officinal succi, and a grant of £1 to Mr. R. A. Cripps for a proposed research on coniine.

The meeting then adjourned.

CHEMISTS' ASSISTANTS' ASSOCIATION.

The annual general meeting was held on May 4, Mr. H. H. Millhouse, President, in the chair.

The minutes of the previous meeting having been read and confirmed, the Chairman called upon the Secretary to read—

The Annual Report.

The Council, in presenting the annual report for the tenth session, have a very pleasing duty to perform.

The Association numbers 165 members, 72 of whom having been enrolled during the present session, showing a numerical increase of 34. There are 34 patrons, being an increase of 7. The average attendance at the meetings has been exceptionally good, viz., 38, this being much larger than during any previous period. The papers read were of considerable merit, and many of them of special value. Special attention has been devoted to the musical and social evenings, and they have proved very attractive. The conversazione was held at the Portman Rooms on November 24, 1886. It was most successfully conducted on an extensive scale, and in order to meet the largely increased expenditure a charge was made for extra tickets. The annual dinner, held at the Holborn Restaurant on March 11, 1887, was presided over by the President of the Pharmaceutical Society, and supported by many eminent medical men and pharmacists; members and friends attended in great numbers, and evidently much appreciated the programme provided for their entertainment.

The Council have this year granted £20, or an increase of £5, towards the publication of the 'Proceedings' of the Association.

The sole disappointment of the session has been the apathy shown by members in not competing for the Burroughs Wellcome prize; three essays only were received, and after careful consideration the Committee decided that none were of that standard which would justify them in recommending the Council to make the award.

The accompanying balance sheet shows that financially the Association is in a most satisfactory condition.

The unexampled success of the session, and the rapid progress the Association has made, render the submittal of the report an agreeable duty. The Council has to thank members and friends who have so ably and willingly assisted them, and to ask a continuance of their valuable support on behalf of their successors.

The President moved and the Vice-President (Mr. T. S. Dymond) seconded the adoption of the report, which after some discussion was carried unanimously.

The Treasurer (Mr. W. R. Dodd, F.C.S.) then read the balance sheet, of which the following is an abstract:—

Receipts.	£	*s.*	*d.*
Balance, April 30, 1886	24	1	0½
Grant from Publishing Fund	15	0	0
165 members' subscriptions	41	5	0
34 patrons' subscriptions	18	18	0
Balance from Dinner Fund	7	6	2
Publishing of papers	1	3	6
Donations	27	1	6
Rent of piano	5	0	0
Sale of 'Proceedings'	6	13	3
Advertisements in 'Proceedings'	4	16	0
	151	4	5½

Expenditure.	£	*s.*	*d.*
Rent	25	0	0
'Proceedings'	31	7	4
Stationery and printing	10	11	8
Stamps	3	11	2½
Post wrappers	3	2	9½
Post cards and printing	6	10	6
Hire of piano	1	11	0
Refreshments	5	7	0
Conversazione	11	8	6
Lime-light for lecture	1	10	0
Sundries	0	2	2
Grant from Publishing Fund	20	0	0
Balance in hand	31	2	3½
	151	4	5½

The President, in moving its adoption, pointed out that in consequence of the larger number of members and patrons, the Council had been able to grant an additional £5 to the publishing fund, and to carry over a balance of £31 2*s.* 3½*d.*, being an increase of £7 1*s.* 3*d.* over that of the previous session.

The motion was seconded by Mr. W. G. Blackham, and after a lengthy and critical discussion carried unanimously.

The followlng resolution was moved from the chair:—"That the following words be added to rule 6:—'Members shall not be entitled to tickets unless their subscriptions be paid.'"

It was seconded by the Vice-President, and carried.

The scrutineers, Messrs. J. B. Barnes, jun., and J. H. Huckidge, reported that seventy-nine voting papers had been received, three of which were informal, the result of the election being that all the old members of Council standing for re-election, together with two new members, Messrs. Millard and Vallance, were elected. The following will, therefore, constitute the Council for the ensuing session:—H. H. Millhouse, T. S. Dymond, J. E. Saul, W. B. Botham, F. C. J. Bird, C. J. Strother, E. S. Taylor, W. R. Dodd, F.C.S., A. J. Phillips, T. A. Ellwood, A. G. Worsley, E. H. Farr, E. J. Millard, A. C. Vallance.

After a vote of thanks had been passed to the scrutineers, the President delivered a short valedictory address. He thanked the Council and members for the valuable assistance they had rendered him, and said, if they were careful how they used in the future the power they now undoubtedly possessed, still greater successes were in store for them.

A vote of thanks to the President for his services during the session was proposed by Mr. W. G. Blackham, seconded by Mr. Taylor, and carried with acclamation.

The proceedings then terminated.

ANSWERS TO CORRESPONDENTS.

Gratton.—There is no doubt that the Act of Parliament restricts the use of the title of "chemist and druggist" to registered persons. But in such a case as you refer to the title would appear to be applied to the consignee by some other person, for which he could hardly be made responsible.

J. B.—See some recipes for paste for labels, before, p. 469.

H. Shillinglaw.—Your letter has been handed to the Honorary Secretary to the Fund, the list having been published as supplied officially.

J. M. Furness.—The subject referred to in your letter has not been overlooked; but though the Council is in favour of carrying out the change you speak of, it is considered that there has not yet been a favourable opportunity for doing so.

Inquirer.—The Regulations relative to the appointment of dispensers in Her Majesty's naval hospitals will be found in the Society's Calendar. The appointments are open to men possessing the Minor qualification, but only Major men receive the extra allowance for the charge of stores.

Communications, Letters, etc., have been received from Messrs. Segg and Co., Oldberg, Elborne, Gratton, Hopkins, T. G., A Member.

ST BARTHOLOMEW'S

ACCURATE METHOD OF DETERMINING SPECIFIC ROTATORY POWER.*

BY W. PEDDIE, B.SC., F.R.S.E.

The following method is based essentially upon the fact that the rotation of the plane of polarization by any substance is different for different wave-lengths.

Nicols prisms are used to polarize and analyse the light. If any substance which rotates the plane of polarization is placed between the two Nicols prisms when they are arranged so as to prevent the passage of light, coloured light passes through. If this light be examined by a spectroscope (direct-vision preferably) the spectrum is seen to be discontinuous, being crossed by one or more dark bands. The number of these bands depends on the amount of rotation produced by the substance. The particular kinds of light corresponding to the centres of any adjacent pair of these bands differ in rotation by 180°. If the analysing prism be rotated the bands shift their position in the spectrum.

A mirror is interposed between the prisms so as to cut off about one-half of the light coming directly through the apparatus. A beam of light is reflected from this mirror through the analysing prism and the spectroscope, and its spectrum is necessarily uncrosssed by dark bands. In this way two spectra are obtained in justaposition, the Fraunhofer lines in the one being continuous with those in the other. The uncrossed spectrum can be used to determine the exact kind of light corresponding to the centre of any dark band.

To determine the rotation for light of any particular wave-length, the analysing prism is turned round through an angle θ until the centre of the dark band in the one spectrum corresponds with that particular light in the other. If ρ be the total rotation for that light, we get $\rho = n\pi + \theta$. To determine n, the same process must be repeated for another kind of light, for which we get

$$\rho' = (n + x)\pi + \theta'.$$

In this equation x is the number of dark bands which cross the spectrum in positions intermediate between the two kinds of light for which ρ and ρ' are the rotations. Combining the two equations above with the approximate formula $\rho\lambda'^2 = \rho'\lambda^2$, where λ and λ' are the two wave-lengths considered, we get $\frac{n\pi + \theta}{(n+x)\pi + \theta'} = \frac{\lambda'^2}{\lambda^2}$. This equation determines n.

The method above described, in which position is substituted for tint, is superior in point of accuracy to any of the ordinary "neutral-tint" methods, and has the additional advantage of giving the rotation for light of a definite wave-length.

[*The discussion on this paper is printed on p.* 965.]

NOTE ON SOLUBILITIES OF MORPHINE HYDROCHLORIDE, SALICIN, AND GALLIC ACID.*

BY D. B. DOTT, F.I.C., F.R.S.E.

As the solubility of the under-noted compounds is variously stated in the ordinary books of reference I have made fresh determinations. For these, however, a high degree of accuracy is not claimed, as the instruments just lately at my disposal did not admit of very exact results.

The method employed has been described in former papers and need not be again detailed. The substance is digested in the menstruum until the solution is saturated, and the temperature having been noted, a portion of the solution is weighed and evaporated to complete dryness. The solubility is then obtained by deducting the weight of the dry substance from the weight of the solution and dividing the latter by the former. In the case of compounds which lose their water of hydration at the temperature required to dry them, a correction must evidently be made. The mean results of the experiments are given below :—

Solubility of Morphine Hydrochloride in Rectified Spirit.—One part is soluble in 40 parts at 16° C.

Solubility of Salicin in Rectified Spirit.—One part is soluble in 66 parts at 16° C.

Solubility of Gallic Acid in Water.—One part is soluble in 118 parts at 16° C.

[*The discussion on this paper is printed on p.* 965.]

NOTE ON THE PURIFICATION OF FIXED OILS.*

BY D. B. DOTT, F.I.C., F.R.S.E.

It is a matter of importance in pharmacy that the oils used in the preparation of ointments and for other purposes should be as pure as possible. I have devised a method for the purification of oils, which, although not yet thoroughly worked out, gives in some cases very good results. The process is briefly as follows :—The commercial oil is agitated with about a twentieth of its volume of 10 per cent. solution of potassium permanganate. Dilute sulphuric acid is then added and the mixture well shaken. After standing a sufficient time to allow the water to settle the oil is filtered. It is now found to be much improved in appearance, and is not, so far as I have yet observed, in any way deteriorated. With the oils of the Pharmacopœia I have only had time to try three experiments. The method seems to apply very well to olive and almond oils, and not to be so successful with linseed oil. I intend to have the process thoroughly tested, and to report the results on a future occasion.

I have to thank Mr. J. Rutherford Hill for assistance kindly rendered in these experiments.

[*The discussion on this paper is printed at p.* 965.

A SIMPLE METHOD FOR PERCOLATION UNDER PRESSURE.*

BY THOMAS MABEN.

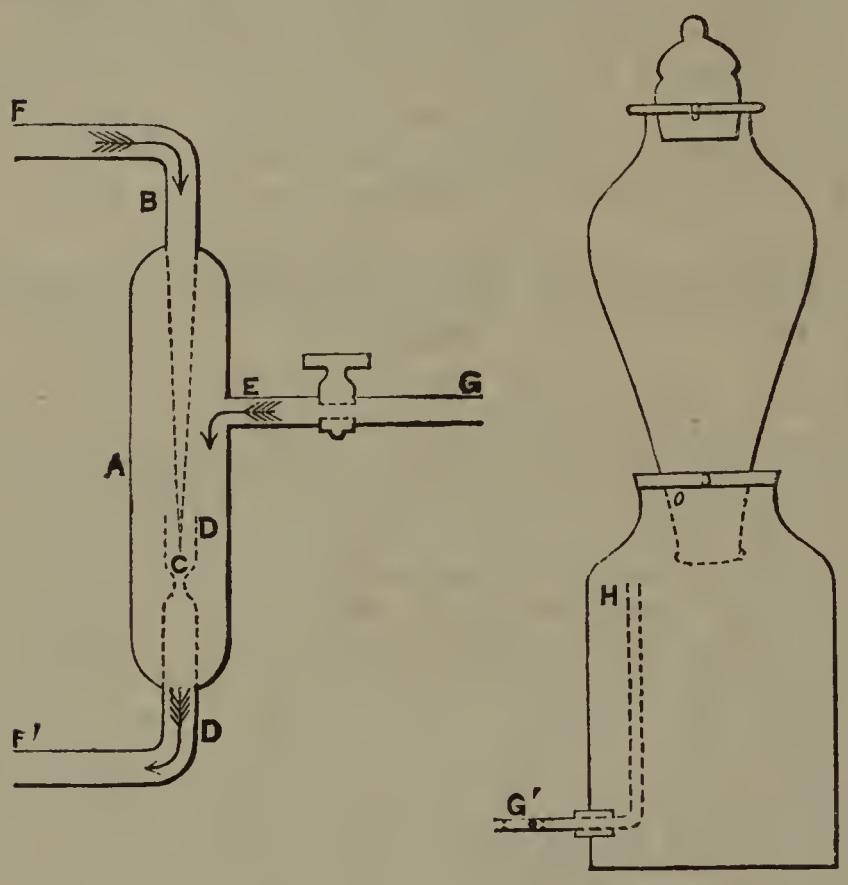
I have for some time past been in the habit of making use, in aid of percolation, of a simple contrivance which is perhaps not so well known as it deserves to be. As a rule, it is not desirable to hasten the process of percolation over much, but it does occasionally happen that it proceeds so slowly that we are glad to lend what assistance we can. The method I now adopt in such cases consists in the use of a vacuum pump, a piece of apparatus which is familiar enough in the laboratory, but of which I have not seen an arrangement whereby it may be conveniently adapted to pharmaceutical use on a small scale.

* Read before the Pharmaceutical Society of Great Britain at an Evening Meeting in Edinburgh, Wednesday, May 11.

* Read before the Pharmaceutical Society of Great Britain, at an Evening Meeting in Edinburgh, Wednesday, May 11.

Remington, in his 'Practice of Pharmacy,' refers to the use of the vacuum pump, but he contents himself with describing the construction of the pump, and leaves his readers to find out for themselves the best way of applying it.

The accompanying drawing illustrates the particular form of vacuum pump which I regard with most favour, one element which recommends it being its simplicity of construction; any tinsmith can put it together at little cost, and if properly made, it is remarkably efficient. These pumps may be bought in glass, but they are too fragile; and also in brass, but these are needlessly expensive, and are not as a rule provided with stop cocks.



The pump is made of brass throughout. A is a tube about 3½ inches long, and ¾ inch diameter, into which is soldered a smaller tube, B, the upper part of which may be conveniently bent to a right angle. This tube is gradually narrowed to the orifice, C, which is inserted about half an inch into the outlet tube, D. This tube, which is also soldered to A, may be cylindrical, but is preferably constricted about an inch below C. A connection having been made by means of india-rubber tubing between the main hydrant and F, the water is forced through C, and in passing into the outlet tube it rapidly creates a vacuum, and A is rapidly exhausted, the air being drawn through the annular space at D. A tube may be attached to F′ if necessary to carry off the effluent water. The inlet tube for admission of air is attached laterally, and is provided with a stop cock, and when this is opened the air rushes into A, a continuous current being drawn through D to the outlet. In this way a stronger or weaker current of air may be produced varying according to the pressure of water.

Before the pump can be employed, it is of course necessary that the receiver of the percolator be air-tight. The plan I adopt is very simple. An ordinary York Glass Company percolator, the various parts of which can be made air-tight at will, is made use of; the tap is removed, and in its place is inserted a cork through which passes a glass tube, G′H, bent at right angles, as shown in the drawing. A small valve is fitted to G′, which admits of the air passing freely through in the direction of the arrow, but prevents water flowing backwards should there be any tendency in that direction.

A tube, which must be of stout rubber or preferably with a coil of wire inside, otherwise it is certain to collapse owing to the pressure, connects G and G′ and the apparatus is complete.

The apparatus may be wrought without the use of the valve at G′, but in that case it is necessary to observe two precautions. An unvarying flow of water from the hydrant must be maintained, otherwise there is the probability that water will be drawn back into the receiver owing to the reduction of pressure, or rather on account of the transference of the pressure from the pump to the receiver, and, for the same reason, the stop-cock at E must be turned off before the flow of water is stopped at the hydrant.

If it be thought desirable to have a vacuum gauge to indicate the degree of exhaustion, it could easily be fitted on at E. The pump which I am using at present is able, with a moderate flow of water, to produce exhaustion equivalent to a pressure of about two atmospheres, which is more than sufficient for most purposes. I find that an extra pressure of 250 mm., or a total pressure of one and a third atmospheres is ample for ordinary percolation.

[*The discussion on this paper is printed on p.* 965.]

IRISH MOSS AS A SUBSTITUTE FOR GUM ACACIA IN PHARMACY.*

BY PETER BOA.

At the present time when the price of gum arabic is about five times what used to be considered its normal value it seems not inappropriate to introduce for consideration a subject such as I have to bring before you to-night. A mucilage of Irish moss, prepared by boiling in water, has been largely used in America for the emulsification of cod liver oil, but so far as I have been able to ascertain by liberal reference to journals published in that country and in this, its more extended pharmaceutical use has not been proposed.

Some years ago I made experiments with the moss mucilage as an emulsifier of cod liver oil, but my experience with it did not indicate any evidence of its superiority to other substances used for the same purpose, such as acacia and tragacanth. In consequence I abandoned further consideration of it, especially as the cost was not then an element of so urgent importance as it now is.

A few months since, however, in conversation with a pharmaceutical friend, the subject of a substitute for acacia came up. Remembering my previous experiments with Irish moss I thought this substance might possess some qualities which would make it worth considering with this object in view. Since then I have from time to time as leisure permitted gone into the subject, and the results of my experiments, so far as they appear to me to be worth recording, I propose to lay before you.

The only two British species of algæ which yield a mucilaginous jelly with water are *Gelideum cor-*

* Read before the Pharmaceutical Society of Great Britain at an Evening Meeting in Edinburgh, Wednesday, May 11.

neum and *Chondrus crispus*, or Irish moss. The latter is the more plentiful, and being a well-known article of commerce is easily obtainable. The composition of commercial Irish moss is given by Church as—

Water	18·8
Albuminoids	9·4
Mucilage	55·4
Cellulose	2·2
Mineral matter	14·2
	100·0

Stanford says it yielded him 63·7 per cent. of carragheenin, or vegetable jelly; this probably includes the albuminoids and mucilage given in Church's analysis.

The mucilage may be obtained by boiling, by heating on a water-bath, and by cold maceration. The usual method is boiling. However, having put a quantity of the moss into water to soak one afternoon, and being unable to attend to it till the next day, I found when I examined it that the water was distinctly viscous. By putting a larger quantity of moss into a smaller quantity of water, and macerating with occasional gentle stirring for twenty-four hours, I obtained a mucilage of about three-fourths the viscosity of acacia mucilage.

At the commencement I encountered a difficulty which threatened to be a serious objection. I found it exceedingly troublesome to get the mucilage clear, the insoluble particles suspended in it being so minute that the straining medium necessary to exclude them required to be so fine that the mucilage would scarcely pass through it. Mr. Huested (*Pharm. Journ.*, July 16, 1881, p. 49) records similar experience. In a case where the small particles in suspension would not be objectionable, a fairly presentable product may be obtained by using muslin or calico as the straining material, and gently stirring or pressing. For emulsions this serves admirably. In a clear mixture, however, the particles become objectionably evident when the mucilage is diluted. To obtain a clear preparation Mr. Huested recommends that the mucilage while hot should be poured into a flannel filtering-bag and allowed to drain through, no pressure or stirring being employed. Proceeding in a similar way I failed to get satisfactory results. I could neither get the mucilage to run through reasonably rapidly nor obtain it so clear as I desired. It may be that Mr. Huested's manipulation is superior to mine, or his mucilage was not so clear as that which I have now succeeded in preparing. After many failures, the details of which I need not give, I found that by using a hot water funnel and straining the mucilage through absorbent cotton wool supported on muslin, a preparation clear enough for all but exceptional purposes could be obtained with comparatively little difficulty. If a perfectly water-clear preparation be required, it may be obtained by making a weak mucilage, filtering it clear, and then evaporating to the thickness required. If a clear jelly were wanted this would be the only way to prepare it, because a decoction of this consistence could not be strained, even when kept hot, in anything like a reasonable time, if at all.

A quarter of an ounce of moss, washed free from dust and sand, soaked in 24 ozs. of cold water for an hour or so, boiled gently for five minutes or heated on a water-bath for double the time, and strained in the manner I have described, yields about 18 ozs. of mucilage closely resembling in appearance and viscosity the acacia preparation, and possessing as little taste.

I have observed that the clear mucilage has less taste,—"flavour" perhaps I should say,—than that which has not been freed from insoluble particles.

A quarter of an ounce macerated in 4 ozs. of cold water for twenty-four hours, or longer, gives a mucilage such as that to which I have already made reference.

Specimens of these and of some other strengths are on the table. I have observed variations in the results from different parcels of the moss.

Comparing the moss mucilage with acacia mucilage in combinations, I find that it serves as well as the latter for chalk mixture. Guaiac. mixture made with it does not so soon acquire a greenish tinge as that made with acacia; oxidation appears to be retarded and presumably the moss is therefore to be preferred. For suspending copaiba it is superior to acacia, separation taking place much more slowly and less completely. Part of the copaiba remains in an emulsified state at the bottom of the bottle when moss is used, but with acacia the liquid in the lower part of the bottle is free from anything of that kind, all the oleoresin having risen to the top.

For emulsifying cod liver oil it is greatly superior to acacia in point of preventing separation, but a finer division of the oil can be obtained by the use of acacia in greater proportion than the equivalent.

Moss mucilage, ℥vj., cod liver oil, ℥j., and water ℥ij., produce an emulsion that is practically inseparable. Using ℥vj. acacia mucilage, ℥j. cod liver oil, and ℥ij. water, the product obtained quickly separates.

It should not be used for suspending heavy powders without some caution, for I find that when it is employed to suspend subnitrate of bismuth, the bismuth when once it settles down will not again shake up. Where there is no objection of this kind it is superior to ordinary mucilage.

Specimens are shown illustrative of the results of these comparative experiments.

In regard to compatibility moss mucilage forms a clear jelly with subacetate of lead solution; it is miscible with rectified spirit and dilute nitric acid; perchloride of iron gives a slight gelatinous precipitate.

The preparation keeps good for some weeks in full bottles without any preservative. One specimen is shown that has been kept in a partially filled bottle in the front shop for two months and it can hardly be said to be bad; other specimens, however, of about the same age have become mouldy on the top. It does not sour lik acacia mucilage.

Pereira says that *Chondrus crispus* has a popular reputation for pulmonary complaints, chronic diarrhœa and irritation of the kidneys and bladder. The mucilage strikes one as being well suited for use with medicines for any of these complaints; a few ounces of it in a cough mixture, for example. It may be used freely for it is readily digested—the melting point of the jelly being 80° F., not much above that of isinglass jelly used for invalids.

[*The discussion on this paper is printed on p.* 965.]

The Redwood Testimonial Fund.

Presentation of a Portrait of Professor Redwood to the Pharmaceutical Society.

A meeting of the subscribers to this Fund was held on Wednesday last, in the theatre of the Pharmaceutical Society, under the presidency of Mr. Michael Carteighe, Chairman of the Executive Committee and President of the Pharmaceutical Society.

The Chairman: Gentlemen, you all know the object for which we are gathered together in this hall to-day, viz., to witness the concluding formal ceremony in connection with the Redwood Testimonial Fund. Most of you are no doubt aware that a considerable sum of money has been contributed by members of the Society, distinguished friends and old pupils of Dr. Redwood, and as the result of the subscription it has been decided to found a scholarship in connection with the Society's School, to be named, for ever, the "Redwood Scholarship," and, in addition, that a portrait of our Emeritus-Professor should be painted and placed on the walls of the Society's house, in order that his features may ever be before the pupils and teachers of the Society. Finally, with a view to the proper gratification of those who are near and dear to the Professor, we have been able to arrange for a replica of this portrait, which will, no doubt, be handed down as an heirloom in his family. The replica is not quite ready, but we will, if you please, consider it is ready for the purposes of the proceedings to-day. I will now ask Dr. Garrod, as a member of the Executive Committee, to be kind enough, on behalf of the subscribers to present the portrait to the Society.

Dr. A. B. Garrod, F.R.S., F.R.C.P.: Mr. President, I am requested by the Committee of the Redwood Testimonial Fund to take a part in this day's proceedings, and will endeavour to discharge this small part to the best of my abilities. The origin of the Testimonial may be thus stated:—At a meeting of the friends and former pupils of Professor Redwood it was resolved: (1) "That some public recognition be made of the long and valuable services rendered to pharmacy and to the sciences connected therewith by Emeritus-Professor Redwood." (2) "That it is desirable that the form of recognition be the foundation of a Redwood Scholarship, to be held in connection with the School of the Pharmaceutical Society. The surplus, if sufficient, to be appropriated to the painting of a portrait of Professor Redwood, to be placed in the House of the Pharmaceutical Society." A General Executive Committee was then formed, numbering among its members many very influential names, including the Presidents of numerous important societies and corporations. The success of this Committee has been sufficient not only to found the Scholarship, but likewise to enable a portrait of Professor Redwood to be executed by a very eminent portrait painter, Mr. Sydney Hodges; and my duty to-day is, on behalf of the subscribers to this Testimonial, to hand over to you, Mr. President, on behalf of, and as representing the Pharmaceutical Society of Great Britain, this portrait, in order that it may adorn the walls of this building, and be the means of daily calling to the minds of the members of the Society the great benefits Professor Redwood has rendered, and to stimulate the students to endeavour to follow in his footsteps. (The portrait was then unveiled amidst considerable applause.) All who know Professor Redwood must admit that this is a very admirable likeness, and does great credit to the artist. It is the Professor in his best moments. It is not for me to attempt to enumerate all the services which your Professor has rendered, not only to this Society, but to chemistry, pharmacy and pharmaceutical chemistry. Most of those present are as well, or even better, acquainted with them than myself. I shall, however, just enumerate some of the services that Professor Redwood has done. In the year 1842 (just 44 years ago) Dr. Redwood was appointed Professor of Pharmacy to the Pharmaceutical Society, and in 1844 Director of the Chemical Laboratories. In 1846 he succeeded the late Professor Fownes as Professor of Chemistry. In these several capacities, in the first instance with Fownes, Pereira, and Thomson, he laboured earnestly and with marked success to promote the cause of scientific education in pharmacy, and at the present time the majority of practising pharmacists, many medical men, and not a few scientific chemists, owe much of their early scientific knowledge to his teaching. Professor Redwood's official connection with the Chemical Society dates from the year 1852, when he was appointed Secretary in conjunction with the late Sir Benjamin Brodie, a post which he held, subsequently with Professor Odling, until 1865, when he undertook the duties of Treasurer until 1870. In 1846 the Cavendish Society was founded, with Professor Redwood as Secretary, a post which he retained during the whole period of its existence. Professor Redwood was also associated first with the London and then with the British Pharmacopœia. I am told that he began to act as Secretary in 1854 to the Pharmacopœia Committee, which was then under the Royal College of Physicians, but in the autumn of 1859 it was transferred from the College of Physicians and put into the hands of the Medical Council, when not only the London, but the united Pharmacopœia of London, Edinburgh and Dublin was ordered to be produced, called the British Pharmacopœia. The Committee held its sittings up to 1864, although the London College of Physicians had ceased its functions after 1858 working from the year 1858 in conjunction with the Medical Council. In 1865 Professor Redwood was appointed by the Medical Council to edit a new edition of the British Pharmacopœia, which appeared in 1867, the edition with Addenda which appeared in 1874, and again the recent edition af 1885. Professor Redwood's 'Supplement to the Pharmacopœia' has long been out of print, but is a book which had a world-wide reputation as an encyclopædia of materia medica. The first edition appeared in 1847, the second in 1848, the third and last in 1857. In 1840 Professor Redwood published a manual of 'Practical Pharmacy,' founded on that of Dr. Mohr. In 1872 an abridged edition of Pereira's 'Materia Medica' was published, to which Professor Redwood contributed the chemical and pharmaceutical portion. In 1841 Professor Redwood was associated with the late Mr. Jacob Bell in the foundation of the *Pharmaceutical Journal*, of which he subsequently became editor, and continued in this capacity until 1870. Its pages bear witness to the extent of his contributions to pharmacy and to the sciences on which it depends. In 1856 Professor Redwood, in conjunction with Professors Graham and Hofmann, was appointed to report to the Chairman of the Board of Inland Revenue, "On the Supply of Spirit free from Duty." The foregoing sketch, although it includes only the chief features in Professor Redwood's career, shows how largely he has contributed to the development of materia

medica, how much purely honorary work he has done for the science of chemistry, and how for more than half a century he has devoted himself to the promotion of the scientific sides of pharmacy, more particularly in connection with the organization of the Pharmaceutical Society. I will now say a few words with regard to my own personal knowledge of Professor Redwood. I believe I make no over-statement when I say I have had the pleasure of his acquaintance for nearly forty-five years, and that I regard him as so intimately connected or bound up with this Society as to form a part and parcel of it. I have also had the advantage of hearing him lecture on several occasions, and although very many years have passed away since I heard one particular lecture delivered to this Society, on Magnetism, still I retain such a vivid remembrance of the clearness, simplicity, and force with which he treated the subject, that I ever afterwards regarded it as a model lecture—one equalling Faraday's best efforts, and one the style of which could with advantage be copied by others. I have also had the advantage of knowing Professor Redwood in connection with the Chemical Society in its early days, and shall not forget a visit with him, in conjunction with Professor Graham, the late Master of the Mint, Professor Fownes and many others, first to Kew, to see some early attempts at electrical telegraphy, and afterwards to a less scientific, but perhaps equally interesting entertainment at Richmond. In conclusion, I feel sure that no more worthy recipient of a testimonial could be found than Professor Redwood, and I can only add one more remark, namely, that all the subscribers to it and in fact all the chemical and pharmaceutical world, hope and trust that he may live long to enjoy the honours and the good wishes he has obtained in his long and useful career. I have great pleasure in handing to you, Sir, as the President of the Pharmaceutical Society, this admirable portrait, and also in stating that the replica is being made and will shortly be delivered to the Professor.

Loud applause followed, and three hearty cheers were then given for the Professor.

The CHAIRMAN: On behalf of the Pharmaceutical Society, which I represent officially here to-day, I beg to tender our thanks to the subscribers for giving us the opportunity of having this portrait upon our walls. I count it one of the most pleasant episodes that is attached to my presidential career that on this, the last day, I should have the opportunity of receiving, on the part of the Society, so honourable a commission as accepting a life-like portrait of my old friend, Professor Redwood, and, as one of his former pupils, I am still one of his grateful admirers. There have been great difficulties to contend with in teaching pharmacy and chemistry and the various branches of knowledge connected with our craft, but I venture to think we can hardly realize what those difficulties must have been when the Professor first commenced his work in 1842. There are difficulties now, but the difficulties then must have been immense. I can corroborate what has been said with regard to the excellence of the Professor's teaching, not only from my own experience, but from what my friends have said to me. There are many who think that as a lecturer on physical science our Emeritus-Professor was unequalled—certainly not surpassed. I congratulate myself on being the recipient for you, and I congratulate the Society at large that we have another addition to our gallery of worthies. This portrait will be placed on the walls of the Pharmaceutical Society among those of other gentlemen who have given up so large a portion of their lives to the Society. The Professor will be in the company of his old friends William Allen, Jacob Bell, Thomas Hills and George Webb Sandford. As this is a typical representation of the handing over of the replica, perhaps it will not be amiss to allow the Professor to thank us for that portion of the work. We do not ask him to say much; one can conceive that he may feel it desirable that he should not say too much; but a few words from him, I am sure, would be gratifying to you, as many persons have come from the country in order to be present to-day.

Professor REDWOOD (who on rising was loudly cheered) said: Mr. President, the kind words which you and Dr. Garrod have expressed and the kind and generous acts that so many friends, including not only pharmacists but distinguished medical and other scientific men, have performed with reference to me, impose upon me a debt of gratitude which I feel that I cannot on this occasion adequately respond to or ever acquit myself of. I am indeed deeply sensible of the honour which is conferred upon me by those who have contributed to the carrying out of this Testimonial, and I am also greatly indebted to the originators and promoters of the undertaking for the very judicious estimate they formed of my feeling and the manner in which they have carried out the Testimonial. As an expression of approval of long continued services, rendered in an endeavour to advance the interests of Pharmacy and the Pharmaceutical Society, I acquiesce in and recognize and accept most gratefully what has been so graciously designed and accomplished. If I may be permitted to express an opinion, perhaps I should rather say to throw out a suggestion, with reference to the scholarship which forms part of the testimonial, it would be that the means which have been provided for aiding students in the acquirement of the knowledge which is requisite to make them good and efficient pharmacists may be in some way made available for extending the time which previously successful students may desire to devote to the further prosecution of their scientific studies. The time which is too frequently allotted by pharmaceutical students to systematic study is, in my opinion, inadequate to the requirements of a sound and thorough pharmaceutical education. Mr. President, Dr. Garrod and gentlemen, I thank you most cordially for the good wishes you have expressed towards me, and feeling, as I do, that I have still strength and health for the performance of yet much work, I hope I shall be enabled to devote such energies as I retain in the furtherance of the cause to which I have been so long devoted.

The PRESIDENT: Gentlemen, I have now the pleasing duty of asking you to convey your thanks to Dr. Garrod for his kindness in attending here to-day and performing his part of the ceremony.

The vote was carried by acclamation.

Dr. GARROD: Gentlemen, I am much obliged to you for your kindness. Although I do not often attend your meetings, I have been for many years an Honorary Member of this Society, and I believe about forty years ago I had the honour of lecturing here, chiefly through the kindness of Professor Redwood.

The proceedings then terminated.

THE BENEVOLENT FUND DINNER.

This dinner, which it has been of late the custom to hold decennially on behalf of the Benevolent Fund, took place on Tuesday evening at the Freemasons' Hall, Great Queen Street, Mr. Michael Carteighe, President, in the chair. There was a very large assemblage, about two hundred and forty being present, and the whole arrangement seemed to give every satisfaction to the guests.

The PRESIDENT, in proposing "The Queen," remarked on the pleasing coincidence that the decennial dinner of the Benevolent Fund should fall in the same year as the Jubilee of her Majesty's reign, which would cause them all to drink Her Majesty's health, if possible, with more than the ordinary enthusiasm with which it was always received in every assembly of Englishmen.

The toast having been drunk, and the National Anthem having been sung,

The PRESIDENT proposed "The Prince and Princess of Wales and the rest of the Royal Family." He remarked on the great advantage it was to have in various parts of the kingdom the members of the Royal family taking part in charitable and other public movements. The social life of a nation was fully as important as its political life, and it was very gratifying to know that the Queen's family had for many years been foremost in everything which tended to advance and brighten the social life of those amongst whom their lot was cast. The Prince of Wales had a very difficult position to fill, for he had almost to act the part of a king without being one. Those who had had the honour of being present at any gathering at which His Royal Highness had presided would agree that for the first subject of the realm he was *facile princeps*, and as for the Princess of Wales everyone would always feel they owed a debt to Denmark for sending her to make a home amongst them.

The toast having been enthusiastically received and followed by a song,

The PRESIDENT proposed the toast of the evening, "Prosperity to the Benevolent Fund of the Pharmaceutical Society." He said he would remind those who might have forgotten it that though the Society had a dinner annually, every ten years there was a Benevolent Fund dinner, and so it came to pass that evening, as they believed that benevolence should be asked for from their own craft rather than from outsiders, they had not invited members of learned societies and others who might construe the invitation as meaning a request for a donation of five guineas. The title of the Fund being associated with the Pharmaceutical Society was somewhat misleading, although perfectly correct, as it was a Benevolent Fund originally started by the Pharmaceutical Society, and one which was dispensed by the Society, but its more correct designation would be the Benevolent Fund of Chemists and Druggists. To those who had not followed the history of the Pharmaceutical Society he might explain the beginning of the Fund. The Society was established by royal charter in 1842, one of its object being to provide a fund for the relief of its members, and accordingly money was subscribed, and from time to time relief was given to members and associates of the Society. The Fund gradually and steadily increased until 1852, when the first Pharmacy Act was passed, and the original objects of the charter were confirmed, no change being made in the mode of distribution of the Fund. So matters remained until 1868, when one of his predecessors in the presidential chair, Mr. Sandford, conceived the idea that it would be a great and noble thing to take power in the Act of Parliament then passed, to make every member of the craft, every one who was registered as a chemist and druggist, whether he subscribed to the Fund or belonged to the Society or not, eligible for relief from the Fund. They owed much to Mr. Sandford, much more than many were aware of, but that one thing especially they owed to him, and to the tenacity of purpose which he then showed, that the benefits of the Benevolent Fund should be available to everyone on the Register. Accordingly powers were given in the Act of 1868 to distribute the Fund in the manner in which it had been administered since that time, to all persons on the Register of Chemists and Druggists, and to their widows and children. Considering the ups and downs of life, and the hard times through which all had recently been passing, it was to the credit of chemists and druggists that their self-reliance was such that the number of cases relieved, although large, was not, in proportion to those on the Register, so great as in some other bodies. The duty of the Society in regard to this Fund was that of a trustee. It was the trustee and distributor of the Fund, and it appealed to everyone, but especially to everyone connected with the craft, for assistance, on the principle that a subscription, however small, continued from year to year, was the best support which any trustee could have in distributing a charity—better than thousands of pounds of invested capital. Some might differ from him, but he ventured to think that if there were some thousands of pounds contributed annually in small sums, the difficulties connected with the Benevolent Fund might be faced with comparative comfort. He addressed himself in the first instance to those whose means were comparatively small, who could subscribe something between 2*s.* 6*d.* and a guinea a year, and he asked them to do so. He did not ask for large sums, but they all ought to subscribe; not because at some future time they might need assistance, but on the ground that it was the duty of every craft to provide for the unfortunate belonging to it. Hitherto, the Fund had been relatively more successful in receiving moderately large sums from a few prosperous members of the trade than in being supported by small subscriptions from the mass. They wanted, of course, both sections to combine for the purpose of carrying on the work, and he should like to say that during the last ten years they had dispensed in the shape of casual grants, in sums varying from £5 to £20, no less than £6000. They had also paid to annuitants no less than £11,300 nearly in the same time. Last year nearly £1600 were distributed to annuitants, though the income from invested property was only £781. Some persons thought they had no right to elect annuitants unless there were invested capital sufficient to meet their annuities, but he belonged to a Council who had traversed that position, and had said boldly, "We will back our subscriptions against the invested capital." He thought if they were prepared to relieve those who were in urgent distress, they might appeal to the present generation to give small sums annually to meet the expense, when they could not expect them to contribute large sums to be invested for the benefit of future generations. On these grounds the Council had recommended the election of a much larger number of annuitants than would be justifiable by ordinary economic laws, and he was happy to say that the members of the trade had responded heartily to the call. He did not complain of what had been done; on the contrary, many had given handsomely; but still there were a large number who for some reason or another held aloof. But he thought this must be owing to a mistaken notion that the Fund was reserved exclusively for members of the Society, and when they knew, as they would through the medium of the press, that this Fund was available for everyone who was or had been on the Register, as well as his widow and children, he thought they would all regard it as their duty to contribute a small sum annually to its resources. The total sum paid away during the last ten years was roughly £17,200, and though he did not wish to bring any undue pressure to bear, he did submit that at this festival, which was held once only in every ten years, whilst in most charities it was an annual affair, they might look for some substantial addition to the subscriptions. There were a certain number of friends who would always do their best, but they wanted a large

number of small subscribers spread all over the country in order to carry on the operations of the Fund satisfactorily. They pleaded for further support because they had not the means to elect all the annuitants who presented themselves each year, and secondly the question arose how far the sums paid were adequate to the purpose contemplated. The annuity fixed for a man or woman at fifty, the lowest age at which one could be elected, was £30, whilst at sixty-five the sum was increased to £35; but he thought this sum too small in many cases, and he hoped that some day they would be able to offer to a distressed chemist and druggist or his widow an annuity of £50. Still, until they were in a position to do so, he thought the wisest policy was to increase the number of small annuities; but if the generosity of the subscribers increased, so that there was a substantial addition to the annual income, he hoped that in a few years they might see their way to also increase the amount of the annuities. The casual grants also were extremely useful. Every case was investigated with the greatest care. In some cases money was voted for purposes which were not fully explained in print, because it was not desirable to give minute details; but there were cases in which a grant of £20 or £25, or, if they were able to afford it, of £50, might be the means of putting a whole family in a position to get their own living. They had been obliged to hesitate from time to time in this work, because, having regard to the state of the Fund and number of applicants, it was difficult to go beyond £15 or £20 in an ordinary grant, but it seemed to him that the policy which had been adopted during the last ten years was a wise one, viz., that of dealing, as far as possible, with all eligible cases, and in the case of those over fifty years of age, placing them as soon as possible on the list of annuitants. Casual grants were not always the most satisfactory way of relieving distress, though they were an essential part of it, and frequently preceded the grant of an annuity. During the last ten years the amount spent in this way had been practically the same, viz, about £600 or £700 a year. This would seem to show that the distress which occurred was very largely one which arose at a time when the machine was worn out. When a man over fifty came for relief, suffering from ill-health, there was not much need to inquire how it came about. A large number of their body had to work many hours a day for a very small remuneration, and it was no wonder if they found, at the age of fifty or fifty-five, that they were not capable of doing the work they were in early days. In conclusion, he invited all to drink the toast with enthusiasm, and to do their utmost for a fund which was so catholic and wide-spreading in its operations.

The Vice-President (Mr. T. P. Gostling) proposed the next toast—"The Pharmaceutical Conference." While the Pharmaceutical Society was doing its work of education and carrying on the business of the Society in all its multifarious details, the Conference was steadily pursuing the work of pharmaceutical research, and since its institution had done a good and great work, not only directly but indirectly, by stimulating pharmacists to greater interest in this matter. It was therefore fitting at all suitable times to remember the work of the Conference, and to do honour to its members, and on the present occasion, which was devoted to the interests of the Benevolent Fund, it was especially fitting to call attention to it, since it would necessarily advance the interests of pharmacy, and increased knowledge and education were the only means which would be effectual in so doing. If the interests of pharmacy were advanced, there would be fewer applicants for the aid of the Benevolent Fund. He begged to associate with the toast the name of the President of the Conference, Mr. Atkins of Salisbury.

Mr. S. R. Atkins said he counted it a great honour to be allowed on this occasion to respond to this toast, having been elected for the present year President of the Conference, and being thus called upon to succeed many distinguished men whose achievements he could only hope humbly to imitate. With regard to the Conference he would only say this, that it was established in 1863 for the twofold purpose of promoting pharmaceutical research and true freemasonry amongst pharmacists, and both these objects had been to a large extent achieved. All human institutions failed to some extent in the objects contemplated, but he ventured confidently to assert that, reviewing the history of the last twenty-four years, those two objects had been largely accomplished. If original research had not been prosecuted with the avidity and the results which were then hoped, they were not alone in that matter, for he believed that England had yet to make up a good deal of leeway in comparison with France and Germany in the matter of original research. However, he believed that a large amount of real, true, substantial work had been done, as could be seen by a glance at the 'Year Book and Transactions' of the Conference. If there were any doubt about this matter there could be none with regard to the fact that a great deal of charming loving intercourse had been promoted amongst the members of the craft. Of all men he thought pharmacists needed that association; the very nature of their calling, being isolated, demanded from them that whenever occasion afforded they should meet together for interchange of social life. The Pharmaceutical Conference was born in the year 1863, at Newcastle, of very respectable parentage. It passed through the period of dentition and various other infantile diseases remarkably easily and well; it had grown up a strong hardy boy, and a remarkably intelligent youth. He had had remarkable opportunities of travelling in this country, had moved all over the kingdom, had been invited to Canada, though he was so much engaged at home that he could not go, but he received very large accessions of support, strength and sympathy from his colonial cousins, which he desired most cordially to recognize. And now, conscious of his athleticism and full manly vigour, having reached the age of twenty-four, he was invited to Manchester, and there, with the shade of Dalton of the past, and the substantial form of Roscoe of to-day, and with the hearty invitation of men like Benger, Woolley and others, he believed that for the immediate future of the Conference there was nothing but hearty congratulation, and that if they were true to themselves there was a brilliant future for pharmaceutical work and social intercourse on the part of the Pharmaceutical Conference.

The Secretary then read the list of subscriptions and donations, which will be found on the following page.

Dr. Langdon Down next proposed the health of the President, saying that he need not, in the company of pharmacists, expatiate on his qualities, or refer to the time, a quarter of a century ago, when he headed the prize lists in four departments. The gentleman to whom they wished to do honour was not only President for the evening, but the distinguished President of the Pharmaceutical Society, and whether one had regard to the way in which he presided over such assemblies, or received his guests as he would to-morrow evening at the Kensington Museum, or whether he presided over Committees, urging, and directing, and guiding the business of a Redwood Testimonial Fund, in all these positions he was distinguished for business tact, good sense and infinite energy. Whatever he undertook to do, he did in a thorough British spirit, whether climbing the mountains in Switzerland, or urging on the work of pharmaceutical education at home. He, therefore, asked them all to drink enthusiastically the health of the President, than whom no one could be more genial, more able, or more worthy.

The President, in responding, having thanked the company for the cordial manner in which the toast had been received, said that Dr. Langdon Down, though in some respects a stranger, would not allow himself to be

considered one there. Having begun his career as a student of the Pharmaceutical Society his sympathies with it were so strong, that he had never failed to attend the annual dinner since he had been in practice in London, and, therefore, when this toast was thus proposed he felt that it was an additional honour to the Society of which he was President, and of which Dr. Langdon Down was an Honorary Member. His friend, Mr. Atkins, the President of the Conference, had referred to the good effect of the Conference in encouraging a kindly fellow-feeling amongst members in different parts of the country. One of the difficulties the Society had to encounter was that it was difficult in the short time available at any gathering, especially at any gathering in London, to convey to all those of the present generation any idea of the work the Society had done in the past. It had been suggested that the President should be peripatetic; that he should be sent round like a professor of physical science to preach the pharmaceutical faith throughout the land. There was a good deal to be said in favour of that view, and if desires alone could be considered in such cases, there might be Presidents who would be willing to attempt even that; but the exigencies of life made it necessary for a President as well as for a Society to live, and, therefore, it was almost impossible for him to march round the country and talk to his fellow members of the work which had been done, and which had yet to be done. Fortunately they had now a press which represented their doings, and reported the proceedings so completely and thoroughly that if they did not know what the policy of the Society was, it was their own fault. At all events the Council had never spared any pains to let it be known all over the kingdom, as widely as possible, what the objects contemplated were, namely, to educate the chemist and druggist so that he might claim from the public at large an esteem and consideration above that of an ordinary tradesman in the work he had to do. He had found throughout his life that that consideration was readily accorded by every intelligent person to whom he spoke on the subject, but the great difficulty was that the members on their own ground were sometimes not courageous enough to hold to the doctrine that knowledge was not only power, but ought to be worth money, and consequently they had difficulties to face which at times appeared almost insurmountable. Still he did not hesitate to say that the prosperity of every member of the craft in future would be directly proportional to his educational qualification. The individual should be educated—not over-educated—but educated up to a substantial standpoint in his special subjects above those who came to him for medicines. In proportion as he did that he would succeed. There was no chance for the pharmacist of the future if he thought he was to carry on the battle of life on capital and commercial principles; he must bring to bear on every work he did that skill and knowledge which the Society had been striving to give him. They were all aware that the Council was promoting a measure in Parliament with the object of more completely accomplishing that aim. He knew that a number of candidates, and fathers whose sons would soon be coming up for examination, were more or less alarmed at the proposition, and had an idea that the examinations of the Society were going to be increased in stringency, so as to make it almost impossible for men to enter the trade; but he begged to give the most emphatic denial to that idea. The object was not to increase the stringency of the examinations, but to demand from the candidates evidence of training. Every craft with which they were acquainted depended for success on the amount of skill and knowledge acquired by the individual. The carpenter, the painter, the plasterer, in fact every craftsman obtained his skill by a process of training. Chemists, unfortunately, were certified to have skill and knowledge on the narrow basis of an examination. For a long time it had been felt that this was not the right course to pursue, but they had been unable in former years to persuade the Legislature that their efforts to obtain educational facilities were not connected with the idea of forming a trades-union. To show that this was not so, he appealed fearlessly to everything the Society had done in the past; its object had not been to take fees from candidates for examination, and put them into the coffers of the Society, but on the contrary, to spend the surplus obtained from examination fees, together with the voluntary subscriptions of the members, associates, and apprentices, in the promotion of education; in fact to give opportunities for the future chemist and druggist to acquire a knowledge of his craft. No examining corporation with which he was acquainted had done anything of this kind. Those who had gone through the portal of examination actually taxed themselves year by year, and some of those he saw around him had been subscribing for forty years to the Society with the object, not of making it a trades-union, or a rich and exclusive corporation, but to enable it to give facilities to those who would otherwise have a difficulty in gaining educational training, and consequently their living. That was the object of the Bill now before Parliament, and he hoped Parliament would see that the Society was doing the right thing and would approve of it. As he saw in the room several gentlemen who were anxious to place their services at the disposal of the members on the Council he would say on behalf of that Council that connected as he was with more than one body somewhat analogous, some scientific and some of other kinds, he knew of none in which there was so much self-denial practised by every individual member of the Council. It was no light thing to ask fourteen or fifteen gentlemen from the country to come to London once a month, and sometimes twice, to attend to the business of the Society; to leave their businesses and to devote themselves heart and soul to advancing the welfare of the body politic. These men all deserved the thanks and appreciation of their fellow members, and knowing more of the matter than anyone not in office could know he begged to thank them, and to say that he appreciated from the bottom of his heart the exertions they made for the common welfare.

During the evening a selection of vocal music was given by Messrs. Winn, Coates and Schartan, and Master Kenningham, and was much appreciated.

DINNER IN AID OF THE BENEVOLENT FUND.

The following Donations and Annual Subscriptions have been received or promised. Further contributions are solicited, and should be made payable to

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Barnard, John, 225, Oxford St., W.	5	5	0	..		
Barnes, J. Benjm., 1, Trevor Terrace, Knightsbridge, S.W.	3	3	0	..		
Barnes, J. Burden, 1, Trevor Terrace, Knightsbridge, S.W.	0	10	6	..		
Barron, Fredk., Bush Lane, Cannon St., E.C.	10	10	0	..		
Bascombe, Fredk., 3, Grand Promenade, Brixton, S.W	1	1	0	..		

	Donations. £	s.	d.	Annual Subscriptions. £	s.	d.
Bate, H., 125, South Lambeth Road, S.W.	2	2	0		..	
Bathe, F. J., High Road, Chiswick		..		0	10	6
Beal, E. J., Ilford, E.	1	1	0	1	1	0
Beckett, L., 32, Aberdeen Road, Highbury New Park, N.	0	5	0		..	
Beddard, John, 46, Churton St., Pimlico, S.W.	1	1	0		..	
Bell, C. B., 6, Spring Bank, Hull	2	2	0		..	
Benger, F. B., 7, Exchange St., Manchester	21	0	0		..	
Bennett, George, 8, Filey Crescent, Grove Lane, Stamford Hill	0	10	6		..	
Bentley, Professor, 38, Penywern Road, Earl's Court, S.W.	2	2	0		..	
Bindloss, G. F., 97, Leighton Road, Kentish Town, N.W.	1	1	0		..	
Bird, Augustus, Wood Lane, Shepherd's Bush, W.	5	5	0		..	
Bird and Storey, 42 Castle Street East, W.	5	5	0		..	
Birkett, John, 16, The Crescent, Morecambe	1	1	0		..	
Bishop, Robert, Eye, Suffolk	1	1	0		..	
Blake, C. A., 47, Piccadilly, W.	2	2	0		..	
Blunt, Thos. P., Wyle Cop, Shrewsbury	2	2	0		..	
Borland, John, 7, King Street, Kilmarnock	6	6	0		..	
Bottle, A., 37, Townwall Street, Dover	5	5	0		..	
Bourdas, Isaiah, 59, Belgrave Road, S.W.	21	0	0		..	
Boutall, G. S., Marchmont Street, W.C.	5	5	0		..	
Bowen, Jno. Wm., 13, Curzon St., Mayfair, W.	2	2	0		..	
Bower, W., 96, Tottenham Court Road, W.	1	1	0		..	
Bowerbank, J., Castle Gate, Cockermouth	3	3	0		..	
Bowker, Ellis, Bury	1	1	0		..	
Boyfield, J. R., 16, Cross Street, Hatton Garden, E.C.	0	10	6		..	
Branford, A. J., 3, Chandos Street, W.C.		..		0	2	6
Bremridge, Elias, Park House, New Malden		..		1	1	0
Bremridge, Richard, 17, Bloomsbury Sq., W.C.	2	2	0		..	
British and Colonial Druggist, Proprietors of	5	5	0		..	
Brown, A. J., 55, Trafalgar Road, Greenwich	1	1	0		..	
Buckle, James, Malton, Yorks	0	10	6		..	
Buckley, James J., 111, Earl's Court Rd., S.W.	1	1	0		..	
Bullock, J. Lloyd, 3, Hanover Street, W.	10	10	0		..	
Burden, E. M., Duke St., Manchester Sq., W.	5	5	0		..	
Burden, R. H., 333, Oxford Street, W.	0	10	6		..	
Burdon, John, 14, Giles Gate, Durham	3	3	0		..	
Burroughs, Wellcome and Co., Snow Hill Buildings, E.C.	5	5	0		..	
Burton, Joseph, 397, Cambridge Road, E.	1	1	0		..	
Burton, Percy H., 397, Cambridge Road, E.	0	10	6		..	
Butt, E. N., 13, Curzon Street, Mayfair	105	0	0		..	
Cadman, D. C., Blackheath	1	1	0		..	
Carteighe, Michael, 180, New Bond St., W.	10	10	0		..	
Cashmore, J. F., Mill Lane, Stony Stratford		..		0	5	0
Chapman, Henry, 52, Newboro' Street, Scarborough	5	5	0		—	
Chapman, J. J., 20, Boundary Road, St. John's Wood, N.W.	1	1	0		..	
Chemist and Druggist, Proprietors of	52	10	0		..	
Childs, J. L., Portland	1	1	0		..	
Church, H. G., Cambridge	3	3	0		..	
Churchill, J. and A., 11, New Burlington Street, W.	5	5	0		..	
Clark, John, 11, Melbourne Terrace, York	1	1	0		..	
Cockeram, R. P., 5, Coleman Street, E.C.	2	2	0		..	
Cole, E. H., 171, North Street, Leeds	0	10	6		..	
Collier, Henry, Guy's Hospital, S.E.	2	2	0		..	
Constance, Edward, 65, Charing Cross, S.W.	1	1	0		..	
Cooper, Albert, 80, Gloucester Road, South Kensington	10	10	0		..	
Corder, Octavius, 31, London St., Norwich	2	2	0		..	
Cowles, Chas., 1, West Ham Lane, Stratford	1	1	0		..	
Cownley, A. J., 13, Fenchurch Avenue, E.C.	1	1	0		..	
Cox, Arthur H., 35, Wellington Villas, Brighton	10	10	0		..	
Cracknell, H., 17, Craven Road, W.	1	1	0		..	
Cracknell, H. W., 17, Craven Road, W.	1	1	0		..	
Cripps, Johnson, Reepham, Norwich		..		0	5	6
Cross, W. G., Mardol, Shrewsbury		..		2	2	0
Darby, S., 140, Leadenhall Street, E.C.	5	5	0		..	
Davenport, Horace, 33, Gt. Russell St., W.C.	10	10	0		..	
Davenport, J. T., 33, Gt. Russell Street, W.C.	10	10	0		..	
Davy, Yates and Routledge, 64, Park Street, Southwark	5	5	0	2	2	0
Dinneford and Co, 180, New Bond Street, W.	10	10	0		..	
Dodd, W. R., 2, St. Andrew's Pavement, Amhurst Park, N.	1	1	0		..	
Down, Dr. J. Langdon, 81, Harley Street, W.	5	5	0		..	
Dyson, W. B., 35 Gloucester Road, South Kensington	2	2	0		..	
Elliman, Sons, and Co., Slough	5	0	0	2	2	0
Elliott, George, 50, Park St., Walsall	1	1	0		..	
Elliott, John D., 3, Orchard Place, Woolwich Road, S.E.				0	10	6
Emsley, J., High Street, Stoke Newington.	1	1	0		..	
Evans, John, Temple Gate, Bristol	0	10	6		..	
Evans, Lescher and Webb, 60, Bartholomew Close, E.C.	10	10	0		..	
Eversheld, G. S., 163, New Kent Road, S.E.	0	10	6		..	
Everson, H. C., 16, Cross Street, Hatton Garden, E.C.	0	10	6		..	
Farnsworth, Thos., Codnor, near Derby	0	5	0		..	
Field, H. E., 70, Orton Road, Birkenhead		..		0	5	0
Fitch, R. O., 255, Well St., South Hackney	5	5	0		..	
Fletcher, John, Montpellier Avenue, Cheltenham	2	2	0		..	
Flux, Son, and Co., 3, East India Avenue, E.C.	10	10	0		..	
Forbes, James W., 65, Newport St., Bolton	0	10	6		..	
Foster, F. H., 2, Bank of England Place, Plymouth				0	10	0
Francis, Geo., Market Place, Romsey	0	10	6		..	
Frith, E. J., 198, New Kent Road, S.E.		..		0	5	6
Froom, W. H., 75, Aldersgate Street, E.C.	1	1	0		..	
Frost, George, 7, Corn Market, Derby	1	1	0		..	
Furness, Joseph M., 137, Fitzwilliam Street, Sheffield	1	1	0		..	
Gadd, Chas., 1, Harleyford Road, Vauxhall	1	1	0		..	
Gadd, Robert, 1, Harleyford Road, Vauxhall	1	1	0		..	
Gale, H. 1, Thorne Villas, Addington Road, Margate	0	10	6		..	
Gale, Samuel, 225, Oxford Street, W.	5	5	0		..	
Garner, James, 119, Kensington High St., W.	5	5	0		..	
George, Henry, 68, Broad Street, Worcester	1	0	0		..	
Gerrard, A. W., University College Hospital, Gower St. W.C.	2	2	0		..	
Gibbs, W., Union Street, Ryde, I.W.	2	2	0		..	
Goldfinch, G., 7, Brent Terrace, Hendon	0	5	0		..	
Goldsworthy, W. L., 6, Giltspur Street, E.C.	0	5	0		..	
Goodwin, John, Lower Clapton, E.	5	5	0		..	
Godfrey and Cooke, 30, Conduit Street, W.	1	1	0	1	1	0
Gossling, W. R., 55, Fore Street, E.C.	1	1	0		..	
Gostling, T. P., Market Hill, Diss	5	5	0		..	
Granger, Harold, High Street, Newhaven	0	10	6		..	
Greasley, M. F., 17, North Street, Leeds	1	1	0		..	
Green, John, 196, High Street, Deal	0	10	6		..	
Greenish, T. Edward, 5, Bathurst Street, Sussex Square, W.	2	2	0		..	
Greenish, Thos., 20, New Street, Dorset Square, N.W.	1	1	0		..	
Gulliver, Wm., 6, Lower Belgrave Street, S.W.	2	2	0		..	
Hackman, L. L., St. Clair Terrace, Kingston, Landport	0	10	6		..	
Hall, T. Howard, 80, Drayton Park, N.	2	2	0		..	
Ham, John, Nether Stowey	1	1	0		..	
Hampson, R, 205, St. John Street Road, E.C.	1	1	0		..	
Handley, Chas., 15, High Street, Stoke Newington, N.	5	5	0		..	
Harding, Joseph, Harwich	0	10	6	0	10	6
Hardy, S. C., 177, Regent Street, W.	1	1	0		..	
Harvey, W., Victoria Park Hospital, E.				0	10	6
Harvey, W. R., 98, Humberstone Road, Leicester	3	3	0		..	
Hawke, W., and Son, Wild Court, W.C.	5	5	0		..	
Hearon, Squire and Francis, 5, Coleman Street, E.C.	26	5	0		..	
Heron, James, 139, Princes St., Edinburgh	10	10	0		..	
Herring, W., 40, Aldersgate Street, E.C.	10	10	0		..	
Hill and Son, Arthur S., 101, Southwark Street, S.E.	5	5	0		..	
Hills, T. Hyde, 225, Oxford Street, W.	10	10	0		..	
Hills, Walter, 225, Oxford Street, W.	5	5	0		..	
Hodgkinson, G. A., 254, Goswell Road, E.C.	0	10	6		..	
Hodgkinson, Stead and Treacher, 198, Upper Whitecross Street, E.C.	10	10	0		..	
Hodgkinson (Thomas), Prestons and King, 81, Bishopsgate Street Without, E.C.	5	5	0		..	
Hogg, Mary, Bideford	0	5	0		..	
Holding, John, 169, Hemingford Road, N.	0	10	6		..	
Holmes, E. M., 17, Bloomsbury Square, W.C.	2	2	0		.	
Hopkin, W. K., 16, Cross Street, Hatton Garden, E.C.	10	10	0		..	
Hovenden and Sons, R., 31, Berners Street, W.	10	10	0		..	
Howell, Maurice, 61, High St., Peckham, S.E.	1	1	0		..	
Howie, W. L., Cornbrook House, Eccles	5	5	0		..	
Hughes, Thomas, Red House, Llandilo	1	1	0		..	
Humphreys, Richard, 12A, Upper Belsize Terrace, N.W.	0	10	6		..	
Idris and Co., 10, Ascham Street, Kentish Town, N.W.	5	5	0		..	
Ince, J., 11, St. Stephen's Avenue, Shepherd's Bush, W.				1	1	0
Ive, William, 115, Gloucester Road, South Kensington	5	5	0		..	
Jackson, George, 870, Rochdale Road, Manchester	1	1	0		..	
Jones, W. Harris, 4, Maclise Road, W.	0	10	6		..	
Jones, W. Hy., 406, Caledonian Road, N.	0	10	6		..	
Kay, Samuel, Lower Hillgate, Stockport	5	5	0	1	1	0
Kay, Thomas, Lower Hillgate, Stockport	5	5	0	1	1	0
Kemp, D. S., 27, Coverdale Road, Shepherd's Bush	5	5	0		..	

	Donations. £ s. d.	Annual Subscriptions. £ s. d.
Kemp, W. C., 56, Milton Road, Tranmere Park, Birkenhead	..	0 5 0
Lee, Charles H., 7, Broadway, Ealing, W.	1 1 0	..
Leslie, H., 2, Northumberland Street, W.C.	0 10 6	..
Lidwell, Joshua E., 257, Vauxhall Bridge Road, S.W.	1 11 6	0 10 6
Lloyd, J., Croydon	..	0 5 0
Linford, J. S., 16, Gladstone Street, Hull	2 2 0	..
Lorimer and Co., Hargrave Park Road, N.	15 15 0	1 1 0
MacCrindle, Thos., High Road, Tottenham	2 2 0	..
McDonald, K., Dunkeld	1 1 0	..
Macfarlan and Co., Edinburgh	10 10 0	..
Macintosh, Archibald, 21, Montague Street, Rothesay	1 1 0	..
Mackenzie, James, 45, Forrest Road, Edinburgh	..	0 10 6
McMurtrie, John, 23a, Duff Street, Macduff	..	0 5 0
Madeley, E. S., 3, West Kensington Terrace, Kensington	1 1 0	..
Maitland, Pelham C., 233, East India Rd., E.	1 1 0	..
Maizey, Ebenezer, 194, Cassland Road, South Hackney	0 10 6	..
Marsh, E. R., 49, Chippenham Road, W.	0 10 6	..
Marshall, J. F., 14, Lord St., Gainsborough	1 1 0	..
Martin, N. H., 29, Mosley Street, Newcastle-on-Tyne	5 5 0	..
Martin, T. C. W., 36, Camden Square, N.W.	1 1 0	..
Martindale, W., 10, New Cavendish St., W.	2 2 0	..
Mason, H. D., 16, Cross Street, Hatton Garden, E.C.	0 10 6	..
Mathews, J. and H. 1, Queen's Gardens, Hyde Park	5 5 0	..
Maurice, James, 34, Bedford Street, Plymouth	1 1 0	..
Mee, George, 79, Grosvenor Rd., Highbury, N.	2 2 0	..
Millhouse, H. H., 54, Piccadilly, W.	1 1 0	..
Moody, Stephen W., 6, Walkergate, Louth	..	1 1 0
Morson and Son, Southampton Row, W.C.	10 10 0	..
Moule, Wm., Redditch	1 1 0	..
Mousley, Wm., Redditch	1 1 0	..
Mumbray, R. G., Richmond, Surrey	1 1 0	..
Mumby, Col. Chas., Spring Gardens, Gosport	10 10 0	..
Mundy, Alfred O., 11, Norton Folgate, E.	..	1 1 0
Mutch, J. P., 359, Hornsey Road, N.	0 5 0	..
Naylor, W. A. H., 5, Coleman Street, E.C.	2 2 0	..
Negus, Samuel, 6, Leicester Terrace, Northampton	0 10 0	..
Nesbit, J, 162, High Street, Portobello	5 5 0	..
Newbery and Sons, F., 1, King Edward St., Newgate Street, E.C.	10 10 0	..
North, Walter D., 180, Upper Kennington Lane, S.E.	0 10 6	..
Paffard, Frank, Blackburn	0 10 0	..
Parkinson and Son, Southampton Row, W.C.	5 5 0	..
Passmore, F. R., 17, Bloomsbury Sq., W.C.	2 2 0	..
Paul, Dr B. H., 1, Victoria Street, S.W.	2 2 0	..
Petrie, J. J., Aboyne	..	0 5 0
Pettinger, Elmer, 49, High St., Hampstead, N.W.	0 5 0	..
Phillips, A. J., 180, New Bond Street, W.	1 1 0	..
Plaister, W. J., 13, Gledhow Terrace, South Kensington	1 1 0	..
Powell, T. H., 116, Denmark Hill, S.E.	0 5 0	..
Prichard, Edward, 10, Vigo Street, W.	2 2 0	..
Quain, Dr. Richard, 67, Harley Street, W.	10 10 0	..
Quick, W. T., Lympstone, Devon	0 10 6	..
Quinecy, R. de Q., 143, Fenchurch St., E.C.	4 4 0	..
Randall, W. B., Southampton	5 5 0	..
Ransom, F., Fairfield, Hitchin	2 2 0	..
Ransom, Wm., Hitchin	5 5 0	..
Reboul, A. P., 69, Liverpool Rd., Islington, N.	1 1 0	..
Redwood, Professor, Shern House, Walthamstow	5 5 0	..
Rees, D., Ystrad-Rhondda	0 10 6	..
Rees, R. W., 10, Vigo Street, W.	1 1 0	..
Reville, H. A., Ealing	0 10 0	..
Richards, Edwin, 16, Cross Street, Hatton Garden, E C.	0 10 6	0 10 6
Richardson, John and Co., Friar Lane, Leicester	10 10 0	..
Richardson, W. I., 5, Great Queen St., W.C.	5 5 0	..
Robbins, J., 147, Oxford Street, W.	10 10 0	..
Robertson, George, London Hospital, E.	1 1 0	..
Robinson, R. A., 195, Brompton Road, S.W.	5 5 0	..
Robinson, Whiteley, Haworth, Yorks	0 10 0	..
Roper, Henry E., Oundle	..	0 5 0
Sadler, Wm., jun., 115, Stoke Newington, Road, N.	1 1 0	..
Sandell, Thos. O., Baron's Court Road, West Kensington, W.	3 3 0	..
Sandford, Geo. W., 47, Piccadilly, W.	5 5 0	..
Sainsbury, S., 176, Strand, W.C.	0 10 6	0 10 6
Sanger, C., 489, Oxford Street, W.	1 1 0	..
Saul, John E., 143, New Bond Street, W.	1 1 0	..
Saunders and Son, 81, Cannon Sreet, E.C.	5 5 0	..
Savage, W. D., 23, Freshfield Road, Brighton	1 1 0	..
Savory and Moore, 143, New Bond St., W.	52 10 0	..
Schaeht, G. F., 52, Royal York Crescent, Clifton, Bristol	1 1 0	..
Sharp, Benjamin, Brook Villa, Batheaston, Bath	..	2 2 0
Shenstone, J. C., 13, High Street, Colchester	0 10 6	..
Shepherd, J. W., Settle	2 0 0	..
Shillock, A., Addiscombe	0 5 0	..
Silverlock, H. T. and W. B., 92, Blackfriars Road, S.E.	5 5 0	..
Simpson, Henry D., 2, New Street, Louth	1 1 0	..
Slater, John, Castle Street, Beaumaris	1 1 0	..
Smith and Co., 132, Borough, S.E.	5 5 0	..
Smith, J., High Street, Clay Cross	0 10 0	..
Smith, John H., 227, Commercial Road, E.	..	0 10 6
Smith, Robt. G., 5, Earle Road, Liverpool	0 5 0	..
Snow, G. F., 7, Pall Mall East, W.	0 5 0	..
Soole, J. H., 48, Compton Street, W.C.	..	0 5 6
Spalding and Hodge, 101, Drury Lane, W.C.	5 5 0	..
Spokes, Sir Peter, 25, Chester Terrace, Regent's Park, N.W.	5 5 0	..
Spurling, W. E., 187, Marlboro' Road, Chelsea	0 10 0	..
Spyer, Newton, 1, Lancaster Gate, W.	1 1 0	..
Squire and Sons, 413, Oxford Street, W.	26 5 0	..
Stamp, E. B., 29, High Street, Hampstead	2 2 0	..
Stanton, H. S., Daere Hill, Rock Ferry	0 5 0	..
Stephenson, G. R., 55, St. James's St., W.	0 5 0	..
Stephenson, J. B., 48, Frederick St., Edinburgh	..	0 10 6
Stickland, W. H., 23, Cromwell Place, South Kensington, S.W.	1 1 0	..
Stone, Fred W., Exeter	1 1 0	..
Stooke, A., 2, King Street, Milton next Sittingbourne	1 1 0	..
Storey, Wm., 43, Church Street, Seaham Harbour	..	0 5 0
Strother, C. J. (*Collected by, in small amounts*), Raglan House, Kennington Park	13 13 0	..
Stuart, J. E., 180, New Bond Street, W.	5 5 0	..
Swingburn, R. H., South Molton	1 1 0	..
Symes and Co., 14, Hardman St., Liverpool	5 5 0	..
Symons, W. H., 130, Fellowes Road, South Hampstead, N.W.	2 2 0	..
Tanner, A. E., High Cross, Tottenham, N.	2 2 0	..
Taylor, Fredk. J., Lovat Bank, Newport Pagnell	5 5 0	..
Taylor, Geo. S., 13, Queen's Terrace, St. John's Wood, N.W.	2 2 0	..
Thomas, H. A., 78, Gracechurch Street, E.C.	2 2 0	..
Thompson, H. A. and Son, 22, Worship St., E.C.	5 5 0	..
Thompson, John, 11, Aldersgate Street, E.C.	5 5 0	..
Thresh, Dr. J. C., The Willows, Buxton	2 2 0	..
Trist, Richard, Pinner	0 10 6	..
Truman, H. V., 187, Newington Butts, S.E.	..	0 5 0
Tuchmann, Dr. M., 113, Fellowes Road, Hampstead, N.W.	1 1 0	..
Turner, Charles E., 20, Bury St., Gt. Russell St., W.C.	2 2 0	..
Turner, Charlton, East Finchley	0 5 0	..
Urwick, W. W., 60, St. George's Road, S.W.	1 1 0	..
Vialls, J. B., 56, Stanhope Street, W.C.	1 1 0	..
Wade, T. T., 37, Grosvenor Road, Bristol	0 2 6	..
Walker, Henry, 44, Bernard Street, W.C.	1 1 0	..
Walker, J. C., 74, Turnpike Lane, Hornsey	0 5 0	..
Warren, William, 24, Russell Street, Covent Garden	1 1 0	..
Welch, S. C., 4, Jewry Street, E.C.	1 1 0	..
West, Charles, 19, Finsbury Square, E.C.	1 1 0	..
Whittaker, John W., Oldham Rd., Rochdale	..	0 2
Wigg, Henry, J., 225, Oxford Street, W.	5 5 0	..
Wilkins, H., St. James's Vestry, Piccadilly	0 10 6	..
Williams, C., Pembroke Dock	1 1 0	..
Williams, John, 16 Cross Street, Hatton Garden, E.C.	21 0 0	..
Wilson and Son, Harrowgate	..	1 1 0
Wilson, C. F., 25, Liverpool Road, Stoke-on-Trent	..	0 5
Wilson, James, 53, Hatton Garden, E.C.	1 1 0	..
Wodderspoon and Co., 7, Serle Street, Lincoln's Inn	1 1 0	..
Wood, C. H., 46, Loraine Road, N.	2 2 0	..
Woolley, Hermann, 69, Market Street, Manchester	5 5 0	..
Worfolk, G. W., Ilkley	1 1 0	..
Wright, Alfred, 8, Bentinck Crescent, Elswick Road, Newcastle-on Tyne	0 10 6	..
Wright, Layman and Umney, 50, Southwark Street, S.E.	10 10 0	..
Wyman and Westwood, 25, Charles Street, Farringdon Road, E.C.	5 5 0	..
Yates, Robert, 64, Park Street, Southwark	..	1 1 0
Yewdall, Edwin, 56, Wade Lane, Leeds	0 10 6	..
Young, R. F., Station Road, New Barnet	1 1 0	..

The Pharmaceutical Journal.

SATURDAY, MAY 21, 1887.

THE ANNUAL MEETING.

THE official record of the proceedings at the Annual Meeting, which appears in the Journal this week, is so full that there is little occasion for doing more in the present number than direct attention to it as being in many respects deserving of careful perusal by those members and associates of the Society who were unable to be present at the meeting. Some of the subjects dealt with are of especial interest at the present time, notably that introduced by Mr. FURNESS, which has an important bearing upon the future of the Society. In the address delivered by the President there will be found matter that may be usefully considered by many of those who are in the habit of declaiming against the Society in some instances for what is done by its executive, and in others for the non-performance of something they deem desirable or possible. They will, we think, have the opportunity of recognizing an unequivocal declaration of the readiness on the part of the Society's executive to take an active and representative part on behalf of its members and the pharmaceutical community generally that needs only the active support of the body and the manifestation of practical interest on the part of its individual members to be made effective for their benefit so far as that is practicable. It suggests the lesson that the action of an executive, such as the Council is, can only be the exponent of the conditions obtaining in the body represented, and that in the absence of union, unanimity and loyalty among the members of that body effective representative action for the general good cannot be hoped for. It may be hoped that this useful lesson may have some effect in promoting the establishment of a solidarity in the pharmaceutical body that is still much needed, and if that be the case, the efforts of the Council and the President of the Society may in future meet with greater success and greater appreciation than they have yet done.

THE BENEVOLENT FUND.

THE dinner held in aid of the Pharmaceutical Society's Benevolent Fund last Tuesday at the Freemasons' Tavern was very satisfactorily supported by a large attendance, chiefly of members and associates of the Society, from all parts of the kingdom. Though the absence on this occasion of guests representing the learned societies and other bodies deprived the dinner of one great feature of attraction, the hearty interest manifested in the special object of the gathering showed that this part of the work which has been done by the Pharmaceutical Society for the benefit of the body it represents is thoroughly well appreciated by a large section of that body. The chair was taken by Mr. CARTEIGHE, the President of the Society, and after the usual loyal toasts had been drunk he proceeded, in proposing the toast of the evening, to enumerate the various steps of progress which have marked the action of the Society in promoting the provision of a fund for the relief of distressed members of the pharmaceutical community. In the first place he directed attention to the fact that though the Benevolent Fund was originated by the Pharmaceutical Society as one of the great objects contemplated in its charter of incorporation, and its administration is still conducted by the Council of the Society, participation in its benefits in cases of necessity is no longer confined to those who are members or associates, but that since the passing of the Pharmacy Act of 1868, the provision for the relief of distress which the Fund affords has been extended so as to be available for all members of the craft who are on the Register of Chemists and Druggists, as well as for their widows and children. This liberal extension of the scope of the Fund, which is to a very large degree the result of the efforts for which chemists are druggists are indebted to Mr. G. W. SANDFORD, is a standing testimony to the desire to benefit the trade at large which has throughout the whole history of the Society characterized its executive. That circumstance alone should be regarded as sufficient to silence the not unfrequent, but unjust, complaint that the Society has done nothing for the benefit of the trade generally, and as regards the Benevolent Fund, it should be accepted as establishing an undeniable claim on every individual member of the trade for some measure of support as a subscriber to it.

The principle upon which the Benevolent Fund is administered is another reason for urging upon chemists and druggists its claim for support from them. The reliance upon annual subscriptions for the means of meeting calls upon the Fund, which the President pointed out to be the policy by which the Council is guided, necessarily imposes upon the trade at large the duty of contributing to it, and if from this point of view it be inquired what the trade does for itself in promotion of the efforts of the Society, it will be seen that the assistance thus rendered is but very limited. There is, therefore, ample ground for the appeal made by the President for additional subscribers, in short for everyone connected with the trade to contribute a small sum annually, so that it might be said the work of the Benevolent Fund was being supported by the whole trade for the common good of all belonging to it. Such support would be an ample justification of the Council's resolve to back the subscriptions against the invested capital in regard to the possibility of dealing effectually with the numerous applications for relief that are constantly coming before it. It was with no sense of dissatisfaction with what has already been done that this appeal was made. The

liberality of subscribers and donors to the Fund hitherto has been beyond question, and its future continuance within such limits may be trusted to; but to enlarge the beneficial influence of the Fund, and to complete the catholic character which has been aimed at, it is essential that there should be a very much larger number of small subscribers spread over the whole country. That this is the case is evident from the fact that the revenue of the Fund is not at the present time sufficient to admit of all the applicants for relief being granted annuities. It is evident, also, from the fact that there is room for doubting whether the sums now paid in this way are adequate for the purpose contemplated. Thirty pounds a year is but a small amount, and in many instances if it could be increased to fifty pounds much greater service would be rendered; but it is only by means of considerable addition to the number of subscribers that there can be any hope of either increasing the amount of the annuities or the number of annuitants.

It may, we hope, be expected that the forcible manner in which the claims of the Benevolent Fund to support from chemists and druggists generally have been urged on the occasion of this dinner will have the result of obtaining a hitherto unprecedented accession to the number of subscribers. The amount collected on that occasion, though constituting a substantial addition to the resources of the Fund, must, in accordance with the provisions obtaining in regard to donations, be invested, and only the interest upon it will be available for the purpose of paying annuities. It has indeed fallen short of the amounts contributed at the previous decennial festivals; but considering the depressed state of business, and the numerous other demands that have had to be met within a recent period, it is matter for congratulation, we think, that so much as eleven hundred pounds should have been contributed in the shape of donations and new annual subscriptions. But apart from the immediate result of this Festival in augmenting the resources of the Fund, it may be anticipated that the opportunity offered for giving greater publicity to the character of this section of the Society's work, and to the reasons for its being favourably regarded, may have the effect of inducing many who have not hitherto given it the attention that it merits to consider the case, and to come to the conclusion of rendering their assistance in the future.

THE REDWOOD TESTIMONIAL.

After the termination of the Annual Meeting of the Society a large number of the subscribers to the Redwood Testimonial Fund assembled, in accordance with a notice that had been given, for the purpose of taking part in the concluding formal ceremony of handing over to the Society a portrait of Emeritus-Professor Redwood, which the Committee has had painted by Mr. Sydney Hodges to be placed on the walls of the Society's premises. The chair was taken by the President, who briefly stated the object of the meeting, and called upon Dr. Garrod, as a member of the Executive Committee, to be kind enough to present the portrait to the Society on behalf of the subscribers of the Fund. In the course of his address Dr. Garrod mentioned the circumstances under which the Testimonial had been originated, and the mode in which it had been carried out by the foundation of a scholarship in commemoration of the great services that have been rendered by Professor Redwood during a long series of years in the advancement of the objects of the Pharmaceutical Society and the promotion of education. After alluding to some of the more conspicuous instances of Professor Redwood's active labours as an officer of the Society, and in official connection with the Chemical and Cavendish Societies, as well as in other capacities, he spoke in warm terms of admiration of the important personal influence exercised by the Professor, which an acquaintance of nearly forty-five years had given him the opportunity of observing, referring especially to the character and style of his lectures delivered at Bloomsbury Square. The portrait was then formally presented, and the President in receiving it on behalf of the Society expressed his satisfaction at being its recipient, besides congratulating the Society at this new addition to its gallery of worthies which would take a place in company with the portraits of the Professor's good friends, Jacob Bell, T. H. Hills, and G. W. Sandford. A further proceeding of the meeting was to request Professor Redwood's acceptance of a replica of the portrait that is being prepared. In reply, Professor Redwood expressed his deep sense of the honour that had been conferred upon him and of his gratitude to the originators and promoters of the undertaking which had been carried out with such judicious regard to his own feelings. In conclusion he said that feeling he had still strength and health for the performance of much work, he hoped to be able to devote such energies as he retained in the furtherance of the cause to which he had been so long devoted. The Professor's speech was received with enthusiastic applause, and after a vote of thanks had been passed to Dr. Garrod, and acknowledged by him, the proceedings were terminated.

THE CONVERSAZIONE.

The Conversazione held at the South Kensington Museum on Wednesday evening did not in any respect fall short of the success that has hitherto marked this annual gathering. The number of visitors on this occasion was 2796. The reception by the President and Mrs. Carteighe, the Vice President and Miss Gostling, the Treasurer and other members of the Council, several of whom were accompanied by ladies, commenced shortly after eight o'clock, and the halls and galleries of the Museum were soon filled with guests. During the evening an excellent selection of music was performed by the band of the Royal Horse Guards Blue in the principal court, under the direction of Mr. Charles Godfrey, and in one of the theatres attached to the Museum a succession of numerous audiences were entertained by Mr. Winn's glee party. The whole entertainment passed off most agreeably, forming a pleasant supplement to the more serious work of the day at the Annual Meeting.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, May 18, 1887.

MR. MICHAEL CARTEIGHE, PRESIDENT, IN THE CHAIR.

MR. T. P. GOSTLING, VICE-PRESIDENT.

Present—

Messrs. Allen, Atkins, Baildon, Bottle, Butt, Cross, Greenish, Hampson, Hills, Radley, Richardson, Robbins, Savage, Schacht, Southall, Symes and Williams.

The Council arranged the order of business at the Annual Meeting, to which it then adjourned, after restoring several persons to their former status in the Society.

FORTY-SIXTH ANNUAL GENERAL MEETING.

MR. MICHAEL CARTEIGHE, PRESIDENT, IN THE CHAIR.

The forty-sixth Annual Meeting of the Pharmaceutical Society was held at the Society's house, Bloomsbury Square, on Wednesday, the 18th inst. Mr. Michael Carteighe, President, in the chair.

The Secretary read the notice convening the meeting. The report, which had already been published, was taken as read.

The PRESIDENT, in moving the adoption of the report and financial statement, said he should probably consult the convenience of the members if he did not go into much detail with regard to the ordinary routine work of the Council, much of which was of a character well understood, but which could not very well be recorded. The financial statement also spoke for itself, and there was nothing he need call special attention to. The first part to which he need allude was that which referred to the Pharmacy Act Amendment Bill, and which stated the position in which the Bill stood when the report was issued. Since then the Bill had been postponed by consent until after Whitsuntide, so that substantially it remained as was stated. This Bill was the outcome of a series of discussions which had taken place in that hall and at the Council table with regard to the best way of training candidates for examination. They knew that a large number of candidates were plucked, which, of course, caused great irritation; but he feared that would always remain so. He never knew an examining body which was beloved by those who had to pass through the examination, and, of course, that feeling was not to be expected on the part of those who were rejected. On the ground of expediency, therefore it would seem desirable to propitiate the rejected candidates and give them an opportunity of succeeding if possible at the first attempt. Much had been said about the possibility of doing this, that, and the other by examination, but all would agree that examinations were necessary evils. Their forefathers did not employ examinations; they put a man through a course of training, a long course, watched the work he did, and if it was satisfactory admitted him to the craft. In later days, all over Europe especially, there had been an attempt to undo that sort of thing; it was thought that seven, or even five or six years' apprenticeship was too long, that any intelligent lad could learn certain things much more quickly in these times than he could before. He believed their forefathers and the ancient Greeks and Romans were right, and that the best test of a man's qualification was what he could do in a series of years, not what could be got out of him in an hour, or three hours in an examination. He spoke feelingly, having done as much mischief in this way as any member of the Society; but having been appointed an examiner he had had to carry on the examination according to the regulations which prevailed. The most painful portion of an examiner's task was that of listening to the plaintive remarks of the rejected candidates. Those remarks did not generally apply to the examiners, the complaint was more of this kind:—"If I had known in early days what I should have to do I could have prepared for it, and could have passed, but until I was twenty-one I did not even know there was a Preliminary examination to pass." It was sometimes the fact that a youth came into the trade, and until he was twenty-one he was not told that he would have to pass a Preliminary examination as well as a qualifying one. What was to be expected from those poor fellows? He had had to reject hundreds of them; but while he rejected them with firmness and decision he sympathized with them, and would be the first to put his hand into his pocket to assist them to get the necessary knowledge and training. They could not be sentimental with regard to examinations; these must be carried on in a practical way, and unless one could adopt the expedient which the Chinese did of examining a man for three months, they could never be quite certain that he was competent. That was too expensive a process for the chemist and druggist, therefore they asked the members to approve the principle that every person who came into the craft at an early age should know what he had to do before he could be registered and qualified to earn his living, and, secondly, that he should have the way pointed out to him by which, with ordinary care and diligence, he might obtain the necessary knowledge tacked on to the practical knowledge he obtained in the shop for the purpose of satisfying the examiners. The most striking thing with regard to the draft Bill now in the House was the remarks of members of Parliament with regard to what was being done for the trade, who did not all seem to appreciate these efforts. They were not long-sighted enough to see that what was good for the public and for the individual with regard to education must in the long run be good for the trade. What astonished members of Parliament was that those who were looked down upon by some people as ordinary tradesmen were putting their hands in their pockets every year and spending money to promote education, and to put young men in the way of passing an examination to come into the very craft of which they were members. It was astonishing to them to find that those on the Register were so generous as to subscribe a handsome sum annually for this purpose, and that went a great way towards enlisting sympathy for any proposal which came from the Society. They had heard of examining corporations, but he knew of none in the kingdom by which a systematic expenditure was carried on for this purpose except the Pharmaceutical Society. It was to the credit of the founders and the present members and associates that they were willing to continue to subscribe to force on the means whereby other persons had become qualified to practise pharmacy. The Bill now introduced was the outcome of the approval which members had given from time to time to this subject. It had been held desirable that some evidence of having acquired knowledge should be presented, and as the powers they at present possessed were not sufficient they went to Parliament and asked for these powers, feeling confident that the Society would continue in the future as it had in the past, desirous of affording facilities for education throughout the whole of the kingdom. That had been the policy of the Society and would continue to be so. It would be perhaps right to refer to one objection which might be taken to the Bill, that it did not cover enough, and there was also another objection which might be taken by some members, and was taken by some outside. The first objection, was, What was the use of going in for small reforms; why did they not take up something else, remodel the constitution, abolish the awkward grades of membership, associateship, and all that sort of thing? The answer to that was

plain. He would assume that they had all read the report of what took place when the Bill was approved in the Council, and it would be remembered that every member who made observations expressed the desirability of going to Parliament for several things; it was simply a question of tactics, how best to deal with the one subject which at present was most important, namely, that of education, on which, at all events inside the Society they were supposed to be agreed. If they had gone with this Bill feeling that the members generally were antagonistic it would have been hopeless, and he ventured to think that the members had expressed their decided opinion that considering the difficult task which every principal had to perform with regard to his apprentice or pupil it was unreasonable to expect him to teach him such an amount of elementary chemistry, botany and *materia medica* that was necessary to pass the examination. Parents and guardians would not pay for that sort of teaching, and therefore the tendency of the time was now for apprentices and pupils to be taken into a pharmacy, the arrangement being that the principal did not undertake to teach them anything more than they could learn in the ordinary course of business. In old days a principal would take an apprentice into his house. He was supposed to be educating him from morning to night, and almost in the night, and he was to take care of his morals after the day's work was over, and especially on Sunday. That was perhaps one of the best forms of training, if principals would undertake the work, but he confessed he had never had the courage to undertake it, though he respected those founders of the Society, men like Henry Deane and others, who used to do so. The fact was that no amount of money recompense would repay an intellectual man for giving so much time to his pupil, and, therefore, the present system was likely to continue, by which the apprentice was allowed to run through the ordinary course of work in the shop or laboratory, whilst he had to get his scientific education in the lecture or class room. The principal might say, "I will give you every facility for learning, but I will not undertake after a hard days' work to sit down and teach you modern chemistry or botany." That was a reasonable proposition, and to meet that the present Bill was drafted. They went to Parliament for one subject only, because it was considered as a question of tactics it was more likely, in the present state of Parliamentary business, to pass. The Council was painfully conscious of a great many things which wanted remedying; probably every Prime Minister was also conscious of many things with regard to the country which wanted remedying; but the Council had to deal with things as they arose, and to attempt to introduce into Parliament any subject about which there was any material controversy amongst themselves and in the present congested state of business in the House of Commons would be useless. They believed that in this particular part of the programme they were substantially correct, and if any opposition arose it would be on account of misapprehension rather than anything else. To the other class of objectors who said that this would increase the difficulty of getting on the Register, he simply traversed the statement and said it was just the contrary. It was assumed that a man going into an obscure Scottish village was so brilliant that he could come up and pass an examination without any help from outside. If he could, so much the better, but as a matter of fact, did experience either of the Scotch or English Board of Examiners show that this was the case? All who had held the office of President or Vice-President of the Society would agree that it was very rare for a man in these days to pass the qualifying examination without having obtained professional assistance in one or other or all of the branches of the examination. The majority of men having to work during their apprenticeship, and not being simply students, had to get the necessary knowledge somewhere to pass the examination. As a rule their previous history and training were not sufficient to enable them to do it without the assistance of a teacher of some kind, and not knowing any better many of them went to what he considered irregular instead of regular teachers. They neglected the opportunities given during apprenticeship, waited until it was over, and then thought they could go to some place in London where everything was made easy, and in three months be prepared to pass. He ventured to think that inasmuch as the law required that every person should pass an examination in the subjects embraced in the Bill, namely, chemistry, botany and materia medica, which covered ground that in ninety-nine cases out of one hundred could not be covered without assistance other than that obtained from the master, the candidate was now driven outside for his education in the scientific portion, and therefore the result of the Bill would be to facilitate persons getting on the Register rather than to place difficulties in their way. An objection has been raised in Glasgow and the West of Scotland with regard to the difficulty about apprentices. It was said that the arrangements there for getting medical qualification were very easy—that a man in connection with the College of Physicians of Glasgow, and to a certain extent in the University of Glasgow, where he could take certain subjects in turn, might after a course of seven or eight years' persistent work eventually become qualified as a medical man—and their friends in the West of Scotland had always said that if a compulsory course of study were required it would be difficult to get men to come into the craft. The answer to that was that where there were such facilities as were known to exist in Glasgow and all Scotch towns for obtaining an excellent education at a nominal cost, there could not be any difficulty in the way of getting men on the Register. If the difficulty was that men wished to take apprentices without telling them frankly and fairly what they would have to do before they were qualified to enter the trade and earn their own living no doubt it would be a little inconvenient to have any legislation of this sort, but if the master intended to act conscientiously towards a lad whom he was taking as an apprentice he ought to assist rather than obstruct the passing of this Bill. He would not say much about the Early Closing Bill, as it would only be repeating what had been said by himself and others before, that many would hail with acclamation a bill that shut up every chemist's shop at eight o'clock every evening. But even Sir John Lubbock was not able to promise that. He told them that though the shop was shut up, the side door would be open for emergency cases. Now, in the present day there were practically no side doors in large towns. There was only one door into the pharmacy, and that was the front door, and he submitted to men of practical common sense that any Act of this sort would be practically useless for the purpose contemplated. If it were possible to carry out the Act in its integrity, the only way would be to make it compulsory to shut up completely. But that the public would not submit to, and therefore in the case of chemists and druggists the exception was needed. It was said you were not obliged to keep the shop open, but in many cases, having regard to the enormous rent, a man had not even a back room to sit in; he or his assistant must be in the shop and must be at the service of the public, and he was, therefore, practically upon duty and his shop open. Further than that, his view with regard to this Bill was that there was an attempt being made to compel a certain number of people who were found in every occupation who objected to be bound by hard and fast lines. If there were a large number who objected to the spirit of the Act, and it were passed against that feeling, there would be in the suburbs of all large towns all sorts of attempts to evade the Act, even if it were carried out elsewhere, and

practically the shops would be kept open although the statutory closing hour was eight o'clock. Under these circumstances he hoped the promoters of the measures would think proper to exempt chemists and druggists from its operation. But he took higher ground even than that. He sympathized with the idea that every man of the craft or apprentice should be relieved from labour at an early hour. He sympathized also more strongly with the proposition that whether they were called traders or not, they were altogether different from the butcher or baker. They had duties to perform to the public, and, like the medical man, were bound to be at the call of the community and they must recognize that as a condition of their existence. These could not be got rid of by legislation any more than you could stop the flow of a stream. He thought he might reserve anything he had to say with regard to the other portions of the report until afterwards, if necessary, but with regard to the Honorary Members, he might mention that there were a number of distinguished men recently elected and that was due to the fact that for some few years the Council had been contemplating a little change in the Bye-law with regard to this matter, and pending those changes elections had not taken place. By the present Bye-laws Honorary Members could only be elected once a year, and at a result of passing them over for two or three years there had been twelve vacancies created, and those were filled up at the last Council meeting. He hoped the Society would see its way before long to establish not only a list of Honorary, but of Corresponding Members. That class usually consisted of men younger than the Honorary Members, such as were spread all over the world doing work in the particular direction in which the Society was working. There were all over Europe, and to a certain extent in India and in the United States, a number of men whom he would like to see associated with the Society as corresponding members, who would not only do the Society honour, but would be extremely useful in advancing pharmacological knowledge, and he hoped that before another year it would be possible to elect a number of these men on the roll of Corresponding Members.

The VICE-PRESIDENT seconded the motion.

Mr. LONG cordially supported the scheme of the curriculum because it was that which nearly all the early members of the Society went through in a voluntary manner in the same way as they underwent the voluntary qualifying examination. With regard to apprentices, he thought that if a man were qualified for his business and took a pleasure in it, and, instead of throwing his books on one side after he passed his examination, kept up his studies and took an interest in his apprentices and assistants, he would be very much better prepared to take advantage of the curriculum. He would advise all those who took apprentices to see that they attended lectures as early as possible, which would be greatly to the benefit both of the pupil and the master. Unfortunately, it was not always the principals, but the youths themselves who were at fault. With regard to early closing he had shut up early for twenty years, but it was impossible to do so now, because his neighbours would not do it. He should like to see a general closing hour for all chemists, just the same as bankers. They did not find a bank in a poor neighbourhood keep open longer than a bank in a richer one. When the public knew they could get anything at any time the result was that it threw all the business of the day into the evening. In the suburbs all the business was done in the evening, just when the chemist had to let his assistant out, or when he wanted to get out himself. He gave the Council credit for its sagacity in extending the premises, but he hoped they had not forgotten that all improvements did not go to the improver, but were a sort of "unearned increment." He hoped that had been taken into consideration. At the present time the Society's rules and teachings were not valued by those for whose benefit they were intended, and if the chemists themselves did not come up, they might be induced to do so by modifying the fees in some way instead of throwing the Society open to the public. Directly the Pharmacy Act passed the Society ought to have become a branch of the Government—as it was in one sense—for regulating pharmacy matters, and he thought the Council neglected its duty in respect to one of the three objects for which it was founded, namely, the protection of its members. He admitted that it had attended to the other two, namely, to benevolence and to education. In the latter respect he considered that it had been of the greatest benefit to himself, for if he had been an ignorant jackass, the many hours of leisure which he was forced to spend would have been irksome, but owing to the education he had received he had resources in himself. Still he thought the Society should devise something with regard to the protection of the members as a trade body.

Mr. ROBINSON said he had one or two questions to ask on the financial statement. He saw the postage of the Journal came to considerably more than it would amount to at a $\frac{1}{2}d.$ a copy to the members and associates. He presumed a considerable proportion was for foreign postage.

The PRESIDENT said that was the case to a considerable extent.

Mr. ROBINSON said he had listened with great attention to the President's remarks and had nothing to say against them, but there was something further he should like to hear, and if the Council could see its way to carry out the objects of the Charter entirely it would be a great advantage. No one would accuse them of neglecting the Benevolent Fund, and they all knew the Council was very careful with regard to the first object of the Charter, namely the promotion of chemistry and pharmacy; and also the second, the promotion of a uniform system of education; but there was another line which said the Society was also to protect the interests of its members. He did not say it had neglected that altogether, but it would be very satisfactory to hear that it intended to protect the interests of the members wherever it could do so without lowering the dignity of a great Society. Of course he did not wish to do anything which would injure that dignity, but an old clergyman from whom he used to receive instruction told him that a dignity which required to be continually trotted out was not worth very much. It seemed to him that the Society might give encouragement to men in the country who at present thought it neglected their interests, and that it would be right in case a man was unjustly attacked, as they were sometimes, to assist him. He did not say it had never done so, because he knew it had; for he had read how, many years ago, when a man named Betts set up an exclusive right to the use of capsules of his manufacture for bottles, and thirty or forty chemists were threatened with prosecution, they united together, and by the help of the Society and its officers and Solicitor—they also subscribing some money themselves—put a stop to those proceedings. It seemed to him that if the Society were willing when thirty or forty members were attacked unjustly to defend them, it might also be willing to take each individual case, and to give support to anyone in such a difficulty. He also remembered an occasion in which the Inland Revenue Department contended that the label, "Rubini's Spirit of Camphor" was liable to stamp duty, and there again the Society stepped in and resisted the claim. Of course, where a man had clearly broken the law he did not want the Society to defend him, but the argument he had to meet was this: It was said, "You might drive the Society into collision either with the Legislature or with the public, and it might be that they were trying to set up some exclusive right against the public interest." He did not want anything of that sort. Anyone who acted illegally must take the consequences of doing so; but there was an

opening, he thought, more especially when another association established purely for trade purposes was not in a very healthy condition, for the Society to step in and gain the goodwill and the guineas of many men in the country who did not at present subscribe. He had always tried to impress upon these men the necessity of joining the Society, and told them that if they kept aloof they had not the chance of altering its constitution; whereas if they would come forward and join it they would be enabled to influence its policy, and to elect those men on the Council who would carry it out. One matter he had brought forward last year, but as the Council promised to consider it, he did not wish to refer to it again, except to say that, although the gentlemen on the Council unanimously agreed that nothing could be done, he believed the majority of them were in favour of some alteration being made. He referred, of course, to an improvement in the Journal; and he was waiting to see on what lines the alteration could be made. There was a considerable expression of opinion on that point, and he had had many more communications on the subject than he expected, showing that there was a large and growing opinion that some change was desirable. Therefore, although it was agreed that nothing could be done specially at that meeting, he hoped the matter would not be lost sight of.

Mr. HOWARD HALL said he noticed from the first paragraph of the report the statement that the financial posi- of the Society was very satisfactory. He had taken a little trouble to go into the items of the account, and he found the net receipts for the last year were £316 10*s.* 8*d.* more than the year previous. As a set off against that there was a falling off in the subscriptions to the amount of £87 8*s.* 6*d.* which, he took it, represented a loss of seventy subscribers. With regard to the entrance fees, which was an important item, there was an increase of £273 5*s.*, and also on registration fees, of £23 2*s.* Then with regard to the Journal, to which he had called attention before, he thought it ought to be made a source of profit to the Society and not a loss. This year he could not see any profit at all, whereas one year, if he remembered rightly, a profit was shown to the amount of £10. The item of paper showed an increase, but the printing showed a decrease, which was very satisfactory. The item of publisher's commission did not appear to him very satisfactory. There was a little increase in the item for contributions, which he was glad to see, because he thought the Society ought not to be in the position of accepting unpaid labour. He was also glad to see an item of £50 given to Professor Dunstan for research work, and hoped that good results would follow. Returning to the Journal, he saw that though the publisher's commission had increased there was on the other side a diminished distribution or sale of the Journal to the extent of £39 2*s.* 8*d.* Could not better arrangements be made with the publisher? It did not seem to be right that there should be an increased commission on a diminished sale.

The PRESIDENT asked if Mr. Hall would explain that point a little further.

Mr. HALL said the publisher's commission was £549, and by last year's report it was somewhat less.

The PRESIDENT said the commission was of course on the business done during the period under consideration. If he were criticising the accounts he had nothing to do with last year, but must take what appeared on the other side.

Mr. HALL said he was only taking it for the purpose of comparison with last year, and it showed a decrease of sales, and an increased publisher's commission, which he thought must be a bad system of business. Then he found on the receipt side some items which swelled up the income,—penalties and costs for infringment of the Pharmacy Act, £94 5*s.*; but on the other side the law costs showed an increase of £138 3*s.* 9*d.*, and the question was whether the game was worth the candle. Of course he knew that the law costs included other business besides prosecutions. The next item he noticed was for the purchase and binding of books, which showed an increase of 2*s.*, and he should have been very glad if it had been more. The Museum also showed a slight increase, and that was very satisfactory because they saw the result in having a more perfect Museum. He was glad to see a decrease in the heading of office expenditure of £70, and he wished to give due credit to the Secretary not only for the efficient way in which he performed his duties generally, but also for the care he evidently took in keeping down the expenses. Then one subject—which although not referred to in the report he could not pass over—was the retirement of Professor Bentley. As an old student of the Society, he could not be present at the Annual Meeting after this had been brought to his knowledge without expressing his best thanks to Professor Bentley for the very great kindness he showed him, not only when a student of the Society, but ever since.

Mr. FLETCHER said there was a paragraph referring to the unsatisfactory number of failures in the examinations, and he wished to ask whether the London Board of Examiners had adopted a regulation by virtue of which a candidate for the Minor examination who failed in the first or any subsequent subject was prohibited proceeding further on his examination, and whether such regulation had been approved by the Council, and was in accordance with the Bye-law, section 10, clause 11?

The PRESIDENT said the answer was very simple. In the first place the Board of Examiners in London and in Edinburgh had adopted no such regulation, but it was their practice to act as described. Mr. Fletcher was evidently confusing the regulations which affected the candidates with the practice of the Board. By the Bye-laws the Examiners were authorized to grant or refuse to such persons as tendered themselves certificates of competent skill or qualification, and in accordance with that practice referred to the examiners granted or refused a certificate so soon as the person who had tendered himself had convinced them by failure in any one of the given subjects that they could not grant him a certificate. They then considered that he could not on that occasion claim their further attention. This course was in accordance with both the Act and the Bye-laws; in other words, the examinations were to test competency, and not to test the degree of knowledge and experience below competency.

Mr. FLETCHER said if he were in order he should like to make a remark on that because he believed this practice was a comparatively new one.

The PRESIDENT said that was altogether a mistake; it had been in force for years, both in London and in Edinburgh.

Mr. FLETCHER said if that were so he thought it would be only fair to candidates coming up for examination to distinctly inform them that if they did fail in one subject, although that might be the very first given them, they would be prohibited proceeding further. His attention was called to this matter a few weeks ago, because he happened to know two very well qualified young men who went up; one went first to dispensing, and the other to pharmacy. The first candidate had a few pepsine pills to make, which he made too soft—they turned out very badly, and the examiner told him he could not proceed further. He applied to the chairman, who confirmed the examiner's statement. The same thing happened with the man in pharmacy. Now when a candidate had come perhaps from the end of the kingdom at a considerable cost, and had paid three guineas fee for the examination, it seemed a great hardship to be only allowed a quarter or half an hour on one subject. The President, in his opening remarks, had referred to examinations as necessary evils, and he did not suppose the most ardent upholder of examinations would pretend to say that they were an absolute test of the qualifications

of a candidate, least of all could a man's qualification in half a dozen different subjects by tested by half an hour's interview with one examiner, under most unfavourable conditions. If there were a well-recognized practice of the Board, endorsed by the Council, the least that could be done would be to give due notice of it.

Mr. WHITTLE desired to endorse the President's remarks as far as the curriculum went. He thought no chemist ought to take an apprentice unless he were able and willing to teach him the business; but he knew many youths were taken without being able to pass the Preliminary, and when they were twenty-one, they said they never understood what would be required of them, and that was the reason of so many failures. If the curriculum were enforced and explained to them at first it would be a saving of money to them. The previously proposed Pharmacy Bill, if supported by the whole trade, would no doubt have gone in for something very different, but they were obliged to modify the Bill on account of the modified support that was received. He should like to know how chemists outside could enhance their position without joining the Society; it was the only means by which they could help themselves. If they studied their own interests and joined the Society, so that it was backed up by the 13,000 chemists throughout the country, the Council would be able to pass a very different Bill. Young men did not so much object to the examinations, but they asked was the game worth the candle. He should like to see a larger selection on the Council, gentlemen better known coming forward, because the members were to a great extent in the dark when voting. Some few had come forward this time, but how many knew anything about them, or how they conducted their own business? He would suggest that as they had the term "P.C." for pharmaceutical chemist, they should also have the title "C.C." for cutting chemist, and that candidates for the Council should state whether they belonged to that category. He believed there was one gentleman on the Council who advertised Cockle's pills for 9*d*, but that was not the sort of man who ought to represent the trade.

Mr. WOOTTON asked if the President could explain how the practice of the examiners which had been referred to was in accordance with the Pharmacy Act of 1868, the 6th section of which said that the examiners were required to examine all persons who tendered themselves for examination in such an examination as that described in the Act of 1852, which consisted of about six subjects.

The PRESIDENT said the regulations of the board were that a man must be competent in every subject, and if on the basis of the marks a man was found incompetent in one subject he failed to pass, and would be no nearer if he were examined in all the other five. He would still be rejected, as competency in every subject was required.

Mr. WOOTTON said he quite understood the candidate would fail in the examination; but he believed that in the cases referred to the candidates applied to be examined in the other subjects, and he very much questioned whether, according to the wording of that clause, they could not insist on going through those other subjects.

Mr. WILLIAMS thought if it was the practice to reject a candidate simply because he failed to make a batch of pepsine pills, it was a great injustice. Probably very few in the room would undertake to make one hundred batches of pepsine pills without a single failure, and if such was the case, was it not to be expected that a man coming up in the nervous condition in which they generally came, if the first thing he tried at was a batch of pepsine pills, should fail?

Mr. SANDALL was pleased to find by the report that the new building was being well advanced, and thought it would be a credit to the Society, and ought to have been undertaken long ago. He should like to know the amount of the contract.

The PRESIDENT said the plans had been slightly changed from time to time, and he could not give the exact figures, but the cost would probably be about £6000. In reply to a further question, he said the lease was for eighty years, at a ground rent of £60.

Mr. CURTIS asked whether the large number of failures referred to might be in any way due to the conduct of some of the examiners; whether those who came to be examined were not sometimes taken entirely off their legs. Personally, he had nothing to complain of in the matter; but he had heard various reports from people coming up, and having known them, and seen the manner in which they did their work, he knew as well as any examiner that they were quite capable of going behind a chemist's counter, and the question arose, Why was it they could not get through? He should like to ask whether one or two of the examiners did not act in a somewhat arbitrary fashion, and treat a person coming before them as if he were a mechanical being whom they could turn and twist about in any way. He hoped his remarks would not be misconstrued as antagonistic to any particular examiner, but there were people who had failed who he thought had not been treated quite fairly, and possibly a word of caution from the Council might be of service. He believed it was the apprenticeship which passed the examinations, though he knew there were men who took apprentices without troubling anything about them. He had known cases where premiums were taken and not a single attempt made to teach the apprentices anything. With regard to the Journal, he would suggest whether a somewhat intermediate course might not be adopted. He had had an interview with the editor and sub-editor that morning, and was informed that the Journal could not be run as a "tit bit" paper, that it would be contrary to the dignity of the Society to do anything of the sort. He quite admitted that, but still all would admit that the Journal was not read half as much as it ought to be. He thought that was because an apprentice taking it up found a lot of hard names which he could not understand, and there was nothing else put in to suit his taste. He thought there might be something put in to help the apprentices and assistants to come up to the highest standard of literature which formed the bulk of the Journal, and if that were done, the other portion would be read, and the general interest of the assistants and apprentices would be aroused. As regarded the Early Closing Bill, he was sorry the Council had in any way opposed it.

Mr. URWICK said as he was neither on the Council nor a member of the Board of Examiners, a remark from him on that subject would be appropriate. He had had several men who had been up to be examined, and who had failed, but on talking to them they had generally confessed in the end that they had no ground of complaint. He had also had men who had passed, and who had complimented the examiners all round. He should like the Society to watch the education given at one place to which a grant had been made, where there was a very good school indeed. He referred to Aberdeen, and he believed it would be found that almost everyone who had come up from that school during the last twelve or fifteen months had passed the examination, and had done so without going to any cramming schools. They had gone straight from the training obtained in Aberdeen, without any extra fees for teaching, and had many of them passed well. That seemed to show that there was a system of teaching there which might be recommended to other centres of education. It was the same thing with regard to the Preliminary examination, for out of eight candidates from Aberdeen, six passed. That must be connected with the mode of training, for he did not suppose that Aberdeen had all the brains of Scotland. It was the same thing with Lincoln, for a very small percentage who came from there failed to pass, whilst in other quarters the failures had been very numerous. He did not think it was altogether the fault

of the youths, but must be a result of defect in the teaching. It was not every man who was a good teacher; there were men who could make their subjects agreeable and pleasant, whether it was arithmetic, Latin, or Greek, and led their students on. Such a man was Dr. Pereira; there was not a man like him in London now, either in the medical profession or any other; he led the students to love their subject, and to adore their lecturer. He might also say that he had the greatest respect for Professor Bentley, who taught him what little botany he knew, and he had never heard a more fluent or competent teacher.

Mr. FURNESS said experience showed that the Annual Meeting was not very competent to deal with the report placed before it by the Council, its power being limited to either accepting or rejecting it in its entirety, and this would explain why he deferred till after the report was passed bringing forward a resolution which he should then submit; still, as criticism had been freely invited, he proposed to ask a few questions upon the report which had occurred to him. In the first place, he should like to ask which item represented the amount spent in promoting the Pharmacy Bill. He thought the amount of law costs, £404 16*s.* 8*d.*, although an increase on the legal expenditure of late years, was not at all proportionate to the income of so influential a Society. There were certain very prominent grievances which required dealing with, and for which the law had to be put into operation to remedy. On the previous night the President referred to the very satisfactory manner in which the Society had carried out one of the objects for which it existed, namely, the provision for indigent members, and he could endorse all that was then said on that subject, and also as to the manner in which it carried on the education of its members. But there was another object in the Charter; it was intended to protect those who practised the art of the chemist and druggist, and although this had been done to a certain extent, it had not been done effectively. Even the President and his colleagues, he thought, could hardly claim that they had carried out this object as fully as they should, and he hoped the Council would think over this point, and spend more money in that way. He would not enumerate the grievances under which they suffered, which had been well ventilated in that room, and in the pharmaceutical press; but he thought it was not sufficient on such a point for the Council to say *non possumus*, that they were anxious to remedy them, but that it was not expedient to do so, that the time was inopportune, and so on. The questions to which he alluded ought not to be allowed to wait, and the Council should not raise obstacles, but face them, and endeavour to remedy them. If they were unable to do so they would, at any rate, have had the satisfaction of knowing that they had discharged their duties. One little item in the accounts he should like some explanation of. It appeared that they had spent £147 on the alterations and enlargement of the stable at the Scotch premises, and that it produced a revenue of £9 19*s.* 6*d.*, which did not seem to him a very profitable investment.

The PRESIDENT said that was only half a year's rent, which made the investment somewhat better.

Mr. FURNESS said he would admit that that was good finance; better, he thought, than spending £6000 on a lease for eighty years with £60 ground rent. He would also ask to what period of the year the accounts were made up.

The PRESIDENT said the accounts were made up to the end of the year, as was indicated by the heading.

Mr. FURNESS said he asked the question because in January, 1886 a grant was made to a provincial association which did not appear in last year's report; that of course was now explained. But a grant had been made in January, 1887, which did appear in the report.

The PRESIDENT said the grant last referred to no doubt appeared in the report which did refer to matters up to the date at which it was issued, but that item did not appear in the accounts for the last year.

Mr. FURNESS said that most associations and companies with which he had to do stated in the accounts the amount which there was at the bank, but he did not see that item in this account; probably it was included in some other item. Passing from the financial statement to the report itself, he thought it was very strange that the Council should have thought fit to take the action it had with regard to the Early Closing Bill, seeing that the trade had for years and years been striving to get more uniform action in the hour of closing. He thought it a pity the Council had interfered to oppose the Bill. He was opposed to the principle involved in Sir John Lubbock's Bill, but he thought the Council might have abstained from any action which might have the effect of wrecking a Bill which might benefit the trade.

The PRESIDENT said there was no opposition to the Bill by the Society. They only proposed to exempt chemists from its action.

Mr. FURNESS, continuing, remarked that the number of cases of alleged infringement of the Pharmacy Acts were recorded at 152, whilst in 32 proceedings had been taken. That showed a very small proportion, he thought, of the illegal trading which took place, for within his own limited knowledge he could report quite as many as the cases prosecuted. He would suggest that in order to get more specific information on this point the Local Secretaries should present annual reports to the Council, which would be valuable documents statistically and otherwise, and would be useful for future reference. He might refer with great satisfaction to the second paragraph referring to the grants made to provincial associations, and commended that practice for further extension. He felt sure that if the Council would devise some well-considered scheme of systematic assistance to these provincial associations, something in the shape of annual grants, it would be of incalculable advantage. He could speak with some authority as to the conditions under which these associations existed. The higher technical education never could be self-supporting; the Society's school itself, if it were dependent on the fees of the students, would soon come to an end, and that was the difficulty they had to face in the country, and probably accounted for the early collapse of many provincial associations. He could testify to the great amount of good done to the school he had in his mind by the grant made; it had enabled the school to keep on, and it turned out some excellent men. These provincial associations were eminently deserving of pecuniary assistance, and of the advice and assistance of members of the Council. Referring to the case heard in the Court of Queen's Bench yesterday, in which it was stated in a very emphatic manner by Lord Coleridge that tincture of opium represented the article which the chemists of Sheffield had contended for, he remarked that that case had been brought forward in some measure through the action of the Sheffield Society, and showed that good work was done in other good ways besides educationally. Speaking for themselves, they were quite willing to submit to any test of competency the Council might see fit to impose, such as a capitation grant on pupils who satisfactorily passed the examination, but he would urge the Council to spend a portion of its funds in defending the interests of the trade, and another portion in trying to assist struggling and deserving provincial associations.

Mr. SMITH (Walworth) thought it would be well if the Council could take a little more account of the peculiar condition of the trade interests of the Society at the present time. He did not find any fault with it; he knew that education was a subject which had always held a very high place in the interests of those who had hitherto been upon the Council, and that it was so still, but he could not help thinking that a little more attention might from time to time be given to

trying to investigate the real interests of the harder working portion of the body. Whatever might be said about education—and they all knew what his views upon it were—the hard bread-and-cheese matter-of-fact kind of everyday life was a thing they could not escape from. They could not live, with all their education, in the present condition, especially in some neighbourhoods, with the frightful competition they had to meet with. It was so everywhere, but much more so in some places. Therefore while he did not hold the Council responsible for this result, he did respectfully suggest that it might recognize that such a thing did exist as the necessities of their humbler brethren, and do what lay in its power from time to time to give them a helping hand. He should support the curriculum unquestionably, for if the young men thoroughly understood their own interests, they would be most anxious to go through a regular curriculum. A large number of men would manage to go through, and to do almost any kind of work you put before them; but there were also a large number who wanted to be assisted, and shown what they had to do. He had taken apprentices, and the name of an apprentice of his was on every one of those boards, but a man who took an apprentice appeared to him a man who had placed upon him the necessity of first of all studying the character of the boy. In times gone by, nothing was more common than for people to be beguiled by the jars in their shop windows, and to think what a grand thing it must be to be a chemist, and parents would come and anxiously desire them to take an apprentice, and offer a handsome premium. The result was some took boys without inquiring whether they had had such a preliminary school training as would render it easy for them to go through the work they had to do. When you had a boy you could not supply him with brains, but you could watch what he appeared capable of, and lead him in the direction in which he appeared to be best able to go and most likely to succeed. As a general rule he had discovered that, without a single exception, out of twelve or fourteen cases all his apprentices had passed, but in two or three cases they had been turned back three or four times. The result in his opinion was this, that the curriculum rule would be cheaper to a youth, and to his friends; if they knew that they would adopt it at first instead of going round the back-stairs course, and spending a great deal more in the end.

Mr. MARTIN (Newcastle) said one gentleman complained that the Society spent so much money in law costs and recovered so few penalties. But the object was not to recover penalties, but to restrain people from breaches of the Pharmacy Act, and the cost of doing so was borne by the Society. Another had complained that enough had not been spent in prosecuting breaches of the Act, and he said that he himself knew scores of cases which had not been prosecuted. He would put it to that gentlemen whether he had not been guilty of a dereliction of duty in not reporting those cases to the Council. To his mind the result was most satisfactory. With regard to the criticisms made on the examinations, it was somewhat depressing, no doubt, for any candidate to come up from Yorkshire or Cornwall, and fail in passing, but he failed to see what good end would be obtained by allowing a man who completely failed on the first subject to go on with the others, except that of imposing so much more trouble on the examiners. As a Local Secretary, he would say that if any person reported to him a breach of the Act, he should at once take steps to ascertain whether a breach had been committed, and if so, to report it, and in every case in which he had sent a report to the Council attention was paid to it. The Local Secretaries were not highly paid, and they could not be expected to go about canvassing the neighbourhood for breaches of the Act.

The PRESIDENT then said he would refer in a few words to the criticisms which had been passed, although Mr. Martin had answered much that Mr. Furness had referred to. He would take, first of all, the questions raised by Mr. Robinson, Mr. Furness, and Mr. Smith, on what they called trade matters, and he would appeal to Mr. Robinson as to how he felt at this moment after what Mr. Furness had said about the Early Closing Bill. He said the Council had no instructions, and therefore ought not to have moved, and were they not to use their discretion! Surely the Early Closing Bill was a trade question, and while, on the one hand, he might be supported in this case by Mr. Robinson, and he knew they had the support of the majority of chemists and druggists, Mr. Furness came up with all the authority of the Association at Sheffield, and said the Council ought not to have interfered.

Mr. FURNESS said he simply pointed out that it was strange the Council should do that after a certain line of action had been taken by the trade.

The PRESIDENT asked if Mr. Furness had not said he disapproved of it.

Mr. FURNESS replied in the negative.

The PRESIDENT said he was glad to find that Mr. Furness agreed with him.

Mr. HALL remarked that all the gentlemen present were principals in business, but they ought to bear in mind that the Shop Hours Regulation Bill affected assistants and apprentices and their rights ought to be considered.

The PRESIDENT said the Council had not opposed the Bill. He wanted to point out to Mr. Robinson the dilemma in which trade matters would sometimes place the Council. For having taken action in one direction they were criticised and told, in the same breath, that in another direction they had neglected their duty. Now he wanted to point out the difficulty they were placed in with regard to dealing with such questions. Mr. Robinson had asked whether if thirty or forty members were unjustly attacked the Society would do something to defend them. His answer was that whenever such a case was put before the Council he did not doubt the answer would be, Yes, when any great principles were involved. When anything objectionable or erroneous had been mooted, the Society had always done what it could; but it could not become a trade protection society in the strict meaning of that term. It would be the death of the Pharmaceutical Society if it became such an association; at any rate that was his opinion. Great questions affecting the mass of the members it could deal with, but individual cases where members of the trade were sailing very close to the wind of the law were not cases for a corporate body like that to deal with. There were only two courses open to those who talked about trade questions. If they want a trade protection in the widest sense they must not go to that Society for it; it would only spoil other individual cases. They must get up an organization supplied with funds,—not with half-a-guinea a year, but with considerably more,—and have an active executive, small in number, who must have absolute power to do what it pleased and not publish its proceedings to be criticised by the subscribers or the world. That was true trade protection. It might or might not be a desirable thing to have, but if they wanted it they must go in for it. But they could not come to a Pharmaceutical Society, nor could they have gone to the Association to which reference had been made, and expect it to do what was required for the modest sum of money placed at its command. Any special case affecting the trade as a whole, the Council would not refuse to consider, and, if need be, take action. If the Council had a case put before it and had a doubt whether it was within its powers to proceed in the direction aimed at by the memorialists, there would be a Council of outside men who would put their hands in their pockets and give time and organization, and do as they did in Betts's case, and crush the

aggressor if necessary. He would plead guilty to neglecting trade interests if it meant trade protection of the kind he referred to. The Council would not object to render assistance to defend important trade interests; but if it were a legal question the Council must be satisfied that it was a proper case in which to take proceedings. All who were connected with corporate bodies knew that there was always a small minority of men who had grievances; who wanted the assistance of the Solicitor and all his staff every day of the week, and it was exceedingly difficult to get at the truth in personal matters. Mr. Robinson had referred to the Inland Revenue, and he had received many letters from time to time, both in former years and since he had been President, from men throughout the country with regard to the Patent Medicine Stamp Act in which grievances had been alleged. He might venture to say what the Secretary of the Association referred to had to tell the members at an annual meeting in London, that in nearly every case in which he had made inquiry, the individual had undoubtedly broken the law, and in most cases had done so with his eyes open, or had sailed so near the wind as to lay himself open to a penalty. In one case in ten perhaps there was a case of distinct hardship which could be dealt with, and then it had not been necessary to consult the Council; he had only to write a letter to the Government Department, and put the case before it in order to receive every consideration, and if the statement made to him was perfectly true, even though there might be a technical breach of the law—as there was in many patent medicine stamp cases, the penalty was remitted. When he had a good case and made application the answer was perfectly clear and unmistakable, the penalty was remitted, and thanks were given for advising the department. He had known men complain of the Society for not protecting trade interests, and they would not subscribe, and within three months such a man would come and say the Somerset House authorities were down upon him, as he called it. On examining into his case it would appear quite clear. He showed a label and the stuff, and declared solemnly that that was how he sent the article out to be sold, and he had no advertisement and nothing to bring it within the regulations of the Board. He (the President) said at once if that were so he was sure the authorities had made a mistake and would not insist upon the penalties. When he went down to Somerset House with the bottle and label in his hands the documents would be produced, and it would be found that this gentleman had got a most beautiful advertisement as to the merits of this particular preparation as a remedy for all sorts of things, which he did not put round the thing liable, but round another preparation; and the Solicitor would ask him: "Do you think a man of that sort is entirely innocent of intention to defraud the revenue?" What could he say in such a case? That showed how difficult it was to move in trade matters without producing discord. If the Council were blamed for proceeding cautiously in trade matters let it be on the true motive that it hesitated to move in directions where by getting the approval of one section it would be incurring the enmity of another. Naturally, therefore, it avoided many questions of that kind. The Early Closing Bill was a very fair instance of its proceeding. It might not be agreeable to some, but from his knowledge of the trade he thought everyone was in favour of early closing. If Sir John Lubbock's efforts were successful he would not want any clause with regard to chemists and druggists, so far as the general trade was concerned. If they were willing to avoid late hours they would follow the rest of the people without any Act of Parliament, and if they were not willing the Act would not compel them, because under the exception clause they would be able to illuminate the whole neighbourhood, shutters being now practically things of the past. With regard to the Pharmacy Acts Amendment Bill, it had not cost the Society as yet £5. It had cost a great deal to some other people in loss of time, brain power, and so on, and perhaps the Law and Parliamentary Committee might have a claim brought against it for loss of health in watching its progress through Parliament. There were many other law matters included in the Bill, such as the preparation of the lease of new premises and things of that kind, but he wished thoroughly to disabuse Mr. Furness's mind of the idea that the whole of that money had been expended in procuring the penalties which the Society had recovered, though they often had to expend £20 in order to get £5. Then Mr. Furness said they ought to have spent more in law expenses. He probably meant in parliamentary expenses. They often found men evade the law, and if they got a man convicted he found a way of meeting the case, still more unsatisfactory to the chemists in his own town. That could not be altered except by going to Parliament, and therefore, he took it, Mr. Furness meant they should go to Parliament. That did not necessarily mean spending money in law. What they wanted in connection with Parliament was not the assistance of a lawyer, but of intelligent members of the trade throughout the country who could use influence and show that they had got a good case. That would not cost the Society money, but it would cost effort, and the greatest difficulty was to get their friends throughout the country to exert themselves. If Mr. Furness could assist in that direction he would do more good than by any amount of money. He thanked the meeting for the courteous way in which it had received his observations, but before putting the resolution he would say one word with regard to the examiners. He had often said before that anyone who had never been an examiner did not know how difficult it was to deal with candidates. They could not expect an examiner to be sent down from Heaven, having special qualifications for his office. Even the best examiner, who desired to make the candidate before him comfortable, might adopt some method or make some observation which only had the effect of making the candidate more and more nervous. It was one of the essential difficulties of practical examination in six subjects in one day, that men were extremely nervous. A good deal had been said about dispensing, but men had to dispense before the public; they had not all a little screen before them, and nerve did count for something. He would admit there were many parts of the examination which were trying, where, for instance, the dispenser had to proceed, in a strange place, to make up a prescription with two pairs of eyes facing him, which was, no doubt, a trying process. On the other hand it was one of the tests, which, above all others, they were supposed to carry out in a way which was fair and reasonable. When they had larger premises which were principally for the purposes of examination it was proposed that one of the rooms should be a dispensary or dispensing laboratory, in which there might be a larger number of candidates examined at once, and they would be all more comfortable. But the examinations after all were practical performances, they cost money, and unless the men were examined for a much longer time you could not very well give opportunities for repetition. But with a full knowledge of what went on in London and Edinburgh, with as wide an experience of examiners as most men in the Society, knowledge acquired at an early age, and with quick perception, he might say that, having visited the examiners of the College of Surgeons and elsewhere, there was no body of men who took more pains, or as a rule who took as much pains as the Boards of Examiners of that Society. He hoped, therefore, when they listened to the grievances of a candidate they would bear in mind the circumstances. No doubt the poor fellow was terribly upset, and he exaggerated unconsciously the treatment he had been submitted to. It was well known that there was an examiner some years

ago who was said to be an exceedingly nice fellow to all who passed, but a perfect brute to all who failed. That happened to be himself, and he was, therefore, able to speak on this subject from the point of view both of the candidate and of the examiner.

Mr. HALL asked if the President would kindly state the result of the dinner last night.

The PRESIDENT said the donations amounted to the sum of £1100, and the new subscriptions promised to £25 or thereabouts.

The TREASURER said there was one question of Mr. Furness's which the President had omitted to answer, viz., with regard to the amount at the bank; he might say that that was represented by the £1300 in the hands of the Treasurer. It was not in his pocket, but at the bank in his name.

The PRESIDENT added that, practically, according to the charter and the bye-laws, all the money was in the hands of the treasurer for the time being; but he was simply a drawer of cheques, everything which came in, or was paid out, having to go through the hands of a committee every month.

The resolution for the adoption of the Report was then put and carried unanimously.

Mr. FURNESS then rose to move the resolution of which he had given notice. He wished it to be quite understood that there was nothing antagonistic between himself and the Council, and he should be the last person to bring forward any individual grievance, but the question he wished to bring forward was one of general interest affecting a large section of the body. There were twenty-one pharmaceutical chemists who constituted the Council, and it might be said it was presumptuous in him, who was only an associate, to bring forward a resolution. He did so with a deep sense of responsibility and humility, and with great regret that some one more competent to do it justice had not taken the matter in hand. The resolution was—

"That this meeting regrets that the Pharmacy Act Amendment Bill now before Parliament contains no amendment of section 19 of the Pharmacy Act of 1868, and requests the Council as promoters of that measure to take steps to introduce into the Bill a clause giving a more popular, satisfactory, and just system of representation to the pharmaceutical electorate on the Council of the Society which governs their affairs."

He asked the Council to grant a measure of justice to a deserving class. Some two months ago, on reading the text of the Bill now before Parliament, he was much struck with the main proposals it contained; but considering the time that had elapsed since the passing of the Act of 1868, he thought it did not go sufficiently far, and, although he was in hearty accord with the principles of the measure, and should like to see it become law, and had done his best to bring about a curriculum of this sort, since the idea was first mooted by Professor Attfield, he thought it did not go far enough in the direction he had referred to. He had also read carefully the discussion that had taken place in the Council, and even after reading the thoughtful speeches then made, he thought that the difficulties, which were weighty in his mind, although not in the same direction were weighty on the mind of the Council, were not such as could not be overcome. The discussion resulted to a great extent in adopting the principle of not introducing contentious matter into this Bill, or anything calculated to jeopardize it, and in that he quite agreed; but he was still of opinion that there was one flaw which had been detected in the past Acts which could have been included with safety, and would even have been more calculated to facilitate its passing, because it would be simply granting a measure of justice to men who were entitled to it, and would raise no opposition from outsiders. The constitution of the Society, as was well known, consisted of members, pharmaceutical chemists; members, chemists and druggists; chemists and druggists; associates in business; associates not in business; and apprentices and students. The numbers were as follows: 1758 pharmaceutical chemists, 694 chemists and druggists, members of the Society: 1281 associates in business; 899 chemists and druggists on the Register, associates not in business, and the remainder 1194 apprentices and students. During the last two months he had given a deal of thought to this question, and so strong was his conviction that something ought to be done, that he felt it his duty to attend that day and see if the Annual Meeting would not grant to one of the most deserving and numerous classes of the Society some proportion of representation on the Council. By the 19th section of the Act of 1868, it was enacted that every person who was, or had been, a chemist and druggist when the Act passed, should be eligible for a seat on the Council if he became a member, and also that the Council should never contain more than seven members who were not pharmaceutical chemists. It was the principle he was concerned with, not the individual members of the Council; they had good men there deserving of the high eulogium passed upon them last night; but at the time the Act passed there were no associates in business, and, therefore, it was easy to understand why no provision was made for their having a seat on the Council. The only two classes really entitled to that position were those who were pharmaceutical chemists, and those who were practising as chemists and druggists, who had the option of becoming members. Since then the members had become less and less, and the associates more and more numerous. All who, after the passing of the Act, became chemists and druggists, if they wanted to become connected with the Society, unless they chose to become pharmaceutical chemists, must be associates, and whatever might have been said of that class at that time could not be said now. The reason given for excluding them had been growing less and less, and the question now required immediate attention for the welfare, if not for the safety, of the Society. The more popular the representation on the Council which had to govern a constituency, and the more it reflected the strength of that constituency, the more vigorous it was, and the more capable of perfecting its work. By sec. 19 the associates were excluded by implication, but by implication only. Sec. 20 said that anyone who subsequently passed an examination, and was placed on the Register, might be elected an associate, and he had often wondered whether that was a distinction in favour of the members or of the associates, but they knew by experience which way it had operated. He claimed that it should never have existed, but if it existed it was in favour of the associates, since they were examined, but a number of chemists and druggists who were members had not passed the examination. Sec. 20 said that so long as he was in business on his own account, and continued an associate he might attend all the meetings and vote thereat, and otherwise take part in the proceedings of such meetings in the same manner as members, provided he contributed to the funds the same as the members. He had not seen the question raised before, and did not know whether an opinion had been given whether this could be construed that associates might have a seat on the Council, and he regretted very much that greater publicity had not been given to this matter. The question of the representation of a corporate body was rather too important to be dealt with at the tail end of a meeting, without notice having been given, but he felt certain that this was such a matter of justice that the meeting would see it was expedient to agree to it. He was willing even at the eleventh hour to withdraw the matter if he were convinced that it was inopportune, because he was anxious to see the curriculum measure passed, and would not suggest this addition if he thought it would jeopardise it. Still, it was not enough to say that if he introduced this somebody else would in-

troduce something else which would be contentious matter. He simply asked where was the opposition to come from; it was simply a matter of internal organization and representation. Would it come from their own body? Would it not rather reconcile the opposition which had already been aroused? He did not wish to make any comparison between the associates in business and the other members of the Society, although he thought they would bear a favourable comparison, but he would just point out the amount which the associates contributed, namely, £1800 to the revenue.

The PRESIDENT asked where Mr. Furness got these figures?

Mr. FURNESS said there were in round numbers 2000 chemist and druggist associates.

The PRESIDENT asked if he proposed to give the associates not in business a vote?

Mr. FURNESS said he did not propose to formulate any scheme. He was proposing that associates in business should have a seat on the Council, and if thought expedient he should like to see those not in business have a vote; they were all men of intelligence, they had the "hall mark" of the Society, and were quite as competent to exercise the franchise as the burgesses of large cities who elected Parliamentary and Municipal Councils. In round numbers there were 2000 chemists and druggists on the Register who were associates, producing £1800 a year, and forming the largest class connected with the Society, and yet they had no seat on the Council. The chemists and druggists not associates were 700, and they were entitled to seven seats. The pharmaceutical chemists were 1542, and they subscribed £1600. That was a state of things to which he wished to call the attention of the meeting. He proposed this resolution with the view of giving the Council an opportunity of acceding to it, instead of taking any other course which might be open to him to get a clause introduced into the Bill. The President said how anxious the Council and he personally were to ameliorate the condition of the Society, and he thought this would be an opportunity for him to show it.

Mr. SANDELL asked if he should be in order in moving that the meeting adjourned for one hour for luncheon.

Mr. FURNESS said that after that intimation he would not trespass any further on the time of the meeting.

The motion having been formally seconded,

The PRESIDENT said he would not detain the meeting long upon this matter. When gentlemen came to the meeting to talk about pharmaceutical politics they generally expected them to look back to the history of their case, and know something about it. If Mr. Furness had gone back to the history of the Pharmacy Act of 1868 he would have found out that the reason why associates in business had not a vote was on account of a compromise, obtained after infinite trouble, with representatives of the trade outside the Society, and with representatives of the members inside. Having taken part in the passing of that Act he would remind Mr. Furness that the efforts of the Society in early days to obtain the proper Pharmacy Act with proper powers were always frustrated by members of the drug trade outside the Society, who always wished to become pharmaceutical chemists, and to this the pharmaceutical chemists objected. The draft Bill of 1866, which was really the only complete Pharmacy Act he remembered, was an Act drafted by the Society, and practically accepted by the Government; but before anything could be done those who did not belong to the Society objected, and said the Bill should not pass unless they were made pharmaceutical chemists as well as members of the Society. To that the pharmaceutical chemists objected; an opposition Bill was brought in by a society called the United Society of Chemists and Druggists, dealing almost exclusively with poisons. Both Bills were referred to a Select Committee, and as the result, a report was presented which dealt with the sale of poisons, but did not affect the internal arrangements of the Society. That being so, the Society as promoters of legislation had to consider what could be done to obtain unanimity, and accordingly a large part of his time and that of others was taken up in talking to those outside the Society, pointing out what he called the unreasonable character of the project, and as the result of the discussion the Council at that time came to the conclusion that an equitable arrangement could be made with all chemists and druggists in business by making them members of the Society.

Mr. FURNESS said he was pretty well acquainted with the history of the Pharmacy Act of 1868, but it did not strike him that it was necessary to place that before the meeting.

The PRESIDENT said he wanted to show the members that it was an arrangement come to on two sides, and that before altering that arrangement both sides must be consulted. The views of the chemists and druggists who took an interest in the Act outside that Society and the views of those who were inside practically culminated in this arrangement, that the pharmaceutical chemists who had passed the examination said emphatically they would not allow every chemist and druggist to come on the Register as a pharmaceutical chemist, but they were persuaded rather against their will, that it was desirable to get all men in as members. That was what Mr. Furness wanted, and he sympathized with him. He only referred to this to show the position in which they stood. The view at that time was that in future every one who passed the Minor would pass the Major, and they would all become members. The associates were looked upon as those who would be in the state of assistants, and would go forwards afterwards and become members. It was actually proposed that all who passed the Minor examination should be members, which would have prevented the present complaint, but the pharmaceutical chemists would not have that; they pressed their views so much on the members of the Council that they had to accept the solution as a compromise. At that time they thought more of the title than of the political principle; they said we do not like a man who passes the Minor being called M.P.S., while the pharmaceutical chemist has the same title. The political point did not come up so much. The then President, Mr. Sandford, who had done so much for the Society in every possible way, was far-seeing enough to propose to let every man who had passed the Minor become a member, but although he was President he was outvoted on that point. The objection he saw to putting forward this proposition now was that they had not asked a very large number of the pharmaceutical chemists what they thought of it. The present Council was practically in sympathy with Mr. Furness, and he might refer to the fact that, without any pressure from outside, but solely from a consideration of the constitution of the Society, a majority of the same Council had drafted a Bill and submitted it to the Government, which was published in the Journal in February, 1883, in which this very point was dealt with, only in a different way, and, he thought, in a more effectual manner. No one could deny that associates in business should have a vote, and that they should have seats on the Council, and the same political privileges as members, but it was thought better to deal with the thing from a different point of view, and, if possible, to abolish the distinctions in the Society. The proposition was, that after a certain date every person who passed the Minor should be registered as a pharmaceutical chemist. There would then be one class of practising chemists and druggists eligible for membership with all political powers. Then the next clause provided that every person who was registered as a chemist and druggist, and examined, should be eligible to become a member. The proposal was, in short, that there should be only one class of dispensers of medicine, who should be eligible to become members with all privileges. That was a convincing

proof that the then Council was in favour of doing what it could to give political representation to every one. But Mr. Furness proposed to go now to Parliament to amend the Bill in some such direction, and argued that there could be no opposition from the inside. He asked them to take his own statement, from a stiff personal fight against this very proposed Act in 1883, with regard to the pharmaceutical chemist members. Those members had rights, and they objected to every man who passed the Minor having the same privileges. It was not correct, therefore, to say that all the members were agreed on this matter, nor would it be fair, seeing that the Bill had been about three months before the members and no comment made upon it, to put in an amendment of that kind without full consideration. The numbers were against the contention raised. The present members were greater in number than the associates; therefore, if a majority went for anything it was the other way; seeing there were more members than associates in business they could not say that the members would necessarily agree with the proposition. In fact, he was in a position to say that a large number were of a different opinion. If they went to alter the Bill to please the associates they would have opposition coming from the members for altering an arrangement which had been come to without due notice. Having shown, therefore, that the Council had already committed itself to a generous policy with regard to the constitution of the Society, and having decided to go to Parliament on one branch of the subject, he hoped the meeting would agree with the Council in thinking that it would be very undesirable that this resolution should be passed. Mr. Furness said this was non-contentious matter, but he had failed to prove that. The two thousand associates might wish to have full political privileges, but the other two thousand members might object; at all events it was debateable ground, and he thought the better way would be to deal with the subject at some future time on the lines of the Draft Bill he had referred to, rather than to do it piecemeal in the way proposed. If the motion were pressed the Council would be obliged to vote against it, but he hoped that after this explanation it would be withdrawn. It was somewhat like putting a pistol at their heads to come to a meeting, and say when the Bill was in committee, if you consent to put this new matter into the Bill I shall support it, but otherwise I shall reserve the right I have of opposing it. There were three things to be dealt with in a Pharmacy Bill; the question of the sale and dispensing of poisons, the internal management of the Society, and the question of education. The Council had thought it wise to divide these into three distinct parts, and to take up that part about which a great deal of work had been done, and on which a great majority were agreed. But it was none the less sympathetic with everyone for whom Mr. Furness had spoken, for, as he often said, the associates were the backbone of the Society. The difficulty in the present case was not with the Legislature, but in getting their own members and associates to understand clearly the Bill which was in Parliament, for he often found they sent letters objecting to this and other Bills, written in such a style as to show they could not know what the Bill was intended to do. That, of course, partly arose from the use of legal phraseology, but it was not all *couleur de rose* in the present House of Commons, and if Mr. Furness thought he had sufficient influence to get the Bill considered as amended, and to get it agreed to by their own members without opposition, the Council might consider it, but he was quite certain that that was not the case.

Mr. FURNESS said he did not propose to deal with the question of titles at all, and that covered a great portion of the President's remarks. With regard to presenting a pistol at the head of the Council, he would simply say that two months ago he wrote to the press drawing attention to this matter, and asking if it were an oversight that it had not been dealt with. That letter appeared in the *British and Colonial Druggist*, and in the *Chemist and Druggist*, but the editor of the Society's Journal did not publish the letter, and he had received no official reply. It was that which had impelled him to come to the meeting to give the Council an opportunity of answering the question he put two months ago. The resolution did not interfere with the question of titles, and, as he understood, that was what aroused opposition before. Even now he would withdraw the motion if the President would show where the opposition was to come from, and that it was likely to interfere with the present Bill.

The PRESIDENT said the one matter could not be dealt with without the other. Many members of the Society objected to associates having all the privileges of members.

Mr. URWICK applied to Mr. Furness to withdraw the motion for the present, and remarked that it was a much larger question than he had any idea of. It cut at the educational question, because it would lead to admitting on the Council men of the lowest standard of education, who would have the control and deal with the examiners

The SECONDER remarked that at present some of the members were not examined at all.

Mr. URWICK said that was a compromise arrived at in the way the President had pointed out. The object had always been to insist on the highest standard of education; they did not wish to shut out associates, but to induce them to pass the Major examination.

A MEMBER said the idea of the Council was to offer an inducement to men to pass the Major examination, and if that were taken away it would be breaking faith with the Major men, who certainly ought to be consulted before any change were made.

Mr. NEWSHOLME wished to say, with reference to an observation which had fallen from the President, that neither Mr. Furness nor himself held a brief for the Sheffield Society; they simply came on their own account. He did not agree with Mr. Furness entirely, though he went part of the way with him, and he thought the present was a very inopportune time to add such a clause to the Bill. Some months ago they had a meeting in Sheffield on this very subject and were almost unanimous, but not quite so, as one gentlemsn dissented. They were all pretty unanimous on bringing forward the associates, but of course it would necessitate an alteration of title.

The PRESIDENT again appealed to Mr. Furness not to press the motion, because if he did it would have to be opposed by the Council, which might give a wrong impression, and make the associates think the Council was opposed to their claims, whereas the only question was one of time.

Mr. FURNESS said it was evident the motion would not be carried, though he thought, if he convened a special meeting, which would be extremely inconvenient, by circularizing all the associates, he had no doubt he could carry the motion; but in the face of the impossibility of carrying it at present, owing to publicity not having been given to it, he would withdraw it if his seconder agreed.

The SECONDER said he was entirely in accord with Mr. Furness and he hoped the Council would take the matter into early consideration, considering it had been before it since 1883.

Mr. FLETCHER then asked if he should be in order in moving a resolution to this effect:—

> "That in the opinion of this meeting the acknowledged practice of the Board of Examiners of prohibiting a candidate who failed in one subject from proceeding further with his examination is contrary both to the spirit and letter of section 16 of the Pharmacy Act of 1868, and is calculated to inflict great injustice on a large class of candidates.

The PRESIDENT said the meeting had no power to propose or carry such a resolution.

A number of gentlemen were appointed Scrutineers.

The PRESIDENT called attention to the following Registers, which were placed before the meeting in compliance with the Acts of Parliament.

Register of Members, Associates, and Apprentices of the Society.
Register of Pharmaceutical Chemists.
Register of Assistants.
Register of Apprentices and Students.
Under the Act of 1852.
Register of Chemists and Druggists.
Under the Act of 1868.

Mr. BELL (Hull) said, for the first time he believed at such a meeting, he had to propose a resolution of thanks to the President, Vice-President and Council for their services during the past year. Many of these gentlemen had devoted considerable time and money to looking after the interests of the Society, and he thought the members in years past had been very remiss in not proposing a vote of thanks to them for their past services.

Mr. FURNESS seconded the motion with very great pleasure, as he thoroughly appreciated the services these gentlemen had rendered to the Society.

The motion was carried by acclamation.

The PRESIDENT declared that the following gentlemen were unanimously elected Auditors for the ensuing year:—

HODGKINSON, WILLIAM, 198, Upper Whitecross Street, E.C.

HOPKIN, WILLIAM KING, 16, Cross Street, Hatton Garden, E.C.

LESCHER, FRANK HARWOOD, 60, Bartholomew Close, E.C.

STACEY, SAMUEL LLOYD, 300, High Holborn, W.C.

WATTS, WILLIAM MANNING, 32, Lower Whitcross Street, E.C.

The PRESIDENT thanked the meeting on behalf of his colleagues for the flattering way in which their services had been referred to, and declared the meeting adjourned until four o'clock on the following day to receive the report of the Scrutineers.

ADJOURNED GENERAL MEETING.

Thursday, May 19, 1887.

MR. MICHAEL CARTEIGHE, PRESIDENT, IN THE CHAIR.

The adjourned meeting for receiving the report of the Scrutineers was held on Thursday, May 19.

The Chairman of the Scrutineers, Mr. Thomas Howard Hall, read the following report:—

SCRUTINEERS' REPORT.

We, the undersigned Scrutineers, appointed at the Forty-sixth Annual General Meeting of the Pharmaceutical Society of Great Britain, do hereby certify that we have examined the voting papers committed to us, and report the following:—

Voting papers reported by the Secretary to have been issued	3541	
Voting papers received	1718	
Voting papers issued but not returned	1823	
Voting papers received		1718
Voting papers disallowed:—		
Informal	21	
Received by post too late	74	
	—	95
Voting papers registered		1623

Result of the Poll.

Atkins	1305	Newsholme	1034
Symes	1301	Williams	1022
Southall	1299	Evans	1004
Baildon	1281	Robbins	975
Cross	1230		
Savage	1197	Martin	951
Carteighe	1188	Butt	884
Hampson	1146	Harrison	848
Hills	1140	Watt	760
Richardson	1066	Neve	685

THOMAS HOWARD HALL, *Chairman.*

J. W. BOWEN.	T. HOWELL WILLIAMS.
JOHN MORRIS BROAD.	THOS. HENRY POWELL.
JOSEPH M. FURNESS.	T. O. SANDELL.
S. J. WESTON.	F. BASCOMBE.
HENRY BATE.	F. CRESSWELL.
EDWARD B. STAMP.	HENRY MATHEWS.
WM. MURTON HOLMES.	THOS. S. DYMOND.
WM. ARKINSTALL.	J. W. SHEPHERD.
WILLIAM WARREN.	W. H. SYMONS.
WM. HOWELL.	ALBERT COOPER.
HENRY C. BIRCH.	R. FISHER YOUNG.
W. RALPH DODD.	S. F. BURFORD.
ROBT. SAML. BATHE.	

THE NEW COUNCIL.

The Chairman then declared that the following gentlemen would constitute the Council for the ensuing year:—

ALLEN, CHARLES BOWEN, 20, High Road, Kilburn, N.W.

ATKINS, SAMUEL RALPH, Market Place, Salisbury.

BAILDON, HENRY BELLYSE, 73, Princes Street, Edinburgh.

BOTTLE, ALEXANDER, 37, Townwall Street, Dover.

CARTEIGHE, MICHAEL, 180, New Bond Street, W.

CROSS, WILLIAM GOWEN, 70, Mardol, Shrewsbury.

EVANS, GWILYM, 7, Stepney Street, Llanelly.

GOSTLING, THOMAS PRESTON, Market Hill, Diss.

GREENISH, THOMAS, 20, New Street, Dorset Square, N.W.

HAMPSON, ROBERT, 205, St. John Street Road, E.C.

HILLS, WALTER, 225, Oxford Street, W.

NEWSHOLME, G. T. WILKINSON, 74, Market Place, Sheffield.

RADLEY, WILLIAM VALENTINE, 42, Hampton Road, Southport.

RICHARDSON, JOHN GEORGE FREDERICK, Elmfield, Knighton, Leicester.

ROBBINS, JOHN, 147, Oxford Street, W.

SAVAGE, WILLIAM DAWSON, 23, Freshfield Road, Brighton.

SCHACHT, GEORGE FREDERICK, 52, Royal York Crescent, Clifton, Bristol.

SOUTHALL, ALFRED, 17, Bull Street, Birmingham.

SYMES, CHARLES, 14, Hardman Street, Liverpool.

WILLIAMS, JOHN, 16, Cross Street, Hatton Garden, E.C.

WOOLLEY, GEORGE STEPHEN, 69, Market Street, Manchester.

The President, in proposing a vote of thanks to the Scrutineers for their arduous services in examining the returns, said that the Society was fortunate that year after year so large a number of Members and Associates were found willing to undertake this work.

The vote of thanks was passed unanimously, and the proceedings closed.

EVENING MEETING IN EDINBURGH.

The fourth Evening Meeting in Edinburgh of the present session was held in the Society's House, 36, York Place, on Wednesday, May 11, at 8.30. Mr. H. Bellyse Baildon, Chairman of the Executive of the North British Branch, in the chair.

The minutes of last meeting having been read and approved, a paper was read on—

An Accurate Method for Determining Specific Rotatory Power.

BY W. PEDDIE. B.SC., F.R.S.E.

The paper is printed at p. 941, and gave rise to the following discussion :—

The Chairman, in moving a vote of thanks to Mr. Peddie for the interesting and lucid way in which he had described his method for determining specific rotatory power, said there could be no doubt as to the superior accuracy of a method in which position took the place of a particular shade of colour. This paper suggested to him that it would be a good thing if candidates for the Preliminary examination could show that they possessed some knowledge of the working of simple equations such as were now brought before them.

Dr. Clark said he had not had a very extensive experience in the determination of specific rotatory power, but he had felt the practical difficulty attending determinations which depended on a comparison of shades, and he was exceedingly gratified to see the ingenious and accurate arrangement devised by Mr. Peddie. He had at first some difficulty as to how the value of n was to be found; the problem had been very completely elucidated. Of course the difference between the rotatory powers of two substances would be the same, although the value of n was not found, and probably, in most instances, pharmacists would be content to remain in ignorance of it. He seconded the vote of thanks, which was unanimously awarded.

Two papers were then read on—

Solubility of Morphine Hydrochloride, Salicin and Gallic Acid.

BY D. B. DOTT, F.I.C., F.R.S.E.

The Purification of Fixed Oils.

BY D. B. DOTT, F.I.C., F.R.S.E.

The papers are printed on p. 941, and gave rise to the following discussion :—

The Chairman said they were much indebted to Mr. Dott for the many valuable contributions with which he had favoured them. An accurate record of solubilities was of much practical value to the pharmacist. He had much pleasure in moving a vote of thanks, which was cordially awarded.

Dr. Clark said he would like to ask Mr. Dott in what respect the oils were improved by his process.

Mr. Dott said this was merely a preliminary note. He had not had time to test the process fully. He should perhaps have said decolorized rather than purified, but he thought that if that were done the oils would also be improved in other respects.

A paper was read on—

A Simple Method for Percolation under Pressure.

BY THOMAS MABEN.

The paper is printed on p. 941, and gave rise to the following discussion :—

Dr. Clark said he did not quite understand what Mr. Maben meant by producing exhaustion equal to about two atmospheres. In his experience he had never attained more than from 16 to 25 inches of mercury. That was about two-thirds of an atmosphere. With regard to the hastening of percolation he had not found it necessary. He did not approve of the practice of reducing drugs to a fine state of division before percolation. It was quite unnecessary, and if the drug were roughly powdered percolation proceeded easily, and might even require to be retarded. There were many other pharmaceutical operations, however, in which increased pressure was advantageous, as, for instance, in filtering a thick extract. The object aimed at in Mr. Maben's arrangement might also be attained very simply by attaching a long tube to the bottom of the percolator. In all such arrangements the valve mentioned in the paper was an essential requisite, as the slightest alteration in the water pressure would cause it to rush back into the receiver. They were much indebted to Mr. Maben for having brought this suggestion before them. He thought practical pharmacists did not sufficiently avail themselves of such aids. It was an arrangement which was capable of being adapted to a large variety of pharmaceutical apparatus, and he had much pleasure in moving a hearty vote of thanks to Mr. Maben.

The vote was seconded by the Chairman, who expressed regret that Mr. Maben could not be present, and unanimously awarded.

A paper was then read on—

Irish Moss as a Substitute for Gum Arabic in Pharmacy.

BY PETER BOA.

The paper is printed on p. 942, and gave rise to the following discussion :—

The Chairman said this was an interesting communication on the practical pharmaceutical uses of Irish moss. They were much indebted to Mr. Boa for his notes on practical pharmacy, and he had much pleasure in moving a hearty vote of thanks.

Mr. Nesbit said at the present time an efficient substitute for gum arabic was of importance. He was struck by the evident emulsifying power for cod liver oil shown by the Irish moss mucilage. Its apparent preservative influence against oxidation in the mistura guaiaci was also of note, and it would be interesting to know if it had any such effect in the case of iron salts as, for instance, in Griffith's mixture. With regard to its unsuitability for suspending subnitrate of bismuth, he had observed the same in the case of tragacanth. He had not found that the same objection applied to subcarbonate of bismuth. He felt much obliged to Mr. Boa for the trouble he had taken, and seconded the vote of thanks, which was unanimously awarded.

Mr. J. B. Stephenson said he recollected many years ago conducting some experiments with a view to obtaining a suitable substance for making bandoline. Among other things he tried Irish moss and was surprised at the strength of mucilage which it yielded by cold maceration. He had some recollection that the objection to it was that it would not keep. The objection that it formed a hard compound with bismuth subnitrate applied also, though perhaps not to the same extent, to gum arabic. In fact he knew of one practitioner who would not allow any agent to be employed to suspend insoluble powders, and who was in the habit of ordering chalk mixture without the gum.

Mr. Thompson asked if the gum arabic cod liver emulsion was the best Mr. Boa could get. His experience was that a much better emulsion could be made.

Mr. Boa replied that what he was testing was rather the suspending than the emulsifying power of the moss and gum, and, therefore, the emulsions had been made by simple shaking up. He had found that the oil could be obtained in a much finer state of division by means of gum arabic than by moss, and he observed that a similar experience had been met with by American pharmacists.

Mr. Boa then exhibited a variety of commercial sugars and syrups made therefrom. The conclusion he had come to was that the first quality of any commercial sugar would give satisfactory results. Difficulties only cropped up when second qualities were employed.

Attention was then directed to two donations to the Museum.

Palembang Benzoin recovered from Table Bay, lost in 1691. From Mr. C. F. Henry, Edinburgh.

Living Plants of *Gelsemium nitidum*.

From Dr. E. R. Squibb, Brooklyn, New York.

The Chairman then said that this meeting concluded the session. He thought he might congratulate them on the success which had attended the meetings. Their best thanks were due to the gentlemen who had contributed papers, and he trusted that all would exert themselves, so that next session they might have many more of equal interest and ability.

Mr. Nesbit said they ought, before separating, to acknowledge the valuable services of their Chairman during the past session, and he would therefore move a vote of thanks to him for the efficiency and ability with which he had discharged the duties of the chair.

The vote was unanimously passed with acclamation.

The Chairman having returned thanks, the meeting was closed.

Provincial Transactions.

DOVER CHEMISTS' ASSOCIATION.

The quarterly meeting was held at the Apollonion Hall, on Wednesday, the 11th inst. Mr. J. F. Brown in the chair.

The minutes of the previous meeting having been read and confirmed, a circular, issued by the Executive of the Chemists and Druggists' Trade Association of Great Britain, was discussed, and the following resolution carried unanimously :—

"It is desirable that an association should be maintained for protecting the trade interests of chemists and druggists on the lines of the circular issued by the Executive of the Chemists and Druggists' Trade Association of Great Britain on May 6, and this meeting hereby approves of the same."

The instructions recently issued to excise officers respecting medicines liable to stamp duty were then read and discussed, and it being the opinion of the members that the Act would thereby be unduly strained to the great inconvenience and annoyance of chemists, the following resolution was passed and ordered to be sent to Council of the Pharmaceutical Society :—

"The chemists of Dover beg to call the attention of the Council of the Pharmaceutical Society to the harsh and arbitrary scope of the instructions recently issued by the authorities at Somerset House to excise officers respecting medicines liable to stamp duty."

BRIGHTON ASSOCIATION OF PHARMACY.

A meeting of this Association was held in the Mayor's room of the Town Hall, on Tuesday evening, May 17. The President, Mr. W. D. Savage, J.P., occupied the chair, and there was a small attendance of members.

The minutes of the previous meeting were read and confirmed.

The Treasurer (Mr. Cornish) presented his report which showed a balance in hand of £24 10*s.* 10*d.*

The President next explained the provisions of the Pharmacy Act Amendment Bill, and after a short disdussion it was resolved, on the motion of Mr. Savage, seconded by Mr. Caton, "That the Amendment Bill of the Pharmaceutical Society be approved—at the same time this meeting trusts that some means may be devised whereby the suggestions recently submitted to the Council by the chemists of Brighton may be carried out, and unqualified men be prevented from infringing the legitimate trade of qualified chemists and druggists."

This was followed by a discussion on the advisability of offering prizes annually to chemists' apprentices in Brighton for proficiency in chemistry, etc., and it was decided, on the motion of Mr. W. W. Savage, seconded by Mr. E. T. Salmon, that two prizes of the value of 21*s.* and 10*s.* 6*d.* be this year offered by the Brighton Association of Pharmacy to students under 21 years of age attending the night classes in chemistry at the Brighton School of Science and Art. Mr. Salmon proposed, and Mr. W. W. Savage seconded, and it was carried unanimously, "That with the object of promoting a spirit of mutual goodwill, and affording an opportunity of social reunion, it is desirable that a dinner should be held at such time as may be deemed convenient, to be the first of a series of annual reunions amongst the chemists of Brighton and Hove ; and that a small committee be appointed to carry this resolution into effect." The following gentlemen were appointed on the committee :—Messrs. Billing, Caton, Salmon and Leigh.

A vote of thanks to the Chairman terminated the proceedings.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

The annual general meeting of this association was held on Wednesday evening, 11th inst., when the report of the year's proceedings was read and the financial statement rendered. The affairs of the Society were shown to be in an eminently satisfactory condition. The work had produced good results, and the summary of the class and laboratory instruction proved the educational branch to be flourishing and progressing most favourably. As the result of the class examinations the following students were awarded prizes :—Botany, Messrs. T. L. Hollely and A. S. Smith (special) ; Chemistry, Mr. J. T. Ellinor ; Materia Medica, Mr. J. Smith ; Practical Chemistry, Messrs. Golland and J. T. Ellinor (special) ; President's prize for all subjects, Mr. J. T. Ellinor.

The election of officers and council for the year being proceeded with, resulted as follows :—President, Mr. J. M. Furness ; Vice-President, Messrs. J. H. Bradwall and W. H. Maxey ; Treasurer, Mr. G. T. W. Newsholme ; Honorary Secretaries, Messrs. G. A. Grierson and Jno. Humphrey ; Auditors, Messrs. G. A. Cubley and C. D. Morrison ; Members of Council, Messrs. Appleton, Ellinor, Lowe, Morrison, Preston and Rhoden.

The business of the evening was concluded by votes of thanks being conveyed to the retiring officers and council, special praise being awarded the Ex-President (Mr. Newsholme), and Secretary (Mr. Bradwall) for the thoroughly conscientious manner in which they had discharged their duties, and striven for the wellfare of the Society.

Parliamentary and Law Proceedings.

High Court of Justice, Queen's Bench Division.

Before the Lord Chief Justice and Mr. Justice Smith.

May 17, 1887.

WHITE *v.* BYWATER.

This was an appeal on a case stated by the stipendiary magistrate for the borough of Sheffield, who had refused to convict the respondent on a charge under the Sale of Food and Drugs Act, 1875.

Mr. Wormald, who appeared for the applicant, said the facts as set out on the case stated by the learned magistrate were shortly these. The appellant, who was the medical officer of health for the borough of Sheffield, in November last went to the shop of the respondent Bywater, who was a chemist and druggist, and asked for 3 ounces of tincture of opium ; having been supplied with it he informed the respondent that he bought it for the purpose of analysis, and divided it into three portions as required by the Act. Upon an analysis the tincture was found to contain, as appeared by the certificate of

the analyst affixed to the case, 56·8 proof spirit instead of 100, as required by the B.P., and morphia 2·3 instead of 7·5, in other words, the result of the analysis showed that the sample did not contain much more than half the proof spirit, and one-third the quantity of opium which the B.P. tincture contained. Of course there was something else, and the analysis did not state what it was, but it might be presumed with tolerable certainty that it was water, whilst the B.P. tincture would appear to be composed wholly of proof spirit and opium. The correctness of the analysis was not disputed, and the evidence given on behalf of the complainant was that of himself, Mr. English White, M.D., and Alfred A. H. Allen, Public Analyst, Thomas George Wilkinson and Mr. Newsholme, President of the Sheffield Pharmaceutical Association. They deposed that "tincture of opium" was a well-understood term in the trade; that the material sold by the defendant was not of the nature, substance and quality as understood by persons usually dealing in that article, thus coming clearly within the words of the sixth section of the Act of 1838 and 1839, Vic., chap. 63 : "No person shall sell to the prejudice of the purchaser any article of food or any drug which is not of the nature, substance and quality of the article demanded by such purchaser under a penalty not exceeding £20." He contended that on this evidence, which was uncontradicted, the defendant ought to be convicted. The learned stipendiary, however, considered that he ought to dismiss the complaint on the following grounds :—That if the purchaser had in some way especially asked for "tincture of opium," made according to the recipe of the B.P., and had been supplied with a tincture professed to be so made, there would be a ground of complaint, but that in this case no such special request had been shown. He should contend that was quite unnecessary in a case like this, "tincture of opium" being a well-known article in the trade, and the defendant, being a chemist dealing in such articles, must be taken to know what it was.

The Lord Chief Justice asked if it was not a question of degree.

Mr. Wormald thought not in this case. Here was a substance sold one-third of the strength of that ordinarily known as "tincture of opium."

The Lord Chief Justice said he understood it was one-third of the strength of the B.P. tincture. Did Mr. Wormald go so far as to say that anything of less strength, or which differed appreciably from the B.P., would come within the Act?

Mr. Wormald said not an infinitesimal difference of course, but he should contend that this was exactly similar to the case of a man going into a public house and demanding to be served with a pint of brandy. If the publican gave him a mixture which was one-third brandy and two-thirds water that was brandy and water, not brandy, which was a very different thing; it was not of the nature, quality and substance of the article demanded.

The Lord Chief Justice remarked that the purchaser would get the brandy, although he had water mixed with it.

Mr. Wormald said, if he asked for a pint of brandy, and only got one-third of a pint of brandy and two-thirds of a pint of water, he should submit that was not a substance of the nature and quality demanded.

Mr. Justice Smith said he understood the contention to be that this article was not of the quality demanded, that the purchaser asked for the tincture of opium of commerce.

Mr. Wormald said, Yes, that was the point.

The Lord Chief Justice asked if it was not a well-known fact that you got much stronger drugs at some places than at others. There were people, at any rate in London, who had a name for particular drugs. He understood there was a very strong solution of opium termed "Batley's solution."

Mr. Wormald said that was a totally different thing to tincture of opium, it was double the strength of the B.P. tincture.

The Lord Chief Justice asked how it would be supposing he asked for tincture of opium and were supplied with "Batley's solution."

Mr. Wormald said that would be very improper ; it would not answer the description of tincture of opium, and it would be highly dangerous.

The Lord Chief Justice said he really thought it must be a question of degree, and that a man obtained that which was substantially of the nature, substance and quality demanded if it were not adulterated to such an extent as to make it useless.

Mr. Wormald said in this case the purchaser demanded 3 ounces of tincture of opium, and what he got was what was equivalent to 1 ounce of the ordinary tincture of opium plus a small quantity of proof spirit, and the rest was water, and that did not seem to be a fair compliance with his demand. He then drew attention to the fact that under the Pharmacy Act, sec. 15, it was illegal to compound any medicines of the B.P., except according to its formularies. He then read the formula for tincture of opium from the B.P., and pointed out that the evidence in this case was that the defendant did not compound this, but got the opium from some one else, so that he could not be summoned under the Pharmacy Act. There would, therefore, be the curious result if the decision were right that the person who made this tincture and sold it as tincture of opium could be affected under the Pharmacy Act and fined, and yet it would be lawful for someone else to sell this illegal mixture. On these grounds he submitted that the decision of the learned magistrate was wrong, and that on the evidence before him he ought to have convicted. He would also call attention to paragraph 8 of the case, which he thought had been inserted by the learned stipendiary in order to suggest to the court that the B.P. was not the authority by which the chemists ought to compound their drugs. He then cited Bell on the Food and Drugs Act, who said:—"There is no direction in the Act how an article is to be compounded. A clause in the Bill provides for compounding drugs according to the B.P., but it was struck out in the House of Lords." That might be so; he did not know whether it was or not, but he could see a very good reason why the House of Lords should have struck it out. The Pharmacy Act was anterior in date to the Food and Drugs Act, and therefore the compounding of drugs was already provided for by the section to which he had referred.

No one appeared in support of the magistrate's decision.

The Lord Chief Justice, in giving judgment, said: I should have been glad to have heard the case argued, but I must decide it on the evidence before me, and the evidence that strikes me as important is the evidence in paragraph 5, in which the learned magistrate sets out that a certain number of persons, apparently intelligent persons, a doctor of medicine, a medical officer, public analysts and so forth, six or seven of them, depose—it is put in a general way—that tincture of opium was a well-understood term in the trade, and that the material sold by the defendant was not of the nature, substance and quality of tincture of opium, as understood by persons usually dealing in that article. The above-mentioned witnesses also deposed that the B.P. preparation was the only one recognized by the medical profession, and by pharmacists generally. That is the evidence which the learned magistrate has very candidly and properly returned to us, and I have no doubt he has extracted it fairly. What is the result of it? The result of it is that in terms these witnesses, who certainly by their description appear to be highly competent witnesses, swore that the drug sold in this case was not of the nature, substance and quality demanded by the purchaser. I say "demanded by the purchaser," because it must be taken, in the absence of any proof to the contrary, that

he was a person dealing in the article, and wanting the article, and the person who sold it was a chemist and druggist, and it was proved or admitted—proved, I think—that the B.P. preparation was the only one recognized by persons in his position, and that this was not according to, nor anything like according to the B.P. The analysis shows that. That is not in the fifth paragraph, but in an earlier paragraph of the case. Under these circumstances what is one to do? The magistrate has decided on the ground that he did not ask for tincture of opium according to the B.P.; but he asked for tincture of opium, and he did not get that which all the evidence in the case shows to be a stuff of the nature, substance and quality generally understood as tincture of opium by people dealing in it. I cannot but think that, that being found, as there is no evidence on the other side, and we have heard no argument on the other side, I am reluctantly—I say that simply on account of the magistrate—brought to the conclusion that he is wrong, and the case must be remitted to him.

Mr. Justice Smith: I am of the same opinion. The applicant at the repondent's shop asked for 3 ounces of tincture of opium. Now what is the meaning of that? I think, and that is where I differ from the learned magistrate, the meaning of that is 3 ounces of the tincture of opium of commerce, or the article which is usually sold by way of commerce as tincture of opium. If that be so, then the evidence before the magistrate is all one way, because the evidence of the gentlemen whose evidence has been set out on the depositions, is that this tincture of opium is a well-known term in the trade, and the material sold by the defendant was not of the nature, substance and quality of tincture of opium as understood by persons usually dealing in that article. It seems to me, if that be so, the purchaser did not get a drug of the nature, substance and quality of that which he asked for.

Mr. Wormald: It will be judgment for the appellant with costs?

The Lord Chief Justice: Yes.

NEWTON AND WIFE *v.* CIVIL SERVICE SUPPLY ASSOCIATION.

This action was in the list for hearing before Baron Pollock and a special jury on Thursday last, but at the sitting of the Court Mr. Lockwood, Q.C., who with Mr. Edward Morten appeared for the plaintiff, said the case had been settled upon terms which it was not necessary to make public. The terms had been put in writing, and he would hand them to his lordship and ask for judgment in accordance with the terms arranged.

Mr. Jelf, Q.C., said he appeared with Sir Charles Russell and Mr. C. Mathews for the defendants; they had considered the matter and agreed to the terms.

Baron Pollock: I can quite understand that it is desirable to arrange the matter. I know something of the case, as it came before me at chambers.

Mr. Lockwood: Your Lordship gives judgment in accordance with those terms.

Baron Pollock: Yes.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

UNFAIR COMPETITION.

Sir,—Is there really, then, no hope of redress? Is it absolutely futile to imagine that by a combined and sustained effort on the part of the trade and its sympathizers Parliament may be induced to repair the leak in a previous Act, and thus put an end to the unfair competition of bogus and other stores? Has everything been done by us that possibly can be done to this end? If not, are we not foolish to idly fold our hands and allow our weapons to rust, while every day that passes strengthens the position of the enemy, and renders the task of dislodging him more and more difficult?

These questions have been suggested to my mind by the incident of the Brighton petition to the Council (reported in your pages), and the certainly not very encouraging remarks let fall by one or two of our leading lights on that occasion.

We are all very well aware that, as Mr. Savage says, in the present state of the law the Council is powerless to prevent the sale of poisons by these companies, but the stating of this unfortunate fact is no answer to the Brighton petitioners. What they desire (and what, if their action be imitated, as it deserves to be, by chemists throughout the country, I believe it is not unlikely they may obtain), as I understand it, is not that the Council should attempt the impossible under the present law, but that supported, as it would then be, not only by the class of which it is peculiarly the representative, but also by a body of men possessing much greater parliamentary influence—medical practitioners—it should again make a strong effort to procure an amended Pharmacy Act.

I am aware that it is believed by many, that to expect at this time of day (as they put it) legislation of a protective kind is little short of madness. The mere whisper of "protection," it is held, is quite sufficient to bar the passage of any Bill in these free-trading times. In many cases it is so, but I maintain, that in setting up this principle in the present case as an ogre, guarding (for us) the gates of Parliament, we are needlessly terrifying ourselves by imagining horrors which either do not exist at all or, at the worst, are much less formidable than we suppose. For, it must be evident to every one, that if the Pharmacy Act of 1868 (the spirit of it, I mean, not the letter) means anything at all, it means that chemists and druggists (in the public interest, of course), having passed certain examinations, and having thereby qualified themselves for the exercise of a responsible calling, are understood to be granted a certain amount of "protection." Some of that protection we still enjoy; part, a very important part, has been lost to us, by what we think a quibble of law. It is surely then not unreasonable to expect, that if we approach Parliament in a proper manner and prove to the lawmakers of the nation that we really desire it, they will grant to us again that which, I hold, they have already said we have a right to possess.

Again, if a slavish adherence to free-trade notions is to prevent the passage through the Parliament of to-day of a Bill such as this, why did not such opinions prevent the passing of the 1868 Act? Are free-trade principles stronger now than they were then? Is it not notorious that they are not?

I am convinced that it is not from any abstract principle of this kind that our strongest opposition will come. That opposition (though it may use the arguments) will be prompted by a spirit, the very opposite of that which stirred to action the pioneers of the free-trade movement. The greater bulk of it will be the offspring of selfishness, the selfishness of the every day increasing number of those who are profiting by our misfortune, and waxing fat at our expense.

I earnestly hope, therefore, that the example set by the Brighton chemists will be promptly and enthusiastically followed, and if it be, I am quite sure that the Council of the Pharmaceutical Society will not fail to do its very best to give effect to the wishes of its petitioners.

Edinburgh. T. G.

Andover.—The practice of pharmacy in Ireland is regulated by the Pharmacy Act (Ireland), 1875, and the examinations are under the control of the Pharmaceutical Society of Ireland.

Candidate.—The Regulations of the Board of Examiners may be obtained by application to the Secretary, 17, Bloomsbury Square.

Apprentice.—Bentley's 'Manual of Botany.'

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Allen, Helbing, Smith, Finsterlin, Haydon, Hutchinson, Crow, He se, Alison, Allan, Modlen, Cook, Salmon.

"THE MONTH."

Serpent Venom.

An interesting *résumé* of an important monograph by Messrs. Mitchell and Reichert on the venom of poisonous serpents, published by the Smithsonian Institution, appears in the *Dublin Journal of Medical Science* (May, p. 443). The authors, in a previous treatise (see *Pharm. Journ.*, [3], xiii., 1075) have pointed out that serpent venoms are not simple in composition, and have suggested that the differences in their power to kill and mode of causing death are due to differences in the quantity and quality of the constituents. It has been found that the solid matter suspended in fresh venom is inert, and that pure cultures of the micrococci constantly found in venom are without effect; the poisonous matter must consequently exist in solution. No alkaloids have been found, but the venoms contain certain proteid substances, to which the poisonous properties are attributed. These proteids are of two classes, globulins and peptones, the relative proportions of which differ very much in different venoms, the globulins preponderating in the venom of American snakes, and the peptones in the cobra venoms. Three kinds of globulin have been separated, one by the addition of water, one by dialysis and one by the cautious addition of cupric sulphate, and these have been named respectively "water-venom-globulin," "dialysis-venom-globulin," and "copper-venom-globulin." After the separation of the globulins the residue gives no precipitate on boiling, but still contains the peptones. A comparative study of the physiological action of the venom globulins and peptones showed that the globulins produce swelling and blackening of the parts by infiltration of incoagulable blood, modify the red corpuscles and produce molecular changes in the capillary walls; they are also powerful depressants of the heart and paralyse the respiratory centres. The peptones are more active in the production of œdema, in the breaking down of the tissues and in inducing putrefaction and sloughing. These and other distinctions explain the varying pathological changes which are caused according as the globulins or peptones preponderate in the particular kind of venom injected. When snake venom is brought into contact with the mucous membrane of the stomach in the intervals of digestion, sufficient absorption may take place to prove fatal, this being more probable with the diffusible peptones than with the indiffusible globulins, but the influence of the gastric juice is often sufficient to destroy either of them before absorption can take place. The best local antidote for snake venom was found to be potassium permanganate; bromine and strong alkalies also proved effective. Ferric chloride is useful to combat those venoms which owe their poisonous properties to globulins. But the authors consider it would be idle to search for a chemical antidote to the poison when once it has entered the circulation, because the active principles of the venom are proteid, and any agent acting upon them would also destroy the normal proteids of the blood.

Composition of Cow's Milk.

The results of an experiment made primarily to determine the variations in the proportion of phosphoric acid occurring in the milk of the cow have been recorded by M. Andouard (*Comptes Rendus*, civ., 1298). The experiment was made on four cows, one of which was fed on pasturage, with the necessary complement of hay and bran, while the others were fed with beet, swedes, potatoes, legumes, etc. It was found that the phosphoric acid in the milk underwent a progressive diminution during the period of lactation extending to 10·46 per cent on the initial weight in the case of the cow fed on pasturage, and ranging from 14·91 per cent. to 45·39 per cent. on the initial weight in the cases of those fed on roots, etc. It was also observed among other things that the butter, and especially the sugar, also diminished in quantity during the same period, whilst, with respect to casein, the milk from two of the cows contained an increasing proportion, while that from the other two contained a decreasing proportion. The paper does not contain any statements of absolute quantities.

Casein as an Emulsifier.

At the last meeting of the Paris Pharmaceutical Society M. Léger submitted some information respecting the employment of casein as an emulsifying agent (*L'Union Pharm.*, May 16, p. 193). Considering that natural emulsions, such as vegetable juices, milk, etc., owe their peculiar condition to the influence of albuminoid substances, he inferred that these substances might be utilized in preparing artificial emulsions if they could be separated in a form convenient for manipulation and preservation. Casein, which so perfectly emulsifies butter in milk, was chosen for the experiment. It was separated by adding 60 grams of ammonia to 4 litres of milk, and after twenty-four hours' contact removing the soapy layer that collected at the top, and then precipitating the serum with acetic acid. The magma of casein, after being strongly pressed, was mixed with 10 grams of sodium bicarbonate and sufficient sugar that the product should contain 10 per cent. of its weight of casein. This "saccharide of casein," when powdered, is said to be easily soluble in water and capable of being employed in the same proportion as gum in making almost any emulsion, without requiring the use of a mortar. The sole defect admitted by M. Léger is that the "saccharide" gives off a slight animal odour.

Lanolin versus Lard.

Further experiments made with a view of determining the relative value of lanolin in promoting absorption through the skin have been reported upon by Dr. Guttmann (*Med. Chron.*, May, p. 170), potassium iodide and salicylic acid being used, as being readily detected in the urine. Ointments of equal strength made with lanolin and with lard were used upon four different patients, and in the subsequent examination of the urine the most frequent and distinct indications of the absorption of the iodide or of salicylic acid were found after the use of the lard ointment. At any rate, the results are considered to prove at least that lanolin possesses no superiority over lard in promoting the absorption of potassium iodide or salicylic acid through the skin.

Alligator Oil.

Pharmaceutists who are also analysts may be interested to know that alligator oil has recently been introduced into commerce for currying leather. Three varieties are met with, one which is pure alligator oil, another, which is known as crocodile oil, and a third, which appears to be a mixture of the two. The alligator oil is stated to be unctuous, semifluid, of a reddish colour, and of specific gravity 0·928, and to consist chiefly of 60·21 per cent. of olein and 32·31 of margarin and stearin, 1·50 of free oleic acid and 0·02 of iodine. Crocodile oil is of a reddish colour, but

more fluid than alligator oil. The alligator oil is preferred by curriers, as it gives more weight to the leather than either whale, cod or seal oil. It is valued at 1 franc per kilogram.

Methylic Ether.

In one of the "opuscula practica" of the last part of *Asclepiad* (p. 135), Dr. Richardson recalls some results obtained by him twenty years since when experimenting as to the anæsthetic properties of methylic ether. In twenty-seven cases the gas was found to produce sufficient insensibility to allow of the operation of tooth-extraction without pain, recovery to consciousness being very rapid. It was noticed that whilst the patients under its influence were rendered insusceptible to pain, they retained sufficient consciousness to respond to requests made of them and even to converse. It also proved to be a very safe anæsthetic. Inconveniences in manipulation led to methylic ether being set on one side for a time, but Dr. Richardson thinks that as methods of condensing gases have been recently so much improved, it may yet be possible to bring this gas into useful service as an anæsthetic.

Syrupus Ferri Superphosphatis Oxygenatæ.

Another of the "opuscula" is devoted to the perfected form of a ferruginous preparation, which Dr. Richardson has found a useful remedy in cases of a neuræsthenic type, especially when anæmia is present, and which he entitles somewhat variously as "syrup of superphosphate of iron and oxygen," "syrupus ferri superphosphatis oxygenatis," and "superoxygenated superphosphate of iron." It consists of a mixture in equal parts of "syrup of superphosphate of iron," solution of peroxide of hydrogen (10 volume strength) and pure glycerine, and the dose for an adult is from one to two fluid drachms two or three times a day in three ounces of water. It is mentioned that it has been observed by Mr. Robbins that if the peroxide of hydrogen be added in excess to the syrup and glycerine be not used, the product is of a beautiful red colour, which, however, is unstable. Made according to the improved formula it is described as very stable, of an agreeable taste, and as capable of being prescribed with tincture of nux vomica, strychnine, morphine, codeine, quinine, salicin, or any other compound that does not liberate the oxygen from the peroxide.

Solutions of Corrosive Sublimate.

When ordinary water is used, in the absence of distilled water, in the preparation of antiseptic solutions of mercuric chloride, an insoluble mercurial precipitate is gradually formed, which according to Herr Feuerbringer is a trioxychloride or tetraoxychloride, due to a reaction between the mercuric chloride and the carbonates of the alkaline earths present in the water. In order to prevent this precipitate the addition of acid has been recommended. But Herr Schillinger has pointed out (*Texas Druggist*, May, p. 58, from *D. Med.-Zeit.*), that the formation of the precipitate does not take place for a considerable time if an equal quantity of sodium chloride be added, and some elaborate experiments by Dr. Emmerich appear to show that this combination of sodium chloride with mercuric chloride does not in the least affect the antiseptic qualities of the latter. It is also stated that pastilles containing equal and definite quantities of the two chlorides have been prepared for this purpose and are used in the Munich clinic.

Yerba Santa and Quinine.

A syrup prepared from *Eriodictyon Californicum* leaves, or "yerba santa," is used largely in the United States for the administration of quinine, the bitter taste of which it suppresses. According to Mr. Rother (*Amer. Journ. Pharm.*, May, p. 225) this property is due to the presence in the leaves of an acid resin that forms with some bases very soluble salts, which react with quinine salts to form an ordinarily insoluble quinine resin-acid salt. This compound is readily decomposed by the stronger acids, and is peculiarly soluble in ammonia.

Antipyrin as an Anodyne.

Antipyrin has hitherto been chiefly used as an antipyretic, but M. Germain Sée points out that it also possesses remarkable anodyne properties (*Compt. Rend.*, civ., 1085). This has been proved in cases of migraine, neuralgia, muscular rheumatism, locomotor ataxy, lumbago, sciatica, cardiac and other painful diseases. M. Sée remarks that it is superior to antifebrin for this purpose, since the dose of antifebrin that would produce the same anodyne result gives rise, if great care be not taken, to serious symptoms, so that it cannot be used with safety. The only inconvenience experienced from the long-continued use of antipyrin, or from an over dose, is the production of a rash resembling nettle rash or scarlatina, but this disappears if the dose is lessened. Antipyrin has also been employed as a hæmostatic by Dr. Goets, of Geneva, in bleeding at the nose in a case of purpura hæmorrhagica, and it has also been applied locally for the same purpose in other diseases.

Veratrum Alkaloids.

About four years since (*Pharm. Journ.*, [3], xiii., 799) it was pointed out by Herr Bosetti that commercial "veratrine," corresponding with the official preparation of the German and British Pharmacopœias, was a mixture of two probably isomeric alkaloids, one of which was crystalline and insoluble in water ("cevadine" of Wright and Luff) and the other non-crystalline and soluble in water ("veratridine" or "soluble veratrine"). The question might therefore arise whether these two constituents are equal in medicinal value, so that the results of some comparative experiments made by Herr Lissauer with the amorphous official veratrine as a preliminary to an investigation as to the physiological action of the crystalline alkaloid have a bearing upon the relative therapeutic value of that mixture (*Arch. f. exp. Path. u. Pharm.*, xxiii., 38). It was found that when injected into frogs the crystalline and the official veratrine corresponded in their action qualitatively and quantitatively. In respect to mammalia the experiments were not sufficiently numerous to allow of judgment being pronounced quite so decidedly, but the results gave no reason to suppose that there is any essential difference between the physiological action of the two preparations.

Strychnine in St. Ignatius Bark.

In a communication to the *China Mail* (March 31), Mr. W. E. Crow, of the Government Laboratory, Hong Kong, announces that he has found abundant evidence of the presence of both strychnine and brucine in the bark of *Strychnos Ignatii*, Berg., the St. Ignatius's bean tree. According to 'Pharmacographia,' the seeds contain about 1·5 per cent. of strychnine and 0·5 per cent. of brucine, but the bark is not known to have been previously analysed. The tree does not appear to be indigenous to China

proper, though its seeds are a well-known article of materia medica. The material examined by Mr. Crow was obtained from the Philippines.

Amyrin.

The principal crystallizable constituent of elemi resin, to which the name "amyrin" has been given, has been variously described by different chemists. Buri, one of the latest investigators, has represented it as a monovalent alcohol, with a melting point at 177° C., and corresponding in composition to the formula $C_{25}H_{42}O$ (*Pharm. Journ.*, [3], vii., 157). In re-examining Buri's compound and by careful and repeated recrystallization, Herr Vesterberg found it was possible to separate it into distinct portions, one consisting of dense aggregates of united prisms, and the other of light thin lamels (*Berichte*, xx., 1242). These were found to represent two distinct but isomeric monovalent alcohols, which have been named α-amyrin and β-amyrin, and are represented by the formula $C_{30}H_{49}OH$. α-Amyrin was eventually obtained in long, fine needles, fairly soluble in hot alcohol, but with difficulty in cold alcohol, having a melting point about 180–181° C., and yielding an acetyl derivative that melted at 220° C. β-Amyrin melted at 193–194° C., and gave derivatives that were more difficultly soluble and had higher melting points than the corresponding derivatives of α-amyrin. Both the amyrins rotated the plane of polarized light to the right.

Hop Bitter.

The bitter principle of the hop has for centuries entered so largely into the dietary of the human race, that it is not a little astonishing to realize that so little is known respecting its true nature and properties. Until quite recently there has been a choice of conflicting statements as to the identity of the compound, but about a year ago (*Pharm. Journ.*, [3], xvi., 1085) Herr Bungener to some extent reconciled them by announcing that the bitter principle as it exists in the hop is a crystalline acid, insoluble in water, which readily undergoes oxidation, and then becomes to some extent soluble. The physiological action of this bitter has now been investigated by Dr. Dreser (*Arch. f. exp. Path. u. Pharm.*, xxiii., 129), and he reports that the unaltered acid in alcoholic solution is a powerful poison, 0·25 milligram being fatal to a large frog, and 20 to 25 milligrams to a guinea pig. In frogs it produces paralysis of the central nervous system and of the heart, but in warm-blooded animals the action is in the direction of an intense accleration of the respiration. However, it may be comforting for beer drinkers to learn that in its altered condition, which it is sure to attain before the beverage containing it reaches its ultimate destination, the hop bitter is almost devoid of these noxious properties. In the words of Dr. Dreser, "the hop-bitter occurring in beer is consequently, on account of its harmlessness, quite an uninteresting substance from a toxicological point of view."

Diastase.

Chemists seem to experience considerable difficulty in arriving at an agreement respecting the nature of diastase, its claim to an albuminoid character being especially the subject of dispute. Herr Hirscheld has attempted to solve the problem (*Arch. f. gesammte Phys.*, xxxix., 499) by examining a "pure diastase," prepared by macerating coarsely powdered malt with an equal weight of one per cent. solution of neutral acetate of lead, afterwards diluting with an equal quantity of water, straining and precipitating the red-brown liquid with alcohol, redissolving the precipitate in water at 50° C., cooling and again precipitating. The diastase so obtained is said to be very active, to contain no sugar or reducing substance, and to give no colour with Millon's reagent. Considering these properties and the published analyses of Zulkowsky, according to which the nitrogen diminishes in proportion to the purity of the ferment, Herr Hirscheld holds that diastase is a carbohydrate, a kind of gum, and that any nitrogen found in it has its origin in impurities. On the other hand, working with diastase obtained by treating malt with water and precipitating with alcohol, the precipitate being redissolved and reprecipitated several times, Herr Lintner has arrived at diametrically opposite results (*Journ. f. prakt. Ch.*, xxxiv., 378). He found that the more pure and more active the diastase the more nitrogen it contained, but that the proportion never exceeded 10·42 per cent., and he therefore concludes that diastase is a proteid, probably an oxidation product of albuminoid matters.

Carotine in Leaves.

It has been recognized that the red colouring matter contained in leaves is a hydrocarbon possessing the physical and chemical properties of carotine, the orange-red crystalline compound obtainable from carrots. Some further observations by M. Arnaud (*Compt. Rend.*, civ., 1293) led him to the conclusion that carotine is a constant and normal product of vegetable life; that in fact it is frequently present in the largest proportion in the leaves of the most vigorous plants, and consequently those that are the most intensely green, its presence being then masked by the green of the chlorophyll. This has been confirmed by some experiments in which leaves carefully dried in a vacuum were exhausted with light petroleum spirit, the residue from evaporation redissolved in carbon bisulphide, and the solution examined colorimetrically. It was estimated in this way that the leaves of *Spinacia oleracea* contain carotine equal to 79·5 milligrams in 100 grams of the dry material; leaves of *Urtica dioica* 95 milligrams, and leaves of various grasses 71 milligrams. This quantity of red colouring matter would appear to be sufficient to modify considerably the colour that would be due to chlorophyll alone.

Chlorophyll as a Dye.

The green colouring matter of leaves is so important a factor in the beauties of nature, that it is not surprising attention should have been turned to it as a possible dyeing material, but hitherto little success has attended experiments in this direction. In a paper recently read before the Manchester Section of the Society of Chemical Industry, Dr. Schunck described some of the difficulties that have been met with in applying chlorophyll as a dye. The first is the extremely fugitive nature of the colour, a solution on exposure to light for a day or two becoming quite bleached. Another is that since chlorophyll is rather basic than acid in its properties, ordinary mordants exercise no action on it. Even the yellowish-green "acid chlorophyll," which is formed upon the addition of acid to a solution of chlorophyll, although much more stable, is not susceptible to the action of mordants. But chlorophyll forms double compounds with certain metallic salts, and one of these, a beautiful green compound that is formed when a small quantity of copper oxide is added to an acetic acid solution of chlorophyll,

readily dyes fabrics that have been previously treated with albumen or gelatin, or substances that normally contain gelatin. The fibre of cotton presents only a very slight attraction for this compound, that of silk a little more, and woollen fibre most of the three.

Colouring Matter of Lac Dye.

Notwithstanding the pigment secreted by the lac insect has long been used as a dye, very little is known as to the exact method of its preparation, and still less as to its composition. The subject has been taken up by Herr R. E. Schmidt, who reports that the actual colouring principle is a crystallizable body having acid properties, which is closely allied to carminic acid, the colouring principle of cochineal, and for which the name "laccainic acid" is proposed (*Berichte*, xx., 1285). It was obtained as a brownish red crystalline powder or as a darker crystalline crust, appearing under the microscope to consist of well-formed rhombic tables, of a yellow-red colour. Laccainic acid is described as being abundantly, though slowly, soluble in alcohol; freely soluble in wood spirit, amylic alcohol, aceton and glacial acetic acid; somewhat less soluble in water, giving it a blood-red colour, and insoluble in ligroin and benzol. It is nearly insoluble in ether, but is not precipitated by ether from an alcoholic solution, in which behaviour it resembles the colouring principle of cochineal. Towards bases it behaves as a tolerably strong acid, though well-defined salts are not easily prepared. In none of its reactions does it markedly differ from carminic acid, which it resembles also in its absorption spectrum, so that it might be supposed the two bodies were identical. But this seems to be precluded by the results of analysis, which indicate that the composition of laccainic acid could be represented by the formula $C_{16}H_{12}O_8$, whilst all the different formulæ that have been attributed to carminic acid represent that compound as containing considerably less carbon. Herr Schmidt, however, calls attention to the remarkable nearness of this formula, especially in the number of carbon compounds, to those attributed to several other colouring compounds; for instance, brasilein ($C_{16}H_{12}O_5$), hæmatein ($C_{16}H_{12}O_6$), crocin, from saffron ($C_{16}H_{18}O_6$), and two derivatives from carminic acid, rufococcin ($C_{16}H_{10}O_6$) and ruficarmin ($C_{16}H_{12}O_6$). Some samples of lac dye examined proved to contain only from 10 to 13 per cent. of the colouring principle. With respect to the method of preparing the lac, consideration of the ash points, in Herr Schmidt's opinion, to a precipitation by lime, to which some alumina has been added to facilitate the washing of the precipitate and make it more convenient for working up.

Substitute for Gum Arabic.

A substitute for gum arabic, which has been patented in Germany, and is likely to be largely used for technical purposes now that good gum arabic is so scarce, is made as follows, according to the *American Druggist* (May, p. 94):—Twenty parts of powdered sugar are boiled with 7 parts of fresh milk, and this is then mixed with 50 parts of a 36 per cent. solution of silicate of sodium, the mixture being then cooled to 122° F. and poured into tin boxes, where granular masses will gradually separate out which look very much like pieces of gum arabic. This artificial gum copiously and instantly reduces Fehling's solution, so that if mixed with powdered gum arabic as an adulterant its presence could be easily detected. The presence of silicate of sodium in the ash would also confirm the presence of adulteration.

Mitchella repens

Several abstracts of theses by graduates of pharmacy, given this month in the *American Journal of Pharmacy* (pp. 228, 230), include the results obtained from the examination of some indigenous American medicinal plants. Of these, *Mitchella repens*, L., was found to contain a neutral principle precipitated by tannin and picric acid, but which did not possess the properties of either alkaloid or glucoside, and a saponin-like principle precipitated by baryta and frothing in aqueous solution. *Leptandra virginica* yielded a bitter principle in crystals of a pale lemon-yellow colour, agreeable odour and very bitter taste. This did not yield glucose on boiling with dilute sulphuric acid, and was not precipitated by tannin or Mayer's solution; it was soluble in alcohol, ether, benzol, less freely so in water, and insoluble in petroleum benzin. The seeds of *Catalpa bignonioides* were found to contain resin, fixed oil and tannin, and a crystalline body, deposited in the form of needles from an ethereal solution, which was soluble also in alcohol and chloroform, but insoluble in water, almost tasteless, and did not reduce Fehling's solution. *Ilex opaca* yielded a volatile body of an acrid mustard-like odour, a resin, tannin, and apparently a glucoside. The seeds of *Gymnocladus canadensis* afforded about 10 per cent. of fixed oil, a little wax, fat and resin, and a small quantity of a glucoside, soluble in water and chloroform, and having a peculiar odour and a burning taste.

Leptandra virginica

Catalpa bignonioides.

Ilex opaca.

Gymnocladus canadensis.

Sodium Bicarbonate.

A curious fact in connection with the production of bicarbonate of sodium has been observed by M. Paul de Mondésir (*Comptes Rendus*, civ., p. 1102). He finds that when carbonate of sodium is mixed with a single equivalent of water, it does not absorb carbonic acid at ordinary temperatures, or if it does, the absorption takes place with extreme slowness. But when it is mixed with a small proportion of dry bicarbonate the reaction commences forthwith and is continued with an energy in proportion to the amount of bicarbonate and the care with which the mixture is made.

New Species of Strophanthus

At the Pharmaceutical Meeting held in Philadelphia on April 19, Professor Maisch directed attention to a new species of *Strophanthus*, discovered near the Congo river, and which is now being cultivated in the Botanical Gardens at Breslau. The seeds are furnished with an awn that is feathery from base to apex. The seeds are poisonous, but it has not been ascertained whether the active principle is strophanthin. The flowers are much larger than those of *Strophanthus hispidus*, and the corolla lobes are much longer. It is figured in a recent number of the *Garten Zeitung*.

Strophanthus Seed.

Dr. T. F. Hanausek publishes in the *Pharmaceutische Post* an account of the anatomical structure of strophanthus seed. Although by the aid of the microscope strophanthus seeds may be distinguished from seeds of other genera, it is somewhat doubtful, according to Mr. Kirkby, who has examined several kinds of the seeds, whether any markedly distinc-

tive microscopical characters occur by which the seeds of one species might be readily distinguished from another. The hairs of the seed are swollen at the base something like those of the nux vomica seed. Dr. Hanausek considers that the reactions given with the seed by liquor potassæ and sulphuric acid are characteristic. With the former a transverse section of the seed shows the testa as a golden-brown line, the albumen colourless, and the embryo of a greenish-canary-yellow. With concentrated sulphuric acid a fresh section of the seed shows the testa and hairs of a golden-brown colour, the albumen verdigris-green, then emerald-green, and the embryo first yellow, then greenish-bronze-coloured, then copper-coloured, and finally, after one or two minutes, garnet-red or even blood-red. These observations refer to the Kombé seed of commerce, or greenish-brown seed. It is stated by Mr. Lindsay, the Curator of the Botanical Garden at Edinburgh, that this seed has produced plants identical in appearance with those obtained from the seed used by Professor Fraser, but there is reason to suppose that this seed is derived from two species. Mr. Christy, in a very useful *résumé* of the available information concerning strophanthus in 'New Commercial Plants,' No. 10, mentions that from three seeds sown and apparently of the same species, two plants came up having smooth and the other hairy leaves. Mr. Lindsay also states that two different seedlings came up from some of the greenish-brown seed recently sown by him.

Adulterated Aniseed.

It is well known that conium fruits bear a strong resemblance to those of anise, and that they sometimes occur mixed with them ('Pharmacographia,' p. 312), but hitherto the regular admixture of the two fruits does not appear to have been recorded. Mr. C. L. Lochman, however, states in the *American Druggist* (May, p. 81) that in every case in which he has planted Italian aniseed conium has come up mixed with it, although such has not been the case when German aniseed was planted. From examination under a lens, as well as from his experiments in planting, he concludes that Italian aniseed contains as a rule 2·5 per cent., if not more, of conium fruits. Mr. Lochman believes that the admixture probably arises from the fact that conium, like henbane, sometimes flowers and fruits the first year, and is thus overlooked. Under a good lens conium fruit, which closely resembles aniseed in colour,* may be easily recognized by being glabrous and covered between the ridges with minute wrinkles. Aniseed, on the contrary, is covered with minute hairs. The Maltese, Italian, and Alicant aniseeds are larger than conium, but this feature is not readily noticeable by the naked eye when the two are mixed, in consequence of the similarity of colour. Under the microscope a section of the two seeds is very different, owing to the fact that conium, when mature, has no vittæ, while aniseed presents nearly thirty.

Jequirity seeds.

The seeds of *Abrus precatorius* have recently been examined by Dr. S. Martin, and in a paper by him, read before the Royal Society on May 5, it is stated that he found the saline extract of the seeds to contain a globulin identical with that occurring in papaw juice, and belonging to the group of vegetable paraglobulins; also, an albumose identical with the α-phyt-albumose of the papaw juice, described by the author. Dr. Martin also pointed out that the vegetable paraglobulins differ from the myosins in the fact that the latter readily become changed into albuminate when the sodium chloride holding them in solution has been dialysed away (*Nature*, May 19, p. 70).

* Russian aniseed resembles conium in size, but is of a much darker tint.

Eschscholtzia californica.

M. Stanislas Martin has lately directed attention (*L'Union Pharmaceutique*, May, p. 197) to the sedative properties of *Eschscholtzia californica*. He believes that a medical and chemical examination of the plant would prove interesting, and is willing to place the material which he possesses at the disposal of any one who will undertake the examination. The plant is so common in gardens, that it could be easily obtained in quantity during the summer months.

Fabiana imbricata.

Fabiana imbricata, the Chilian plant that was introduced to the notice of the medical profession some months ago, blossoms at this time of year. It is hardy out of doors in the South of England, and forms in less-favoured localities a pretty greenhouse shrub. Although it belongs to the Solanaceæ it has a remarkably heath-like habit, and racemose flowers resembling a heath but of a pure white colour. It remains in flower for a considerable time (*Garden*, p. 474, May 21).

Vaccinium intermedium.

At a meeting of the Linnean Society on May 5, Mr. N. E. Brown read a paper on *Vaccinium intermedium* as a native of Britain. The plant was discovered at Cannock Chase, by Professor Bonney, growing with *V. Myrtillus* and *V. Vitis-Idœa*; it is regarded by Mr. Brown as a hybrid between these two, originated independently at Cannock Chase, and not introduced from the continent.

Sheaths of Algæ.

Some important observations have recently been made on the substance of which the sheath that invests the filaments of some algæ is composed. Herr G. Klebs maintains that it is not formed from the cell-wall, but from the contents of the cell, through the cell-wall. The sheath substance differs from the ordinary mucilage in not being dissolved by alkalies (*Nature*, May 5, p. 15).

Root-Buds.

One of the distinctions between roots and stems was formerly stated to be the appearance of leaf-buds on the latter and their absence from the former. The *Gardeners' Chronicle* (p. 583) illustrates the formation of leaf-buds on the fibrous roots of a fern (*Diplazium malabaricum*) and suggests that it will ultimately be found that buds and sporangia of all kinds are variants from a common type.

Euphorbiaceous Root Barks.

Mr. E. Schmidt, continuing his examination of the barks of the roots of the Euphorbiaceæ, in the present number of the *Répertoire de Pharmacie* (p. 237) points out that the bark of *E. Esula* is distinguishable from that of the nearly allied *E. Cyparissias* by the characters afforded by the woody zone. In the former it is formed of four large fibrovascular bundles separated by wide medullary rays. In *E. Cyparissias* the fibrovascular bundles are narrower and more numerous, and the number of medullary rays is consequently greater. The root bark of *E. Cyparissias* is an emeto-cathartic in doses of ·60 to 1 gram.

In a note in the *Gardeners' Chronicle* of May 21, Mr. A. Gordon states that at Colchester the Japanese peppermint plant has proved perfectly hardy, and that it produced seed last year. If the present low price of menthol continues, the plant will hardly repay the expense of cultivation.

Japanese Peppermint.

Those who take an interest in the cultivation of medicinal plants will find some interesting notes on the subject, by Mr. Lewis Castle, in Christy's 'New Commercial Plants.' As Mr. Castle is on the staff of the *Journal of Horticulture*, his remarks on the best methods of cultivating these plants are worthy of attention. Among those which have not yet been cultivated on a commercial scale in England, he mentions *Cimicifuga racemosa*, *Citrullus colocynthis*, *Hydrastis canadensis*, *Podophyllum*, *Spigelia marilandica* and *Veratrum album*.

Cultivation of Medicinal Plants.

A piece of amber, said to be the largest ever discovered, and weighing 850 grams, was recently dug up near the Nobis Gate, at Altona (*Nature*, May 19, p. 63).

Amber.

QUININE TESTING.*

BY DR. O. HESSE.

The subject of quinine testing has recently been made prominent by the circumstance that the long-known presence of cinchonidine sulphate in commercial quinine sulphate has been again discovered by De Vrij, and an importance has been attached by him to his discovery which it does not possess, and probably will never acquire. But the vehement outcry raised by De Vrij as to this fact, supported by the incorrect results he had obtained by the optical method of testing, has at least had the effect of directing more critical attention to the test of the German Pharmacopœia, the defects of which I had previously pointed out. Though Vulpius some weeks ago expressed the opinion that the problem in question had been solved by means of Schäfer's oxalate test, it is evident from the fact of Schäfer having very soon supplemented that test by the tetra-sulphate test, which was represented as giving better results than the oxalate test, that it was not altogether free from defect.

In this position of the matter, and in order to satisfy the demands made upon me, it appeared appropriate that I should take up the discussion. But before entering more in detail upon the subject of quinine testing I think it desirable that I should endeavour to answer the question as to what admixtures of alkaloids may be expected to obtain in the manufacture of quinine sulphate, and to inquire to what extent there may be any justification for the assertions of De Vrij that the therapeutic value of quinine sulphate is reduced by the presence in it of these possible admixtures.

Chemically pure quinine sulphate, free even from hydroquinine, crystallizes in heavy needles, according to my observation. By means of certain mechanical devices it may indeed be obtained in a somewhat lighter form, but not of such a light flocculent character as the sulphate usually prepared and answering to the test of the German Pharmacopœia. The light character of the latter is therefore due to some other circumstance, and especially to the presence of small admixtures of the sulphates of hydroquinine and cinchonidine, possibly also of hydrocinchonidine and homocinchonidine. The sulphates belonging to the cinchonidine group can be separated from quinine sulphate without interfering with its light form when it happens that there is a sufficient amount of hydroquinine present.

Quinine sulphate does not assume the light character in question as a result of the presence of quinidine or cinchonine sulphates; moreover it has not the least tendency to crystallize together with either of these salts. It is true, Jungfleisch states that quinine sulphate made from cuprea bark contains quinidine, which separates in crystals when such quinine sulphate is subjected to my test, but so far as my observation goes this statement is not supported by experiment.

Leaving out of consideration for the moment hydroquinine—which, as I shall show in a subsequent paper, approximates very closely indeed to quinine in its chemical nature—as well as the traces of hydrocinchonidine and homocinchonidine that are now and then met with in normal quinine sulphate, cinchonidine is the only adventitious alkaloid that has to be taken into account as being not unfrequently present in large amount in the bark from which quinine sulphate is manufactured. The Ceylon bark which is now so abundant in the market is for the most part especially rich in this alkaloid. But notwithstanding this disadvantage it is still the case that in the old-established quinine factories quinine sulphate that contains only a very small amount of cinchonidine sulphate is made from this bark.

It may indeed be safely assumed that formerly, when the method of manufacture was less perfect than it is at present, quinine sulphate contained a much larger proportion of cinchonidine, although the bark then employed for the purpose generally contained a smaller amount of cinchonidine than at the present time. But even then the amount of cinchonidine was limited by the prescribed method of testing. So far as I am aware, Liebig's test was then most in use, and, as I have shown in another place, it indicates the presence of cinchonidine only when amounting to more than 10 per cent. I, therefore, consider it very probable—and in this respect I agree fully with De Vrij's opinion—that in his time the therapeutic value of quinine sulphate was ascertained with a salt that contained cinchonidine, and contained at least several per cent. It is, however, now known that cinchonidine acts in the same manner as quinine if only with one-fourth the potency. If this relation be considered, it must also be admitted that a diminution of the therapeutic value of quinine sulphate due to the presence of a few hundredths of cinchonidine sulphate could not be appreciably expressed in figures at all. Consequently in the case now under consideration it is not with therapeutic value that we have to do, but it is only the pecuniary question that has perhaps to be taken into account.

This latter consideration, combined with the circumstance that formerly cinchonidine was not separated from quinine at all, was in fact the reason for De Vrij's suggestion that the two alkaloids should not be separated, and, indeed that none of the cinchona alkaloids should be thus separated. As is well known, this opinion led to the discovery of "quinetum." It is true De Vrij defined the idea of quinetum as representing a constant mixture of the alkaloids obtainable from the bark of *Cinchona succirubra* that would always give a rotation equal to $(\alpha)j = -38°$, though in reality it is a "mischmasch" of alkaloids, such as the bark may happen to furnish, and though it is lævogyre, it is not uniformly so. Besides this, the compound of part of such a "mischmasch" of alkaloids with sulphuric acid is prepared and brought into the market as "quinetum sulphuricum." While quinetum itself is a yellow or yellowish-white powder, quinetum sulphuricum is in the form of delicate white needles, and by reason of its great resemblance to quinine sulphate, it is well adapted for the adulteration of that article. This is the preparation that De Vrij on another occasion, in 1877, proposed should replace quinine. It is true that this proposed substitution was, as it appears, to apply only to the case of half-civilized people. To judge from the remarks made by Vulpius in reference to this preparation, it may be inferred that he is not acquainted with its nature, and, therefore, I will give here the results of some analyses of it.

* From the *Pharmaceutische Zeitung*.

Quinetum.	1875. Hesse. Per cent.	1879. Oudemans. Per cent.
Quinine	14·96	6·1
Cinchonidine	35·29	22·9
Cinchonine	21·08	37·0
Quinamine	trace	4·5
Amorphous alkaloid	21·06	21·2
Sodium carbonate	—	2·9
Sulphuric acid	1 21	—
Water	6·01	2·7

Quinetum Sulphuricum.	1875. Hesse. Per cent.	1876. Hesse. Per cent.
Quinine sulphate	14·14	11·91
Cinchonidine sulphate	62·92	61·17
Cinchonine „	22·94	26·92

In another sample of quinetum, Oudemans found only 1·1 per cent. quinamine, but 0·3 per cent. quinidamine and 0·5 per cent. quinidine.

From the foregoing remarks it will be seen that quinine, which chiefly determines the medicinal value of cinchona bark, is present in the preparation called quinetum only in small amount, and that the quinetum sulphuricum which was represented as being directly comparable with quinine sulphate contains no less than about 87 per cent. of the associated alkaloids, and among them about 63 per cent. of cinchonidine sulphate. Closely approximating in character to this latter preparation is the quinine sulphate the English Government prepared in their factories in India, containing, according to the data published by Hooper, 40·88 cinchonidine sulphate and 59·12 quinine sulphate, or as Hooper calculates, 37·55 cinchonidine sulphate and 62·45 quinine sulphate. All this meets with approval from De Vrij.

It is therefore inexplicable to find De Vrij contending that quinine sulphate is depreciated in its therapeutic value by the presence of a small percentage of cinchonidine sulphate, and that for this reason it must be prepared absolutely free from cinchonidine. In any case such an assertion by De Vrij is unjustifiable so long as he continues to maintain the opposite view as to the above-mentioned preparations and warmly advocates their use.

I completely agree with Vulpius in the opinion that a preparation sent out as quinine sulphate and to be used as such ought to contain only a moderate proportion of the associated alkaloids, and it is upon this very ground that I raised objections to the test given in the first issue of the German Pharmacopœia. Subsequently I pointed out how the least trace of cinchonidine could be detected with certainty in quinine sulphate. On the basis of my long experience of this subject I proposed to the Pharmacopœia Commission in 1882 not only a test which would without difficulty admit of the detection of a small admixture of cinchonidine sulphate, but also sent a report that was read by the late Professor Fehling at a meeting of the Commission, in which I fully discussed the whole subject, and pointed out the defects of the test in the Pharmacopœia. Notwithstanding this, only Professors Fehling and Otto were in favour of my test being adopted, all the other members prefering to adopt Kerner's test on the recommendation of Professor Flückiger, although I had shown in my report that with quinine sulphate that is not effloresced, or only partially so, a large portion of the cinchonidine sulphate present would escape detection by that test.

In reply to the objection raised by Vulpius to my proposed test, that I desired to pass a less pure quinine sulphate than the Pharmacopœia and the German pharmacists required, I can therefore refer to these facts as proving that his opinion in that respect is entirely unfounded.

The test proposed by me was as follows :—

Take 1 gram of the quinine sulphate dried at 100° C., shake it with 20 c.c. of water at 60° C., filter after cooling, and place 5 c.c. of the filtrate in a narrow test tube with 5 c.c. of ether and 5 drops of ammonia solution ; close the tube and shake the mixture. The clear ether solution thus obtained should not afterwards deposit crystals. The settlement of the point as to the time to be allowed for such a deposit to take place I left to the Commission ; also the decision whether quinine sulphate with two or more per cent. of cinchonidine salt was to be passed.

It will be seen that this test was very similar to that I had previously recommended ; it was simply an improvement upon that by which I had done away with defects of which I had become aware by long experience.

The principle on which this test is based is the fact, unfortunately still insufficiently known, that the compound of cinchonidine sulphate with quinine sulphate is decomposed at 100° C., and in a certain way disintegrated, so that the whole of the cinchonidine sulphate present is acted upon and dissolved by the water used. Although in contact with water a partial combination of the associated sulphates may be induced, by far the greater part of the cinchonidine sulphate passes into solution, while the quinine salt remains almost entirely undissolved. If it were possible to leave the quinine salt completely undissolved there would be no reason to fear any loss of cinchonidine sulphate, but some of the quinine sulphate is dissolved at 60° C., and thus opportunity is afforded for a small portion of the dissolved cinchonidine salt to form a certain quantity of a double compound, which is afterwards deposited in amount corresponding to its solubility. Thus it happens that the whole of the cinchonidine is not obtained in solution in such an experiment. But in any case such a mode of extraction is more complete than when the sulphate is boiled with water, or dissolved in boiling water, since in the latter case there will be not only a decomposition of quinine sulphate attended with elimination of quinine (which can be extracted by benzol), but since greater part, and perhaps the whole of the quinine sulphate will then pass into solution, a larger portion of the cinchonidine sulphate will again become latent from formation of the double salt when crystallization takes place. For this reason I cannot approve of the modification in my original test which Schäfer suggested, nor can I confirm the condemnation that he pronounces upon all tests which do not involve a complete solution of the whole of the quinine sulphate during the operation, though I admit that by complete solution of the material tested mixed crystallizations may be placed on the same level as artificial mixtures. This latter result may, however, be obtained simply by allowing the mixture to effloresce at a moderate temperature.

In reference to the other tests that have recently been proposed that of Kremel may be mentioned as very delicate, but like other titration methods it has the disadvantage that it must necessarily be assumed that the substance examined actually contains the constituent that is to be determined by the operation. This condition cannot be ensured in the case now under consideration, consequently that method of testing is inapplicable quite independently of the circumstance that when the commercial quinine sulphate containing cinchonidine sulphate is heated with hot water, as Kremel directs, a solution is not unfrequently obtained on cooling which does not contain the sulphates in question in the same proportions as water solutions of each of them separately would do.

The bisulphate test recommended by De Vrij has a sounder foundation, and it yields very good results when it is carried out with the modifications I have suggested. It requires, however, the use of very pure ether, as is indeed the case with every form of cinchonidine determination that is carried out with ether. The modification of this test introduced by Schäfer is less to be relied upon, probably because the evaporation of the ether solution is attended with such a concentration of the quinine as to have the effect of hindering the crystallization of the alkaloid or its compound. It may be for this reason

that Schäfer was unable to obtain crystals of "cinchonidine" in operating upon quinine sulphate known to contain 2 per cent. of cinchonidine sulphate. I have no hesitation in affirming that the crystals obtained by the bisulphate test as modified by Schäfer and described by him as "pure cinchonidine" are a compound of quinine with two molecules of cinchonidine. As I have shown on another occasion, this bisulphate method always gives a cinchonidine result that is too high in the case of a sample containing only a small amount, and with one containing a larger amount the result obtained is too low. On the whole, however, the results obtained by this test are very satisfactory, and they are obtained with one operation, while the recrystallization test recommended by Dr. Paul appears to require several successive operations.

It is well known that Paul was the first to direct attention to the occasionally considerable amount of cinchonidine sulphate in the quinine sulphate of commerce. His method of ascertaining the amount of this impurity consists in dissolving 5 grams of the salt in question in 150 c.c. of boiling water and after cooling the solution treating the mother-liquor thus obtained with ammonia and ether. The recrystallized sulphate is to be again treated with 100 c.c. of boiling water, and the mother-liquor obtained after cooling subjected to treatment with ammonia and ether, this operation being repeated until no more crystals are deposited from the ether solution thus obtained. These crystals, however, are not pure cinchonidine, but the compound already mentioned. Consequently the amount of cinchonidine indicated by weighing them is too high by the amount of quinine they contain. If the mother-liquors were treated with ether direct this surplus would be to some extent reduced by the circumstance that it would not then be possible to obtain the whole of the cinchonidine in a state for weighing. But if the mother-liquors are concentrated by evaporation so as to allow of less ether being used, satisfactory results are readily obtained. The mode of procedure I adopt in applying this test is to dissolve 5 grams of the sulphate in question in 150 c.c. of boiling water, and after the cooled solution has crystallized the mother-liquor is separated by filtering with the aid of suction. The partially-dried residue left on the filter is then boiled with another 120 c.c. of water, and this operation is repeated as often as may be necessary for removing the whole of the cinchonidine. In the case of a salt containing 5 per cent. cinchonidine sulphate at least three such operations will be requisite, and a salt containing 9 per cent. will require at least five recrystallizations. The mother-liquors obtained in the first three operations are then mixed together and evaporated at a moderate heat almost to dryness; the saline residue is dissolved by a few drops of dilute sulphuric acid, and the solution, made up to the volume of 20 c.c. by addition of water and ammonia solution, is shaken with 16 c.c. of ether. After the lapse of twenty-four hours the crystals that may have separated from the ether solution are collected and weighed. The mother-liquors from subsequent recrystallizations are evaporated separately to the volume of about 8 c.c., and after being shaken with ammonia and 2 or 3 c.c. of ether they are left at rest for twenty-four hours for the separation of crystals.

For the purpose of comparing the results obtainable by this method of recrystallization and by the bisulphate method of testing the following experimental data are given. No. I. was an old sample of French manufacture, which would not stand the test of the present German Pharmacopœia, and No. II. a sample of German make, which just passed that test, and therefore contained an amount of cinchonidine sulphate that was within the limits allowed.

Bisulphate Test.

	Crystals.	Cinchonidine sulphate. Per cent.
I.	0·534 =	8·94
II.	·302 =	5·09

Recrystallization Test.

	Mother-liquors. 1, 2, 3.	4.	5.	6.		Total.	Cinchonidine sulphate. Per cent.
	Crystals.						
I.	0·505	0·046	0·007	0	=	0·558 =	9·34
II.	262	·015	·0			·277	4·64

From this comparison it appears that both methods of testing furnish results which agree in a satisfactory manner, and consequently it is optional which mode of testing is applied for ascertaining the amount of cinchonidine sulphate in the quinine sulphate of commerce.

I may mention here that the compound of quinine and cinchonidine obtained in applying the bisulphate test to commercial quinine sulphate will also contain hydroquinine, and probably also in some cases hydrocinchonidine and homocinchonidine in small proportions, so that if the crystals separated were tested for quinine by the optical method it would give results decidedly too low. This is less to be feared with the recrystallization test, because hydroquinine, which has the greatest influence on the result of the optical test, would not be concentrated in the mother-liquors.

De Vrij's bichromate test is quite unsuited for the quantitative determination of cinchonidine, though it admits of its presence being detected when it amounts to only 0 3 per cent. The reason of this is that as the amount of cinchonidine increases, more or less of it is precipitated with the quinine chromate. It is probably on this account that in applying the test to a sulphate containing 2·7 per cent. cinchonidine sulphate, as Schlickum recommends, I did not obtain immediate indications of the presence of cinchonidine, and only a few crystals were formed after the lapse of an hour. The crystals obtained by this test also contain quinine, and are a compound of quinine with seven molecules of cinchonidine.

This is also the case with the oxalate test, and what Schäfer originally took for pure cinchonidine contains quinine, as he has since admitted. The amount appears to be considerable, as I infer from the fact that when dissolved with excess of sulphuric acid the solution has a strong fluorescence, and it becomes intensely green when mixed with chloride of lime and ammonia.

According to the directions for applying this test the precipitate formed on adding soda solution to the filtrate from the quinine oxalate is not to be collected until after twelve hours, and for each 100 c.c. of liquid an addition of 0·04 grm. is to be made to the weight of the precipitate as a correction for the cinchonidine remaining in solution. When the amount of cinchonidine exceeds 4 per cent., the addition is to be 0·066 grm., and the concentration of the solution must be kept to 1 in 50.

Objection has been made from several quarters to this test that too little potassium oxalate is used for precipitating the quinine. But that is not the case, for normal potassium oxalate has only one molecule of water, and with quinine sulphate containing 15 per cent. water 0·42 gram oxalate would be requisite, or with completely effloresced sulphate 0·47 gram.

Another defect of the oxalate test is in the direction as to time. With 60 c.c. of liquid half an hour is not sufficient for obtaining a temperature of 20° C. throughout the whole mass, and this is still more the case with larger quantities. For this reason I have always allowed one hour.

Quinine oxalate is, as Schäfer states, almost insoluble in the presence of potassium oxalate, while cinchonidine oxalate is readily soluble. When a cold saturated solution of quinine oxalate is mixed with the proper quantity of potassium sulphate and an excess of potassium oxalate, the quinine oxalate is at once separated so completely that caustic soda gives no precipitate in the filtrate. On warming the oxalate dissolves, but it separates again completely on cooling. If, however, one per cent. of cinchonidine sulphate be added, and the liquid again

warmed, a very much smaller quantity of quinine oxalate separates on cooling than in the former case, showing that the presence of cinchonidine exercises a solvent influence on the quinine oxalate. It is evident therefore that in operating upon a mixture a certain portion of quinine remains in the mother liquor, and consequently the precipitate produced in such a solution by caustic soda is not pure cinchonidine. Moreover, cinchonidine is precipitated with the quinine oxalate, and in both cases the proportions thus escaping separation appear to be determined by accidental conditions. Hence it is not possible to estimate from the precipitate produced whether the cinchonidine salt amounts to 2 per cent. or only 0·5 per cent. without a quantitative determination.

Assuming that in operating upon quinine sulphate containing 0·5 per cent. cinchonidine salt, the precipitate obtained after twelve hours is 0·001 grm. (it is really rather more) the addition to be made to this for 60 c.c. of solution would be 0·024, and the 2 grm. would accordingly appear to contain 0·025 of pure cinchonidine, or 1·685 per cent of sulphate, at least three times as much as the salt actually contained. A direct experiment under these conditions gave 1·77 per cent. The result is still more unsatisfactory when the amount of cinchonidine salt is larger, and the concentration of one to fifty has to be kept to. In operating with a mixture of 1·875 of quinine sulphate and 0·125 cinchonidine salt, corresponding to 6·25 per cent., the result obtained showed 9·22 per cent., or nearly 3 per cent. more than was really present.

If such known mixtures give differences of this kind, little is to be expected of this test when applied to commercial quinine sulphate, as will be seen from the following results with the sulphate above mentioned (II.), which gave –

	Bisulphate test.	Crystallization test.	Oxalate test.
Cinchonidine sulphate...	5·09	4·64	10·22

Evidently, therefore, the oxalate test is not less defective than the optical test in giving too high an indication of the amount of cinchonidine salt.

It has already been mentioned that the sample II. containing 5·09 per cent. cinchonidine just passed the test given in the second edition of the German Pharmacopœia. With another sample I found that this test passed 7·2 per cent. On a former occasion, in testing according to my optical test a sample which only just passed the test given in the first edition of the German Pharmacopœia, my results in two experiments showed 12·92 and 13·02 per cent. cinchonidine sulphate, which appeared so questionable that I made further experiments with the bisulphate method and the tartrate method (Oudeman's optical test), and found by the former 8·46 per cent., but by the latter 15·7 per cent. cinchonidine sulphate. The cause of this high result—not altogether due to the presence of hydroquinine—was not clearly ascertained, but the experiment gives another illustration of the untrustworthy nature of the tartrate method.

PHARMACY IN INDIA.*

BY J. A. FALCK.

The subject "Pharmacy in India" is probably one which has not been brought before you, and for this reason I am induced to address you, trusting the characteristics of Indian pharmacy will make up any lack of composition by the writer. In the first place there is no pharmacy law in the country, and anyone can engage in the drug business regardless of his knowledge of chemistry. Hence, there are all sorts and conditions of chemist shops from the strictly legitimate shops of Calcutta and Bombay to the native medical halls in the bazaars, where poisons of all sorts are as freely sold as Epsom salts. In Calcutta and Bombay the drug stores are on a line with the pavement as at home, but in other cities and stations of India they, as well as all stores, are built in the centre of yards, or, as called here, compounds, to which there is an entrance and exit gate. The buildings are all one story with very high ceilings, large airy rooms, the store portion to the front and residence part in the rear. Over the entrance to the store a portico is built on account of the great heat of the sun, which would be felt severely by some persons even in the short space of time occupied by leaving the carriage and entering the store. Around the portico are potted plants, rose bushes, etc., and the entrance is, as a rule, bordered with potted plants. Hence, we have no window display, and the part of an apprentice's life, the flies in the window, is unknown here. Outside of Calcutta and Bombay there are no strictly chemist businesses ; but this is an adjunct to a general store, and, as a rule, is the best paying branch of the business. The chemistry part of the business takes the lead in the firm's advertisements, as Root and Co., chemists and general merchants, and this is carried out by merchants whose stock in trade consists of a few auction patent medicines.

The British Pharmacopœia is the standard, but many Indian medicines are prescribed, and there is an Indian Pharmacopœia, which is unofficial. Many American preparations are used, and the United States Pharmacopœia is to be found in every drug store. American patent medicines have a very large sale, and among the non-secret preparations, Parke, Davis and Co's Fluid Extracts and McKesson and Robbins's Capsuled Pills have become best known. The quantity of McKesson and Robbins's Quinine Capsules that are sold is marvellous. Of course, this is a country of fevers and malaria, and the perfections which these capsules have reached have impressed themselves on the medical men, and the natives are among the most frequent buyers. To sell them in bottles of one hundred is of very frequent occurrence. The patent medicine trade is large, but it is much hampered by the natives, who sell at prices that Europeans cannot touch. Most of the goods of the former are auction goods, such as have been on the shelf until the wrappers become unsightly and are then handed over to the auctioneer. Then the native bears the same relation to the European as the Chinaman to the American ; he can live on such a small amount that the profit on one bottle of medicine would keep him in food several days.

Connected with all chemist shops (the term for drug stores) is a manufactory for aërated waters, the sale of which is enormous. Aërated water (carbonic acid water), soda water (with a tinge of bicarbonate of soda), lemonade, gingerade, tonic water (with a trace of quinine), and potash water are those principally bottled. Soda water is kept in bottles of 14 ounces capacity, and the sweetened waters in 12 ounce bottles. The water in India is very bad and many persons never drink anything but aërated waters ; but what causes the greatest consumption of soda water in India is the "Peg." This is a drink of whisky or brandy mixed with a bottle of soda water, and ninety-nine one hundredths of the liquor is drunk in this way. Whisky is never drunk "neat ;" but although it is well watered, I doubt if there is a place in the world where the consumption of liquors will average that drunk by the European population in India.

The term European applies to all foreigners in India who are of white skin. The aërated water trade is being much cut into by the regimental messes, who are large consumers. They buy a machine, manufacture their own waters and sell them to customers at greatly reduced prices. A petition has gone up to the Viceroy from the tradespeople, protesting against the soldiers competing with them in this way. Natives do all the work, prepare the syrup, and bottle the waters.

A feature of the drug business is that no small quantities are sold as a general rule. Most things are put up in bottles and the customer must take a bottle or none. If he asks for an ounce of chlorate of potash lozenges, he is told they are only kept in bottles, one rupee each, a four

* Read before the Alumni Association of the Philadelphia College of Pharmacy. Reprinted from the *American Journal of Pharmacy*.

ounce bottle containing about three ounces of lozenges for forty cents. Vaseline, lime water, ipecac. wine, spirit of nitre, etc., are all kept in bottles, and it is very seldom any one inquires for half an ounce or one ounce, and sends a bottle for it. Many things that are sold several times daily in all shops at home rarely find a sale here. Senna, salt, magnesia, and paregoric are sold once a week probably.

The prescription trade is large and profitable, there being a fixed price which is adhered to by most Europeans. There are many native chemist shops which advertise the compounding of prescriptions, but many who deal exclusively with them for other things, send their prescriptions to European chemists.

There are a great many native doctors who have a diploma from some Indian native university, who can speak and write English, and have considerable practice. Then there are the apothecaries, who are employed by the Government in every station to take charge of the station dispensary and practice among the Government clerks, such service being given to them free, while the apothecary draws an income also from the tradespeople, many of whom employ him. The European doctors are all army surgeons who are appointed civil surgeons in the different European stations. Besides drawing his army pay he enjoys a large income from his practice. A civil surgeon serves three years in one station and is then transferred to another. From these different practitioners there comes a large prescription business and sale of surgical appliances, etc.

Few customers appear at the store, and then only when it is necessary to select, or when buying fancy goods, etc. A greater part of the trade is done by chits (notes sent by servants), and nine-tenths of the business is credit. Such a country for credit does not exist in another place, and there is not a firm that does not carry a large amount of bad debts on its books. People seldom carry money with them, and credit is refused only to those who are known as "bad hats."

Now, as to the preparation of prescriptions. In Bengal and the Punjab, the eastern and northern portion of India, the European assistant copies the prescription in the book, and at the same time calls out the ingredients to a native, who is called a compounder. He has served a sort of an apprenticeship in some dispensary, then has some experience in a drug store and there develops into a compounder. He seldom speaks English, but, as a rule, can make out the names of the ingredients and quantities, but can seldom read directions. He places all his bottles on the counter, and then prepares the prescription while the European gives him the quantities. Unless the prescription requires some special manipulation, he manages to compound it all right; but otherwise it is necessary to stand by him and tell him what to do. They do everything, prepare plasters, suppositories, etc., make all the preparations for the shelves, but everything must be checked. After the prescription is compounded, he calls out the quantities, and has his bottles in order as they appear in the prescription. Often he has gotten hold of the wrong bottle, and the preparation is useless. and all it concerns is an ejaculation and it passes out of his mind the next minute. It would be impossible for Europeans to do the work, the heat is so great, and working away at a batch of pills would cause a profuse perspiration in two minutes. There is a native for everything, and on account of the caste institution of India one man will not do the work of another. There is one man whose special duty is washing bottles, etc., another acts as an apprentice to the compounder, who shoves the hard work on him, such as working pill masses, pounding roots, etc., and so firm set are they in their feeling of respect for those above them they dare not rebel.

Bills are all collected by natives called chupprassees, and are sent out at the beginning of each month. There is a system of checking by which the bills can be traced daily to each chupprassee; and should any money be missing or not be turned in, and some customer declared he paid, the chupprassee to whom the the bill was delivered on the day of payment can be traced at once. But there is little stealing this way and natives are trusted with large amounts in their possession.

But nine-tenths of them steal, though in small amounts, and while your man would not steal a hundred dollars from you he would not scruple to steal a two cent piece. It is necessary to keep all the show cases locked day and night, and when serving a customer, you are compelled to unlock a case before you can get at the goods. Quinine and expensive chemicals are also under lock and key. The natives in the Government dispensaries stole so much quinine that, to protect itself, the Government have all their quinine coloured pink, which effectually prevents any one from disposing of it. As for lying, they are professionals, from the compounder to the lowest menial, and they can hatch up a lie in a twinkling. There is a man (Chowkedar), who sleeps on the verandah at night to receive any chits that may come and also to guard the place.

In the Bombay Presidency the European clerk has a still better time of it, as Portuguese compounders are mostly employed, and they write their own labels, copy the prescriptions and do not require checking, But what is most to be commended in the business in India are the hours. Here in Lahore we open at eight o'clock and close at six. One hour is allowed for breakfast, one for dinner or lunch, and a cup of tea is brought into the shop about four o'clock; close on Saturday afternoon at two, and never open at night or on Sunday. In Simla, in the Himalayas, where I served two years, in winter we opened at nine and closed at five in the afternoon.

It is a poor place to apprentice a white boy. From his earliest days all his work is done by natives, and when he comes into a shop he thinks he is being made a menial if called upon to do anything servants could do. So he gets no practical experience in the rudiments, learns the business in a superficial way, and would not be fit, when three years in the business, to take the place of a six months' apprentice at home. But do not let anyone who hears these lines come to India on a speculation. In the first place the climate is against you. Should you be on a Plains station during the summer you must be under a punkha—a large fan, which swings backward and forward above your head, creating a breeze—all day and all night. One is over your head in the dispensary, another in the shop proper, one over your dining table and one over your bed, and this last is the one which causes one to forget the commandments if anything in the world does. You go to sleep with the punkha coolie giving you a fine breeze. After an hour he falls asleep, and you awake in a profuse perspiration, and with a muttered ejaculation shy a boot at his head, which effectually wakens him for another hour. And thus goes on the night, and the poor punkha coolie in the morning is only too glad to get away and soothe his bruises.

It is difficult to get a situation. I came to India knowing nothing whatever of the country nor anybody in it. I found but three chemist shops in Calcutta employing Europeans, and this is the largest city in India. Then I received the awful information that every chemist brought his assistant out from England on an agreement, passage paid out and back, and the assistant to stop with his employer, three, four or five years as the case may be. In three weeks I was fortunate enough to secure a vacancy, but I might have been six months without even hearing of one. For a clerk to leave at the end of his agreement long notice must be given, allowing his employer ample time to bring out another man from England. Lastly your salary varies, a very distressing fact. The rupee, the coin used in India—silver—fluctuates. When I came to India it was worth 1*s.* 8*d.*, then it went down to 1*s.* 6*d.*, then to less than 1*s.* 4*d.*, and now it is at 1*s.* 6*d.*; it should be 2*s.* when at par, and I trust that when I leave the country it may be at a favourable rate of exchange to somewhat compensate me for the heat and fevers that I have endured since entering the country.

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THE STANDARD OF MEDICINAL PREPARATIONS.

THE judgment given last week by Lord COLERIDGE and Mr. Justice SMITH in the appeal from the decision of the Stipendiary Magistrate for the borough of Sheffield will doubtless afford general satisfaction to all who are desirous of seeing the proper standard of quality maintained in medicinal preparations. We are glad to notice that it has been commented upon in this sense by the medical papers. The *Lancet*, for instance, points out the danger to the public that may arise from the use of weak or impure drugs, and adds that the effects of the most skilful treatment may be lost through the defective nature of the medicines administered. In regard to this point, while fully recognizing the care and skill with which the majority of pharmaceutical chemists do their work, it maintains the necessity of guarding the public against the dishonest minority. This expression is harsh, but we must confess that in cases where it is proved medicinal preparations have been sold of defective character it cannot well be complained of. Nor do we think it would be of much effect as a mitigation of such an offence to plead that it had been committed in ignorance, or unknowingly. The vendor of drugs and medicinal preparations is especially bound to make himself aware of the quality of the articles he supplies. It is only in this respect that he can claim from the public consideration superior to that due to general traders. The purchasers of medicine are to a great extent in his hands, and from their want of special knowledge they are disproportionately more dependent upon him than they would be in any transaction with a grocer or a linendraper. If, therefore, the chemist fails to satisfy himself that his drugs and preparations are of the proper standard, he not only neglects his own interest by sacrificing the advantage of being able to give a personal guarantee for their quality, but he neglects his duty as well, and has, in such case, no reasonable ground for complaint if he is spoken of with disparagement.

In referring last January to the case out of which the appeal just decided has arisen, we took occasion to enforce the indispensability of a careful examination of all drugs and medicinal preparations by chemists and druggists. This is the more necessary when the preparations are not made by them, but as is now so frequently the case, obtained from wholesale houses. It is not sufficient to have implicit faith in the character of their supplies, and however much the makers may be deserving of such confidence, the fact of the chemist being able to vouch for every article passing through his hands is the only ground upon which he can lay claim to a higher rate of remuneration than the general run of shopkeepers. The *Lancet*, alluding to the fact that medicinal preparations are now often obtained from wholesale manufacturers of them, suggests that dispensing chemists as well as medical practitioners who dispense their own medicine are to a great extent at the mercy of the manufacturers; but, so far at least as the chemist is concerned, if he is so it is from his own omission to apply the knowledge and skill he ought to possess for the purpose of ascertaining that his drugs and preparations are what they ought to be. There is, moreover, in this direction an opportunity of doing something towards the removal of that great evil of medical dispensing which is the cause of the less satisfactory relations between medical men and pharmacists in this country, as compared with others where there is a more natural demarcation between medical and pharmaceutical functions. In connection with this subject we cannot omit to recall to the minds of our readers the admirable paper read by Mr. BARNARD PROCTOR before the North of England Pharmaceutical Association on pharmacopœial testing, in which he showed that very many of the preparations with which the dispensing chemist has to do can be readily submitted to examination with no other appliances than those appertaining to the ordinary dispensing counter. The field there opened up is one that will well bear development to general advantage, and we trust that Mr. PROCTOR will find time to continue his labours in showing how this useful branch of pharmaceutical work can be made an everyday and constant part of the duty of assistants and apprentices.

The discussion of the subject of the testing of quinine sulphate which has taken place since De Vrij endeavoured to represent that the presence of cinchonidine sulphate in the commercial salt was a circumstance newly discovered by himself, and one of importance as regards its therapeutic value, has at least been useful in directing more attention to the real facts of the case than it had been hitherto possible to command. The idea that quinine sulphate as ordinarily met with is, or ever has been, a substance of remarkable purity from a chemical point of view has been dispelled by the demonstration that it often contains several other bases besides quinine whose existence has in several instances only been recognized within a recent period. And although De Vrij's exaggerated estimate of the amount of cinchonidine in the commercial article has been disproved it has been sufficiently shown that this may vary so much as to affect materially the money value of different samples. The defective nature of most of the official tests has also been demonstrated,

and the importance of a careful examination of this article of the materia medica has been made evident. Dr. Hesse's observations in this respect have led him to give the preference to the bisulphate test recommended by De Vrij, and the recrystallization test introduced some two years ago by Paul. These he regards as giving results that are satisfactorily comparable; but the figures he gives as representing the results of his own work will be seen to show that the recrystallization test is the most delicate, and its results the most accurate.

* * *

Considered chemically, the base obtained from coffee and from tea has hitherto been regarded as one and the same substance, though the names of caffeine and theine have been applied to it according to the source from which it is obtained. It is, moreover, probable that as a commercial article it is chiefly, if not entirely, produced from tea. There have been statements that the base obtained from coffee has a physiological action different from that of the base obtained from tea, but they have not met with much acceptance, though it is a common opinion that there is a decided difference between the effects of tea and coffee when used as beverages. This question has recently been studied by Dr. Lauder Brunton and Dr. Cash, and in a paper read before the Royal Society they have described a difference in the action of caffeine and theine upon the voluntary muscles which is sometimes exceedingly well marked, though variable. According to these authorities theine seems to be more powerful in its action than caffeine, and there is a qualitative difference between them, inasmuch as theine tends to produce rhythmical contractions in the muscle. The study of such differences in the physiological action of substances differing in composition has already given a number of interesting facts, and it appears likely to be a means of throwing still further light upon the constitution of substances which appear to be chemically identical.

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It is nearly two years ago since we called attention to the fact of the formation of a South African Pharmaceutical Association for the promotion of the interests of pharmacy in Cape Colony, the first meeting of the Association having been held in King William's Town in July, 1885. One of the earliest efforts of the first President of the Association, Mr. Des Vages, who was also a member of the colonial legislature, was to get a Poisons Bill enacted, but this had to be abandoned in consequence of the strong opposition it evoked. It is admitted that under the present conditions of the colony, when, except in large towns, chemists' shops are rarely to be found less than forty miles apart, considerable inconvenience would attend any restrictive legislation applying to the less populous districts of the colony. But, nevertheless, it is felt that there are many ways in which good work could be done by a strong pharmaceutical society, and with this view an appeal has been issued by the present President of the South African Pharmaceutical Association, Mr. Albert Walsh, for the co-operation of all pharmacists in business in the colony, as well as their assistants and apprentices. Among the objects contemplated as desirable of attainment by the Association, are—(1) that the Government examinations for the chemist's licence shall be conducted by chemists who shall have seats on the Medical Board for that purpose; (2) that such examinations shall be held at least once a year in Cape Town, Port Elizabeth, Kimberley and King William's Town; (3) the reciprocal recognition of licences with the other South African States; (4) the compilation of a correct register; and (5) the prevention of unregistered persons from carrying on business on their own account as chemists and druggists.

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On a recent occasion, when the subject of dispensing was being discussed in the House of Commons, the member for Ross and Cromarty, himself a medical man, was reported to have said that in this country the wives of medical practitioners generally do the dispensing. It would seem that a still more liberal view is taken in some quarters of the qualifications for dispensing, if we may judge from an advertisement appearing in the *Glasgow Herald* a few days since, under the heading "MEDICAL," as follows:—"A young man wishes situation as groom and dispenser to doctor in the country." The existence of a demand for such combined services may be inferred from the fact of their being thus publicly offered, and some idea may be formed of the conditions under which the dispensing of medicine is carried out in such cases by medical practitioners. Our correspondent who sends the cutting thinks that in the face of such a system as is suggested by this advertisement it is unreasonable to attempt to establish a curriculum of study for persons intending to become chemists and druggists, but we cannot agree with him in the view that the vicious system he refers to can be any justification for their omitting to make themselves competent for the discharge of the duties they propose to undertake.

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We learn from the *Indische Mercur* that the quinine factory in Amsterdam, which stopped working some months ago, has been purchased by one of the late Board of Directors with a view to reorganization of the business, in the carrying out of which Messrs. Böhringer and Son, of Mannheim, will take an active part.

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According to a table compiled by the *National Druggist*, there are at present in the United States forty-nine pharmaceutical associations more or less representative of the respective states or territories in which they are located, in addition to the American Pharmaceutical Association and two other associations of the nature of trade societies. In twenty-eight of the states and territories represented the practice of pharmacy is regulated by special Acts.

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A Detroit firm is coating menthol pencils intended for hot countries with gelatine, in order to prevent loss of menthol by volatilization before the pencils are required for use.

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We learn that Dr. Withers Moore, of Brighton, President of the British Medical Association, has been suffering from serious illness, the result of having unfortunately taken a teaspoonful of carbonate of potassium instead of bicarbonate of potassium.

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The next meeting of the School of Pharmacy Students' Association will take place on Thursday, June 2nd, when Mr. E. Young will read a paper on "Turpentine and Terpenes," and Mr. Tingle will give his postponed Report on Analytical Chemistry.

Proceedings of Scientific Societies.

ROYAL INSTITUTION.

Some Electrical Fishes.

A lecture on "Electrical Fishes" was delivered at the Royal Institution on Friday, the 13th inst, by Dr. Burdon Sanderson, who has had the opportunity of studying the physiology of the "torpedo" fish during a recent visit to the shores of the Bay of Biscay. With a view of making his subject more interesting, the lecturer not only gave the results of his research, but also compared the physiological structure of the torpedo (*Torpedo vulgaris*) with those of *Malapterurus electricus* and *Gymnotus electricus*, whilst the Zoological Society had placed a fine living specimen of the latter fish at his disposal during the evening. It was with a fish of the latter type that Faraday experimented, and found that the strongest shocks were obtained by touching the fish simultaneously at the head and tail, whilst scarcely any effect was observed on touching each side at the same distance from the extremities. He calculated that at each medium discharge the animal emitted as great a force as the highest charge of a Leyden battery of fifteen jars, exposing 3500 square inches of coated surface. The Gymnotus, or electrical eel, is common in the tributaries of the Orinoco, and is generally captured by causing the fish to expend their shocks upon horses driven into the stream, until exhausted, when they become an easy prey. The electrical organs form more than half the body, and consist of four batteries, two on each side, one above the other, the uppermost or dorsal being the larger. These batteries consist of a series of parallel piles placed horizontally in a direction from head to tail, each layer consisting of protoplasm upon the upper and nerve upon the lower surface, and these are again subdivided by transverse sections. In the Malapterurus, a genus of fishes of the family *Siluridæ*, the whole animal is clad in a tegument of dense tissue, which in this case constitutes the electric organ and is connected with the nervous system by one large nerve. It is remarkable that the natives on the Congo use the same word for the name of both this fish and the telegraph. The torpedo, which is allied to the skate, and varieties of which are found in the Mediterranean, Atlantic and Indian seas, differs from both of the former in possessing a special brain, or rather a special lobe of the brain, termed the "electrical lobe," which is situated behind the cerebellum and has control over the electric organs of this fish. These organs are divided by means of a number of vertical columns, about five hundred in an ordinary specimen of the torpedo, although in the case of one caught off the coast of the United States, 5 feet in length and 12 stone in weight, one thousand of these columns were observed. The divisions between the columns are again subdivided into compartments presenting a honeycomb appearance, and to each of these compartments five nerves are attached, so that in a medium-sized fish some twelve thousand nerves are employed in the electric organs. Dr. Sanderson gave a very elaborate description of the arrangement of the nervous system in the torpedo, showing how the large nerves pass along the vertical columns, sending out branches to each of the cells on either side, the nerve invariably passing along the lower side of the cell wall. Throughout the lecture Dr. Sanderson illustrated his remarks by photographed sections of the parts under discussion thrown upon a screen, but at this stage some very fine microscopical slides were projected, the results of the lecturer's recent work. These slides not only illustrated the general arrangement of the nerves, but descending into further detail showed that the principal nerves were sheathed, whilst the smaller ramifications were not, whilst at the end of the nerve there was no complex structure observable, but a simple termination. Having thus brought before his audience the least technical of his observations, Dr. Sanderson proceeded to discuss the origin and use of the electric organs in fishes. In most cases the initial development of the electric organs is similar to the development of muscle, but in the Malapterurus it is not the muscular system which is transformed, but the skin, glands and other parts connected with the skin. The lecturer raised the question as to why fishes had been provided with such a weapon of attack or defence. In the case of the torpedo, has the torpedo degenerated into the skate through not making use of its electrical organs, or is the skate the original form of the torpedo? Both hypotheses seem unstable, as it hardly seems probable that a fish would cease to make use of such a useful adjunct as electricity in procuring food, or that it should by any circumstances develop an organ of which there is no sign in the original, although some naturalists assert that in the tail of the skate there is a development which may allow of such a possibility. Dr. Sanderson, however, thinks it quite as probable that the electric organ should be formed from the muscular system as the muscle formed from the electric organ, and prefers to consider that they have both their origin in a simpler element. If such be the case, by what steps have these organs progressed in their development from the original matter? The lecturer expressed an opinion that most probably an answer would be found to this question in an exhaustive microscopic examination of the nerve. Looking at it from the physiological side, the only difference between the muscles and the electric organs is, that one is supplied with motor nerves, the other with electro-motor nerves. Another remarkable fact recently observed by Dr. Sanderson, to which he drew attention, is that two kinds of shocks are experienced in experimenting with electrical fish. Thus, when a fish is suddenly touched or attacked, a sharp explosive shock is felt, but the more normal effect is a prolonged series of smaller shocks of inferior intensity. The lecturer made this point very apparent to his audience by touching the specimen of Gymnotus present simultaneously at the head and tail with two wires connected with an electro-magnet, when the shocks delivered were made perceptible by the movement of a paper lever, the shadow of which was thrown upon the screen. The Chairman was even more favourably situated, as he was enabled, by means of a telephone, to hear the distinct shocks produced. Dr. Sanderson also gave the results of a series of experiments conducted with regard to the measurement of the period of time elapsing between the "exhortation" of the fish and the delivery of its shock, and also concerning the duration of the shock. He found that after a sudden attack one-hundredth of a second elapsed before the primary single response to the exhortation was obtained, the discharge reached its maximum power one-five-hundredth of a minute after its commencement, and had a duration of about one-fourth of a second. On continued irritation a number of smaller shocks were received, recurring at intervals of about one-fiftieth of a second.

SOCIETY OF CHEMICAL INDUSTRY.

The Digestive Ferments.*

BY F. BADEN BENGER, F.C.S.

At the request of several members of the Committee of this Section of the Society of Chemical Industry I have undertaken to read a short paper on the digestive ferments, and to give some illustrations of the action of these ferments on articles of food. I at first hesitated very much to pose before you in the position of one who presumably has something new to say—when I have so little—but I was reminded that this particular branch of physiological chemistry is probably rather outside the field of observation of most members of the Section, although many of the experiments I have to show you

* Read before the Manchester Section of the Society of Chemical Industry..

are in reality performed daily by each one in his most private laboratory—his stomach. These are the considerations which led me to attempt the task of interesting you for a very few minutes this evening.

The study of these digestive processes has naturally attracted the attention of many eminent men. In this country one of the most recent, and certainly the most distinguished investigator, has been Sir Wm. Roberts, M.D., F.R.S., of this city, and to his researches I am indebted for much that I have to bring before you.

Digestive ferments is the name given to certain principles secreted at different points in the alimentary canal, their office being to transmute the food we eat into products capable of being assimilated, and so used in the building up of our tissues, or in supplying the necessary fuel required to maintain the continuous working of our several functions. Speaking generally these ferments have the power of increasing the solubility and diffusibility of food—for instance, starch is converted into sugar (maltose), and albumen into peptone. The changes brought about are not, chemically speaking, complicated, though the physical condition of the substance acted on is often entirely altered. The actual ferments themselves have never been absolutely isolated. It is known, however, that they are albuminoid, or are invariably associated with albuminoid matter; they are soluble or unorganized, as distinguished from the organized and insoluble ferments, such as yeast. They are precipitated from watery solution by alcohol, but even prolonged contact with this fluid does not injure them. When the alcohol is removed their solubility and activity are found to be unimpaired. They are destroyed by many chemical reagents, and when in solution they are coagulated and rendered permanently insoluble and inactive by a temperature of about 75° C. They have no power of self-multiplication or growth of any kind, as is the case in the class of so-called organized ferments, but their action is quite distinct from what we understand by chemical, in the ordinary sense of the word. I shall presently have the opportunity of illustrating my meaning by an experiment. A special interest attaches to these principles from the fact that they play so important a part in our individual organisms. Their origin is shrouded in mystery, they are formed under the influence of vitality, and seem indeed to be a remnant of unexpended vital force.

The importance of preparations of these ferments in modern civilized life is considerable; some of them are largely used in medicine, and others are employed in the manufacture of peptonized or partially digested foods.

The first of the secretions with which our food is brought in contact in the process of digestion is the saliva. One of the purposes served by saliva is to lubricate the morsels of food, and so facilitate their being swallowed, and this probably is the extent of its service with regard to meat, and many other articles of diet; but saliva contains a very important ferment—ptyalin. This body may be precipitated in an impure condition by adding filtered saliva to strong alcohol. Its action on cooked or gelatinized starch is similar to that of malt diastase, converting it into dextrine and sugar. Starchy foods of course form a considerable part of the diet of man. The importance of ptyalin can, therefore, be well understood, especially when it is known that starch is not acted on by the juices of the stomach, and that it is not until it reaches the duodenum that farinaceous food is again brought under the influence of a starch-digesting ferment. It is essential that the starch should be cooked, as raw or unbroken starch granules are scarcely acted on at all by the saliva of man, though the lower animals are capable of digesting it. I have here a small quantity of ptyalin, and if I add a little to this test tube full of warm starch mucilage you will observe that a change will shortly take place. The change is much more rapid if saliva is used, as the ptyalin is then in solution, and a few seconds will be required to bring the ptyalin to the same condition. The first step in the digestion of starch is the formation of soluble starch; a bright transparent solution is obtained which still gives the blue reaction with iodine; then dextrines are produced, yielding brown and yellow reactions with the same reagent; and finally sugar, yielding no coloration with iodine. This digestion of starch by ptyalin can take place only in alkaline, neutral, or faintly acid media. The juices of the stomach during digestion are acid, but it seems probable that masses of bread and other farinaceous food, saturated with saliva, would continue for a time to be acted on by the ptyalin after they reach that organ, as they could hardly be immediately permeated by the gastric juice.

We now come to the digestive ferments of the stomach. These are pepsin and a curdling ferment, the active principle of the well-known rennet used in the manufacture of cheese. Pepsin is the agent by which albuminous matter or proteids, such as meat, eggs, etc., are converted into soluble peptones in the stomach, and thus fitted for absorption. Though not absolutely inert in neutral media, it is practically so. The normal acidity of the gastric juice is equal to about 0·2 per cent. of HCl, and though it is probable that during the digestion of meat, etc., other acids are set free from salts contained in the food, hydrochloric acid is found to be the one secreted with pepsin in the gastric juice. Water containing 1 per cent. of strong hydrochloric acid is a suitable medium for experiments with pepsin.

Pepsin, like all the digestive ferments, is soluble in water or glycerin. From an aqueous extract of the mucous membrane of the stomachs of animals it may be precipitated in various ways—perhaps it would be more correct to say that precipitates may be obtained in which the presence of pepsin can be demonstrated by its digestive power. But actual pepsin has never been isolated, and attempts to purify the precipitate are very apt to lead to great diminution in its activity. The mucous membrane does not always yield an active extract. The pepsin is sometimes incompletely formed. It may exist as what is called pro-pepsin or pepsin-precursor, and time, aided by atmospheric influences, may be necessary in order to develop the perfect ferment.

The Pharmacopœia process for preparing pepsin is the somewhat rough-and-ready one of scraping the cleansed mucous surface of the stomach of the pig with a blunt knife; the matter thus removed is dried at a temperature not exceeding 120° F., and powdered. Carefully prepared this is a fairly active product; but the best that can be said of it is that it contains the proteolytic ferment of the stomach mixed with much undesirable animal matter, extremely liable to decomposition. I once asked a candidate at an examination of the Pharmaceutical Society how to make Pharmacopœia pepsin, and he told me it was done by scraping the outside of a sheep after the removal of the skin. I have examined some specimens of pepsin which may have been prepared by this method.

Some commercial pepsins are prepared by precipitating aqueous extracts of the mucous membrane of the pig or sheep; the precipitate is commonly mixed with starch powder or sugar of milk. Fuid preparations are, however, now much used; but by whatsoever process pepsin is prepared, the only test of its quality that can be applied is the measure of its digestive power. The mode of applying this test adopted in the last edition of the British Pharmacopœia is one proposed by myself in a paper read before the British Pharmaceutical Conference at its York meeting in 1881. The official direction is as follows:—"Two grains of it with an ounce of distilled water, to which 5 minims of hydrochloric acid have been added, form a mixture in which at least 100 grains of hard-boiled white of egg, pressed through wire gauze of thirty-six meshes to the linear inch, and made of No. 32 brass or copper wire, will dissolve on their

being well mixed, digested, and well stirred together for thirty minutes at a temperature of 130° F."

In previous editions the white of egg used was ordered to be in thin shavings, the temperature 98° F., and the time "about four hours." The test was tedious, the condition of the egg not precisely indicated, and the element of time more or less variable according to the meaning attached to the word "about."

My original paper contains some details of manipulation necessarily omitted from the brief Pharmacopœia directions. In practice I find that the white of egg having been pressed through the wire gauze and weighed, is best lightly rubbed in a glass mortar with the acidulated water; this separates the vermiform particles, which cannot be satisfactorily accomplished by mere stirring; this is, of course, most important, as the amount of albumen dissolved, other things being equal, will depend on the amount of surface presented to the action of the ferment. The mixture is then poured into a large test tube and floated in a beaker of water. Half a dozen such tubes, numbered, and each containing 100 grains of hard-boiled white of egg and 1 oz. of acidulated water, can thus be floated in the same water-bath, and the same number of examples of pepsin or preparations of pepsin can then be tested under absolutely identical conditions. This latter point is most important in comparative experiments, for it must be remembered that the digestive power of pepsin is greatly influenced by many circumstances, the degree of subdivision of the egg, the temperature of the mixture, the volume of the solvent, and the frequency with which the mixture is stirred. Having floated the charged test tubes in the beaker, as shown on the table, and provided each tube with a small glass stirrer so that pepsin may not be transferred from one tube to another, the heat of the spirit lamp or Bunsen's burner is applied until the temperature of the whole has reached 130° F. There is no practical difficulty whatever in this, and any slight variation of temperature affects all the tubes alike, so that the value of the test for comparative experiments is not influenced by slight variations.

The samples of pepsin or its preparations, having been previously weighed or measured, are now added to the tubes and the temperature maintained as nearly constant as possible, care being taken that it does not rise above 130° F. The contents of the tubes should be stirred at regular intervals, say every five minutes, and in half an hour the albumen should have dissolved. The glass water-bath is more convenient than the ordinary water-oven or incubator, as it enables the operator to see the progress of the experiment, and in practice it is often easy to select the best sample of pepsin in a few minutes.

It will, of course, be noticed that the temperature employed in this artificial stomach is much higher than that of the body. It was adopted because it was found that about 130° F. is that of the maximum activity of pepsin, and experiments had shown that specimens of pepsin which were most active at the higher temperature were invariably the most active at the temperature of the body (98° F.), whilst the adoption of the higher temperature enabled the operation of testing to be accomplished in half an hour instead of occupying four hours, as in the previous edition of the Pharmacopœia.

Some may perhaps be asking themselves the question, How can a dose of pepsin which requires twenty or thirty minutes to digest 100 grains of egg at 130° F., have any appreciable effect on a meal when taken as a digestive?

In answering this, we must not forget the fact that whilst in our laboratory experiments the products of digestion remain in the digesting apparatus to gradually retard, and finally stop, the action of the ferment, in the stomach these products are constantly removed as digestion goes on. It must not be supposed that 100 grains of egg albumen is all that 2 grains of B.P. pepsin, or the minimum dose of a fluid preparation, will digest in half an hour under other conditions and with other surroundings. The following experiment (described by me in *The Lancet*, April 3, 1886) will demonstrate the contrary. I took ten times the Pharmacopœia quantity of egg and acidulated water—that is, 1000 grains of egg and 10 fluid ounces of water; these were placed in a beaker; 100 grains of egg and 1 oz. of acidulated water were put in a test tube and stood in the beaker, and the whole heated to 130° F. A teaspoonful, the minimum dose of an active fluid preparation of pepsin, was then added to both beaker and test tube, the temperature maintained constant, and the contents of both stirred occasionally. When the egg in the test tube had all dissolved, which in this experiment occupied twenty-five minutes, the contents of the beaker were thrown into a fine muslin filter and drained; the undissolved egg weighed 220 grains. Here, then, a small dose of pepsin had dissolved 780 grains of egg in 10 ounces of fluid, whilst a similar dose had dissolved 100 grains in 1 ounce of fluid. Another attempt was made to approach more nearly to the conditions under which pepsin acts in the stomach. The egg, acidulated water, and pepsin were placed in a parchment dialyser and floated on a bowl of acidulated water. In this case it was found, also, that enormously more egg was dissolved in the dialyser, where the products of digestion could diffuse away, than in a test tube containing a similar mixture.

Each of the two beakers on the table contained, this afternoon, 1000 grains of hard-boiled white of egg and 10 ounces of acidulated water. To one I added a teaspoonful of an active solution of pepsin, and maintained it at a temperature of 130° F. for half an hour—you will observe that the white of egg has disappeared, and it now exists as peptone, or peptones, for there are several—in solution, and the presence of this peptone can be easily demonstrated by a colour test. When a solution of peptone is rendered strongly alkaline with potash, and a few drops of Fehling's copper test are added, a beautiful rose colour is produced. I will apply this test to a portion in a test tube.

The second ferment contained in the gastric juice is that known as the curdling ferment, and is familiar to all of us as the active agent in rennet. Its sole property, as far as is known, is to curdle milk, to cause a separation of the casein, though it is probable that it serves some other purpose. If it were found only in the stomachs of milk-consuming animals, we might rest on the supposition that it is merely a milk curdler, but Sir William Roberts has obtained it from the digestive organs of the fowl, and I have myself extracted it from the stomach of the cod fish. Now, neither of these creatures can possibly require the services of a milk-curdler. The curdling power of gastric juice was long considered to be due to pepsin, but it is now known to be caused by the presence of a distinct ferment. If the mucous membrane of the stomach of the calf be macerated in a saturated solution of common salt, an extract is obtained practically destitute of proteolytic power, but extremely active as a curdler. If I add a few drops of this solution to a beaker of warm milk (about 100° F. is the best temperature), and stir them together, we shall see that in a few minutes the milk will solidify in a characteristic manner—a solid jelly-like mass being produced. If this be now broken up with a glass rod, the casein, or curd, will shortly contract, and form lumps floating in the whey. Much of the fat of the milk is entangled with the casein in these masses, and the whey is chiefly a solution of the lactose, or sugar of milk, and the salts.

The ferments of the pancreas or sweetbread have not, until recently, attracted much attention, and the remarkable digestive power of the pancreatic juice was scarcely suspected. Three of these ferments are known to exist; an amylolytic or starch-digesting one, resembling ptyalin in its power of converting starch into sugar, a proteolytic or proteid digesting one called trypsin, and another curdling ferment. The ferments of the pancreas, like those of the stomach, have not yet been absolutely

isolated; they may be extracted from the minced pancreas by similar solvents, water, or glycerin—and here again, the same difficulty is experienced as in extracting the ferments from the mucous membrane of the stomach. The gland may contain no completely formed ferments. They may exist as zymogen, or mother of ferments, and our solutions may prove inactive until the perfect ferment is developed.

I am not aware of a process by which they can be entirely separated from each other. I have obtained by fractional precipitation from aqueous solutions with strong alcohol, precipitates possessing respectively very much more of the diastasic and of the tryptic ferment, but have never completely separated them. Like the peptic ferments, they are very easily destroyed, and the utmost care is necessary in their preparation,

I have here a solution of these pancreatic ferments, and will first give you an illustration of its starch-digesting or diastasic power. This beaker is filled with warm thick starch mucilage. If I add a little of the solution and mix it with the starch paste by stirring, you will notice a rapid change in the contents of the beaker—they quickly become thin and transparent. I can now pour them from one beaker to another like water. If we now apply the well-known iodine test for starch to a portion, we shall still get the blue coloration—the starch has for the most part been merely converted into the soluble modification; but the digestive process is going on, and in a short time we should get the brown, and then the yellow, reaction of the dextrines; but to save time I will add a little more of the pancreatic solution—now iodine no longer produces a blue reaction—the starch no longer exists as starch, but as dextrine. A few more drops are added, and now no colour is produced by the addition of iodine; the starch has been transmuted into sugar (maltose). The rapidity of this transmutation depends upon the proportion of ferment to starch. It is easy to produce the change almost instantaneously. If I half fill this test tube with the pancreatic solution, warm it slightly, and add a drop or two of the starch mucilage, I cannot apply the iodine test in time to catch a molecule of the starch unconverted. This illustrates the peculiar action of the ferments, to which I referred early in my paper. This change from starch to sugar can be produced almost as rapidly as the neutralization of an acid by an alkali; but, on the other hand, if the proportion of ferment to starch be small, many hours may be required to effect the transformation; or, if still smaller, the ferment may exhaust its energy before the whole of its work is accomplished. Sir William Roberts, in his Lumleian Lectures, gave a very graphic illustration of this action. "There is," said he, "something in this, strikingly suggestive or reminiscent of the action of living organisms. To illustrate my meaning, let us compare the particles of the ferment to a band of living workmen, whose function it is to scatter little heaps of stones. If the heaps are few, and the workmen many, all the heaps will be scattered at once, and the energy of the workmen will remain sensibly unimpared; but if the heaps are millions, and the workmen hundreds, and if the workmen are doomed to labour on until they fall exhausted at their task, the scattering of the heaps will go on for a comparatively long time, and the process of exhaustion will be a gradual one."

We will now turn to the proteolytic or proteid-digesting ferment of the pancreas, trypsin. It will be remembered that the proteolytic ferment of the stomach, pepsin, is practically inactive in neutral solutions, and is destroyed by alkalies. Trypsin, on the other hand, is active in neutral and alkaline solutions, and inactive in more than feebly acid media. An alkalinity equal to about 1 per cent. of bicarbonate of soda seems the most favourable, however, to its full action. Its digestive power is exercised less rapidly on coagulated white of egg or fibrin than is that of pepsin. The casein of milk, however, is much more rapidly digested by the pancreatic than by the peptic ferment, and therefore affords us a convenient means of illustrating its action.

I have here two beakers filled with slightly-diluted milk. To one has been added a teaspoonful of the same solution of the pancreatic ferments used to demonstrate the action of the amylolytic or diastasic ferment, and the mixture has been kept at a temperature of about 55° C. for half an hour. There is very little alteration in the appearance of the milk. It is a little yellower; but a few tests will show that the casein has disappeared, and peptone has taken its place. I will pour some of the milk from each beaker into these test glasses, and add a little dilute acetic acid. In the peptonized or digested milk no precipitate is produced, but in the other the casein is, of course, precipitated. If we take two other test glasses of the peptonized and unpeptonized milk, and apply the test for peptone used just now, solution of caustic potash and a few drops of Fehling's copper test, we get the rose-red coloration instantly in the peptonized milk, but none in the other.

During the transformation of casein into peptone, an intermediate body called meta-casein is first formed. This is distinguished from ordinary casein by its property of coagulating on boiling. Ordinary milk can, of course, be boiled without change, but if we boil milk which has been submitted—for a few minutes only—to the action of a small proportion of the pancreatic ferment, and which is thereby partially peptonized, an abundant curdy precipitate is formed. This, however, can be entirely prevented by previously rendering the milk slightly alkaline; about 1 grain of bicarbonate of soda to the ounce of milk is sufficient to prevent the precipitation of meta-casein on boiling. That this does not prevent its formation can be shown by neutralizing a portion of alkaline milk at the proper period of digestion, and immediately boiling it, when the meta-casein will be thrown down as before.

We may illustrate the wonderfully rapid action of trypsin somewhat in the same way that we did the amylolytic ferment of the pancreas. I mix in this test tube a little pancreatic solution, water, and milk; it is even unnecessary to warm them. If, now, I apply the peptone test, the rose-coloured reaction is produced; some of the casein has already been converted into peptone.

By adding a solution of the pancreatic ferments to a large excess of strong alcohol, a white precipitate is formed, possessing both the amylolytic and proteolytic power of the original solution. I have some of this precipitate in my hand. It has been dried at a low temperature, and its activity is very remarkable. If I take a small fraction of a grain of it on the point of my penknife, and stir it into this beaker of warm starch mucilage, you will observe in a few seconds that a change is going on; the mucilage has become thin and clear, the starch is rapidly undergoing transformation into dextrine and sugar. Its action on milk, too, is similar to that of the pancreatic solution, from which it is precipitated. The pancreas contains yet another ferment, one capable of coagulating milk in a very similar manner to the curdling ferment of the stomach or rennet, but differing from it in this respect:—Rennet will coagulate neutral or very feebly alkaline milk, but alkalinity produced by a grain of bicarbonate of soda to the ounce of milk is sufficient to prevent it. The curdling ferment of the pancreas, however, is unimpaired by an alkalinity three or four times as great, so that the two ferments cannot be identical. It is singular that, until comparatively recent times, the only function attributed to the pancreatic juice was the digestion of fats, and yet to-day it is the one that is questioned. It is one I have never obtained satisfactory evidence of, and am, therefore, unable to demonstrate to you.

In testing preparations of the pancreatic ferments we have again to rely, as in the case of pepsin, on the measurement of the work they are capable of performing In an elaborate paper read before the Royal Society,

London, Sir William Roberts describes a method of accomplishing this. In the case of the amylolytic ferment, it is based on "the quantity of starch mucilage of known strength, which can be transformed by a unit measure of solution of the ferment to the point at which it ceases to give a colour reaction with iodine in a unit of time, and at a fixed temperature." The proteolytic ferment is estimated in a similar manner, except that milk is used instead of starch mucilage, and the indication or end-reaction of the experiment is the precipitation of meta-casein on boiling a portion of the milk.

A knowledge of the temperature at which the maximum activity of these ferments occurs is important in their practical application to the production of peptonized or partially peptonized or digested foods. The activity of the diastasic or amylolytic ferment commences a little above the freezing point, and rises gradually with the temperature until 30° C. is attained; it then remains stationary until 45° C., and then gradually falls with the further rise of temperature, until at 65° C. it ceases to act.

The activity of the tryptic ferment rises gradually with the temperature until 60° C. is reached, and then rapidly falls until at about 75° C. it becomes inert.

Peptonized or partially peptonized milk, and other articles of diet, are very largely used at the present time in rearing infants, and by invalids unable to digest ordinary food.

Fully peptonized milk has a slightly bitter taste, which is unobjectionable to many, and which may be covered by the addition of a little coffee. It is, however, seldom necessary to fully peptonize articles of food, and partially peptonized milk scarcely differs in appearance or taste from ordinary milk; nevertheless, it has been very considerably modified. Its undigested casein cannot be curdled by the acid juices of the stomach into tough compact indigestible masses, but forms on the addition of acid light flakes, which are much more easy of digestion.

In preparing this partially-digested milk, the following points should be borne in mind: 1st. The milk should be diluted with a fourth, or, better, with a third of its bulk of water. This entirely prevents the action of the curdling ferment of the pancreatic solution. 2nd. The temperature of the milk should be from 50° C. to 60° C., at which the tryptic ferment attains its maximum activity; and 3rd. That if the milk be not consumed by the infant or invalid as soon as it is sufficiently peptonized, it must be rendered slightly alkaline by the addition of about one grain of bicarbonate of soda to the ounce, and boiled up to put an end to the action of the ferment, the addition of soda being then necessary to prevent the precipitation of meta-casein. It is preferable, when convenient, to use the partially-peptonized milk unboiled with the ferment still active. Many other articles of food are peptonized in a similar manner—soups, beef-tea, farinaceous gruels, etc.

We must content ourselves on this occasion with the mere mention of the remaining ferments concerned in the digestion of our food. Bile is said to assist in the emulsifying of fats, and the intestines secret a ferment which changes cane sugar into invert sugar. Such, gentlemen, is the very hurried sketch of the principal digestive ferments which the limited time at our disposal this evening permits, and I feel that my apologies are due to you for having attempted to traverse so wide a field.

CHEMICAL SOCIETY.

A meeting of the Chemical Society was held on Thursday, May 19. Mr. William Crookes, F.R.S., President, in the chair. A number of certificates were read for the first time, and the following papers were read :—

The Formation of Hyponitrites. By Professor DUNSTAN and T. S. DYMOND.—Zorn (*Ber.*, xv., 1258) has stated that alkali nitrites and nitrates are readily acted on by ferrous hydroxide, forming hyponitrite, ammonia, nitrogen and nitrous oxide. Divers and Haga (*Trans.*, 1884, 87, and 1885, 364) allege that alkali nitrites yield much ammonia, but neither hyponitrite nor hydroxylamine, nor any gaseous product; and that alkali nitrates are wholly unaffected; while nitric oxide in presence of alkali is to a large extent converted into ammonia by ferrous hydroxide, but yields no hyponitrite. The authors find that nitric oxide in the absence of alkali is reduced by ferrous hydroxide to nitrous oxide and nitrogen; no ammonia or hyponitrite is formed. In the presence of an alkali (sodium hydroxide) nitric oxide is partly reduced to nitrous oxide and nitrogen, and partly absorbed; the solution contains hyponitrite and ammonia. but on standing with excess of ferrous hydroxide it evolves nitrogen, and the hyponitrite disappears. The amount of hyponitrite formed depends within certain limits on the quantity of alkali which is present, on the quantity of ferrous hydroxide used, and on the time during which action is allowed to proceed. When three formula weights of ferrous hydroxide, $Fe(OH)_2$, and one of nitric oxide are used, the quantity of hyponitrite formed increases with each formula weight of sodium hydroxide that is added. About 20 per cent. of the nitric oxide may be converted into sodium hyponitrite. Alkali nitrites and ferrous hydroxide readily interact, producing nitrogen, nitrous oxide, ammonia and hyponitrite. The amounts which are formed of these substances depend on the quantity of ferrous hydroxide used, and also on the time during which the action continues. Excess of ferrous hydroxide after some time converts sodium nitrite entirely into nitrogen and ammonia. As a lecture experiment it is recommended to dissolve 5 grams of ferrous sulphate in about 25 c.c. of water, and to precipitate the liquid with sufficient of a 10 per cent. potash or soda solution to leave the mixture faintly alkaline; 1 gram of sodium nitrite dissolved in about 25 c.c. of water is then added, and the mixture stirred. After effervescence has ceased, and the liquid has stood for about half an hour, it is filtered. If the filtrate is diluted with an equal volume of water, and carefully neutralized with acetic acid, on the addition of silver nitrate a pale yellow precipitate of silver hyponitrite (mixed with some silver nitrite) will be obtained. Or a few drops of a silver nitrate solution may be added to the liquid before neutralization; but in this case the precipitate will rapidly darken in colour. Alkali nitrates are hardly at all affected by ferrous hydroxide; small quantities are slowly converted into ammonia. In explaining their results, the authors draw attention to the simultaneous formation of hyponitrite and hydroxylamine when sodium amalgam acts on dissolved sodium nitrite. They show that the ammonia is not derived from a further action of sodium amalgam on the hyponitrite, which yields only nitrogen. Similarly, ferrous hydroxide liberates nitrogen from sodium hyponitrite, but no ammonia is formed. They consider that the action of sodium amalgam on a solution of sodium nitrite is best explained by supposing that the sodium nitrite combines with two hydrogen-atoms, forming $NaN(OH)_2$. This compound may decompose, yielding hyponitrite: $NaN(OH)_2 = NaNO + H_2O$; or it may undergo reduction, yielding hydroxylamine,

$$NaN(OH)_2 + 2H = NaOH + NH_2OH,$$

and also ammonia and nitrogen—

$$4NaN(OH)_2 + 10H = 4NaOH + N_2 + 2NH_3 + 4H_2O.$$

Ferrous hydroxide, it is suggested, acts in the same way, being a substance which will combine with the hydroxyl of water when sodium nitrite is present to unite with the hydrogen. Any hydroxylamine which may be formed will at once be converted into ammonia by ferrous hydroxide. The authors find that when excess of ferrous hydroxide is used, and nitrogen and ammonia are the only products, the reaction takes place almost exactly in accordance with the equations—

$$(1)\ 4NaNO_2 + 8OH_2 + 8Fe(OH)_2 = 4NaN(OH)_2 + 8Fe(OH)_3$$

(2) $8NaN(OH)_2 + 6OH_2 + 14Fe(OH)_2 = 8NaOH + 3N_2 + 2NH_3 + 14Fe(OH)_3$.

Since nitric oxide in presence of alkali yields exactly the same products as nitrites, the change can be most readily explained in the same way, assuming that the compound $NaN(OH)_2$ is first formed.

Ozone from Pure Oxygen. By W. A. SHENSTONE and J. TUDOR CUNDALL.—The authors describe an apparatus in which oxygen has been prepared and stored without the possibility of air gaining admittance. So far as it is possible to determine the purity of the gas by tests, it would appear certain that it has contained at most $\frac{1}{5000}$ of nitrogen. The oxygen has been collected and sealed up in glass tubes containing phosphoric oxide, in contact with which it has been kept for periods ranging from eight weeks to eight months. Subsequently it has been submitted to the action of electricity, and the ozone produced has been measured. In one experiment made at 10° C. no less than 11·7 per cent. of the oxygen taken was converted into ozone. This is a very considerably higher proportion than has been obtained either by Brodie or by the authors from ordinary oxygen when similar means of electrification are employed, but not so high as was obtained by Andrews and Tait, who, however, worked in a different way, and the exact value of whose results is uncertain in consequence of the tendency of the sulphuric acid that they used in their gauges to absorb ozone. The action of dry ozone on dry mercury has also been well studied. Dry ozone from pure oxygen is decomposed in the well-known manner by pure and dry mercury, but without visible oxidation of the mercury. Further, when a definite volume of oxygen is ozonized and afterwards left in contact with mercury for many hours, the oxygen almost entirely recovers its original volume, the small differences observed between the initial and final volumes being probably due to the difficulty of measuring oxygen with accuracy in a tube partly coated with mercury. The authors point out that the apparently high yield of ozone obtained under somewhat unfavourable conditions as to temperature may be due:—1. To the absence of nitrogen, the presence of which Andrews has shown is, under some conditions, very unfavourable to the production of ozone. 2. To the character of the electric discharge, which is most free from large sparks when the air and glass surfaces from which the discharge takes place are free from moisture.

The Volumetric Relations of Ozone and Oxygen. A Lecture Experiment. By W. A. SHENSTONE and J. TUDOR CUNDALL.—Soret and Brodie have shown that if v be the contraction produced on the electrification of a mass of oxygen, then $2v$ will represent the further contraction that will occur on absorbing the ozone formed by means of turpentine. If it be true that ozone completely dissolves in turpentine, this indicates that three measures of oxygen are concerned in the formation of two measures of ozone.

The Thermal Phenomena of Neutralization and their bearing on the Nature of Solution and the Theory of Residual Affinity. By S. U. PICKERING.

The Action of Metallic Alkylates on Mixtures of Ethereal Salts and Alcohols. By T. PURDIE, Ph.D., B.Sc.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting was held on Thursday, May 19, Mr. Edmund White occupying the chair. The proceedings commenced with the following paper:—

BUTYL-CHLORAL HYDRAS.

BY J. J. THOMAS.

This body was discovered by Krämer and Pinner in 1871 during the course of an investigation they were engaged in with the object of discovering some useful substance in the accumulated bye-products at Schering's chloral factory, and Hofmann also proved it to be present in some samples of chloral-hydrate. The alcohol used in making chloral is purified from various badly-smelling bodies by passing it through charcoal, when a large quantity of aldehyde is produced by the dehydrogenation of the alcohol by the oxygen occluded by the charcoal, and also perhaps by the oxygen of the atmosphere acting on a large surface of the alcohol; and it is this aldehyde which is the source of the butyl-chloral hydrate found by Krämer and Pinner in the bye-products.

This butyl-chloral hydrate was formerly called croton-chloral hydrate from an erroneous idea of its composition, and the formula $C_4H_3Cl_3O.H_2O$ was assigned to it, but the discoverer, Pinner, afterwards found that the true formula was $C_4H_5Cl_3O.H_2O$, and that it was a tri-chloro derivative not of crotonic, but of butylic aldehyde.

Butyl chloral, $C_4H_5Cl_3O$, is manufactured by passing dry chlorine gas into aldehyde cooled to −10° C. until it is no longer absorbed. The product is then fractionally distilled, the part passing over between 163° and 165° C. being anhydrous butyl-chloral. This is a colourless, oily liquid of peculiar odour, having a specific gravity of 1·395 at 20° C., and boiling at 163° to 165° C., and on treatment with water, soon deposits crystals of butyl-chloral hydrate, $C_4H_5Cl_3O.H_2O$. The reaction probably consists in two molecules of aldehyde condensing to one molecule of crotonic aldehyde with the separation of water. This crotonic aldehyde by the action of chlorine yields HCl and mono-chlorcroton aldehyde, while the latter body unites with more Cl to form butyl-chloral, as represented in the following equations:—

$$2C_2H_4O = C_4H_6O \text{ (croton aldehyde)} + H_2O.$$

$$C_4H_6O + Cl_2 = C_4H_5ClO \text{ (monochlorcroton aldehyde)} + HCl.$$

$$C_4H_5ClO + Cl_2 = C_4H_5Cl_3O \text{ (butyl chloral)}.$$

Or, neglecting the intermediate steps, we may represent the reaction by the following equation:—

$$2C_2H_4O + 2Cl_2 = C_4H_5Cl_3O + H_2O + HCl.$$

When the formula $C_4H_3Cl_3O$ was assigned to butyl-chloral, it was supposed to be formed from crotonic aldehyde by the substitution of three atoms of Cl for three atoms of H, thus:—

$$C_4H_6O + 3Cl_2 = C_4H_3Cl_3O + 3HCl,$$

but we now believe that only one atom of the H of the crotonic aldehyde is substituted by Cl, the product forming a direct additive compound with two more atoms of Cl.

The water in butyl-chloral hydrate, $C_4H_5Cl_3O.H_2O$, does not exist as water of crystallization, but is probably in combination with the butyl-chloral, forming a true dihydric alcohol, namely, trichlor-butylidene glycol, and its formula is more correctly written $C_3H_4Cl_3CH{<}^{OH}_{OH}$. It does not, however, yield chlorinated acids of the lactic and oxalic series on oxidation, but the elements of water are split off, and the product is trichlorbutyric acid, $C_3H_4Cl_3.COOH$. This of course must of necessity occur, as the two hydroxyl groups are attached to the same carbon atom. It is here interesting to note that although as a rule a carbon atom can only have one OH group combined with it, it may have two when the body is a chloro-derivative, but the union, as seen in this case, is feeble, and the elements of water are easily given off.

Liebreich claimed for this body an advantage over ordinary chloral hydrate in that it did not affect the heart, and it is also stated that, unlike chloral hydrate, it is not necessary to increase the dose as the patient gets accustomed to its use, and also that it is a specific in certain cases of facial neuralgia, but it is not nearly so extensively used as the ordinary chloral hydrate. As in the case of chloral hydrate it is doubtful whether its physiological effects are due to its specific action, or to the products of its decomposition by the alkali of the blood. The action of alkalies upon butyl-chloral hydrate may be represented by the following equations:—

$$C_4H_5Cl_3O.H_2O + KOH = HCOOK \text{ (potassium formate)} + C_3H_5Cl_3 \text{ (propylic chloroform)} + H_2O.$$

$C_3H_5Cl_3$ immediately decomposing to $C_3H_4Cl_2$ (allylene dichloride) + HCl.

Butyl-chloral hydrate was introduced into the British Pharmacopœia in 1885, and it is not official in any other pharmacopœia. The characters and tests given in the B.P. are as follows:—"Pearly-white crystalline scales, having a pungent but not acid odour resembling that of hydrous chloral, and an acrid nauseous taste. It fuses at about 77·8° C. to a transparent liquid, which in cooling commences to solidify at about 71·1° C. Soluble in about 50 parts of water, in its own weight of glycerine and of rectified spirit, and nearly insoluble in chloroform. The aqueous solution is neutral or but slightly acid to litmus paper. It should not yield chloroform when heated with solutions of potash or soda, or with milk of lime." I may also add that it is very soluble in ether. Its vapour is very irritating to the eyes.

The following table shows the result of the examination of five samples of butyl-chloral hydrate:—

	Fusing point.	Solidifying point.	Yield of $CHCl_3$ with KOH	Test paper.
No. 1.	77° C.	68·5° C.	None	Very slightly acid.
No. 2.	78° C.	69·5° C.	Distinct	Slightly acid.
No. 3.	79·5° C.	68·5° C.	None	Neutral.
No. 4.	77° C.	64° C.	None	Slightly acid.
No. 5.	79° C.	66° C.	None	Neutral.
B.P.	77·8° C.	71·1° C.	None	Neutral or slightly acid.

All the samples examined corresponded to the B.P. description in appearance, odour and taste.

Sample No. 1 was prepared by myself from pure aldehyde. The first attempt to prepare the butyl-chloral failed, owing probably to the slight heating of the aldehyde during chlorination, and also perhaps to the use of excess of Cl, giving pungent acetyl chloride according to the equation $C_2H_4O + Cl_2 = C_2H_3O.Cl + HCl$. At the second attempt a moderate quantity of butyl-chloral was obtained, a sample of the hydrate from which is on the table.

In ascertaining the boiling point of butyl-chloral hydrate, it was noticed that ebullition commenced at 100° C., and continued up to 165° C. This suggested that the compound was dissociated by heat, and this was proved to be the case, because after maintaining another sample at about 110° C. for a short time, an oily liquid remained on cooling, which was proved to be anhydrous butyl-chloral, and which re-deposited crystals of the hydrate on the addition of water. It has long been known that ordinary chloral hydrate is dissociated by heat, but I can find no mention of this in connection with butyl-chloral hydrate, although the fact is much more evident, because with the latter the water is given off much below the boiling point of the anhydrous butyl-chloral, while in the case of chloral hydrate, both the hydrate and the anhydrous chloral boil about the same temperature as the water, and the dissociation can only be proved to have taken place by the determination of the density of its vapour.

This dissociation of butyl-chloral hydrate also greatly interferes with the determination of the fusing and solidifying points, and seems to take place to a greater or less extent below 100° C., depending probably upon the time the body is kept in the fused state. These points were first determined by fusing the butyl-chloral hydrate in a capsule over a water-bath, and sucking into thin tubes, which were then sealed at both ends, and placed in a water-bath after the butyl-chloral hydrate had solidified. Both the fusing and solidifying points obtained by this method were much too low, averaging 72° C. and 62° C. respectively, and in some cases the contents of the tubes did not solidify at all, and the liquid in the tubes was found to be anhydrous butyl-chloral. The method of placing a few crystals on the surface of mercury in a beaker placed in a water-bath was next tried, but was not found satisfactory.

The final method adopted, the results of which are arranged in the table, was to introduce some of the crystals into a tube with a bulb blown at one end, and to place the bulb and part of the stem in a water-bath. This I believe gives fairly accurate results for the fusing points, but dissociation seems to take place to a greater or less extent in the fused liquid, because sample No. 4, the solidifying point of which is marked 64° C., did not solidify at all until a drop of water at the same temperature was introduced into the bulb.

These experiments were first undertaken because several samples of butyl-chloral hydrate gave a distinct smell of chloroform when heated with alkalies, apparently indicating the presence of chloral hydrate.

$$CCl_3.CH{<}^{OH}_{OH} + KOH = CHCl_3 + HCOOK + H_2O.$$

The presence of chloral hydrate would be accounted for by the action of Cl upon some of the aldehyde without condensation, thus:—

$$CH_3.COH + 3\,Cl_2 = CCl_3.COH + 3\,HCl.$$

But the allylene bichloride produced by the action of alkalies on perfectly pure well washed butyl-chloral hydrate has an odour almost, if not quite, undistinguishable from that of chloroform, so that the production of a chloroform odour is not sufficient evidence of the presence of chloral hydrate. Only one of the samples examined gave the unmistakable odour of phenyl carbamine when the alkaline solution was heated with aniline, showing that although all the samples yielded an odour resembling chloroform when treated with alkali, in one only was chloral hydrate present.

$$CHCl_3 + C_6H_5NH_2\ (\text{aniline}) = C_6H_5NC + 3\,HCl.$$

Chloral hydrate reduces Fehling's solution, but if the quantity of chloral hydrate is very small, no immediate reduction takes place in the presence of butyl-chloral hydrate, as was proved by some comparative experiments performed. This is the reason that none of the samples gave any immediate reduction with Fehling's, the quantity of chloral hydrate present in No. 4 being too small to bring it about.

This reduction of Fehling's solution by chloral hydrate is no doubt due to the formate formed by the alkali, thus — $2\,CuO + HCOOH = Cu_2O + H_2O + CO_2$, and the non-reduction of Fehling's by a pure sample of butyl-chlorate hydrate seemed to indicate that no formate was produced by the action of alkali upon the latter, and that the equation previously given for the reaction is not correct. Richter states that the products of the reaction are acetate and chloride of potassium and allylene dichloride, but does not give an equation for the reaction. Although the alkaline solution of butyl-chloral hydrate did not reduce Fehling's, it powerfully reduced $HgCl_2$ to HgCl, and also $AgNO_3$ to the metallic state when supersaturated with acetic acid, indicating the presence of some powerful reducing agent, most probably a formate. Taking for granted that a formate is produced, I am quite unable to explain how Fehling's solution was not reduced, but perhaps some one present will be able to offer some suggestion.

A discussion ensued, in which the Chairman, Secretary, Messrs. Eastes and Woolley took part.

Mr. Tingle's report on analytical chemistry was postponed to the following meeting.

Some miscellaneous subjects were discussed, the Chairman mentioning that in an estimation of copper by precipitation as metal by means of zinc, he had on one occasion used large excess of HCl and found that the supernatant liquor, although quite colourless when poured off, gradually became green on exposure, showing that some of the copper had remained as cuprous chloride; however, on repeating the experiment several times he had failed to obtain a similar result. The meeting then adjourned.

Chemists and Druggists' Trade Association of Great Britain.

At a meeting of the Executive Committee of this Association, held on the 25th inst., the following resolution was passed and a preliminary advertisement of the special general meeting appears in our advertising columns.

Resolved:—"That in consequence of the inadequate response to the circular of the Executive Committee of May 6, a special general meeting of the members of the Association be convened for Friday, June 17 next, to consider the expediency of winding up the Association."

It now remains for those members of the trade who have not responded to the circular, dated May 6, of the Association to prevent its final collapse by an immediate reply to that appeal.

Obituary.

JEAN BAPTISTE JOSEPH DIEUDONNÉ BOUSSINGAULT.

The death of Jean Baptiste Boussingault in Paris, on the 12th inst., has removed a man who has influenced chemical science far beyond the limits of his own country. Born in Paris in 1802, he commenced his public scientific career in 1821, while still a pupil in the School of Mines at St. Etienne, by the publication of a treatise upon the compounds of silicium with platinum. Shortly afterwards he went, in the employment of an English mining company, to Columbia, and was appointed professor in the School of Mines at Bogota. He was not allowed, however, to pursue his duties undisturbed, but became involved in the insurrection directed by Bolivar, to whose staff he was attached. After the return of peace, he not only resumed his ordinary work as professor, but he so threw himself into the investigation of the natural wonders of the new country as to gain a reputation as an explorer, second only to Humboldt. Returning to France in 1833 he was appointed Professor of Chemistry at Lyons, and from that time devoted himself to the study of the chemical problems of the soil and the atmosphere, with which his name will always be especially associated. Besides a number of separate treatises he also became the author of several standard works upon agricultural chemistry. In 1839 Boussingault was elected a member of the Academy of Siences, and at the time of his death was the senior member next to the centenarian Chevreul. In the troublous times of 1848, Boussingault gravitated towards politics and was elected a member of the Constituent Assembly, but the events of the 2nd of December sent him back to his studies and the duties of his chair at the Conservatoire des Arts et Métiers.

FRIEDRICH WOLFRUM.

The name of Friedrich Wolfrum, *apotheker*, of Augsberg, who died suddenly on the 15th of May, in the seventieth year of his age, is probably not familiar to many in this country, but for many years it has been an honoured one among German pharmacists. Before the Franco-German war which welded the Germans into one united nation, Herr Wolfrum for many years filled the office of President of the South German Pharmaceutical Association. After the formation of the German Pharmaceutical Association, Herr Wolfrum became its President in 1875 and continued in the office until 1879, when, although re-elected, he declined to serve and was succeeded by the present holder of the office, Dr. Brunnengräber. In 1878, during the meeting of the Association at Cologne, it fell to the lot of Herr Wolfrum to receive the German empress and act as her conductor during her visit to the pharmaceutical exhibition.

Notice has also been received of the death of the following:—

On the 14th of April, Mr. William Sanders, Chemist and Druggist, Darlington Street, Wolverhampton. Aged 75 years.

On the 30th of April, Mr. James John Harding, Pharmaceutical Chemist, late of Sudbury. Aged 61 years. Mr. Harding had been a Member of the Pharmaceutical Society since 1852.

On the 4th of May, Mr. John Woodward Lomas, Chemist and Druggist, High Street, Burton-on-Trent. Aged 72 years.

On the 6th of May, Mr. Samuel James Potts, Chemist and Druggist, Mansfield, Notts. Aged 52 years.

On the 8th of May, Mr. Robert Owen Steed, Chemist and Druggist, Wandsworth Road, S.W. Aged 42 years. Mr. Steed was an Associate in Business of the Pharmaceutical Society.

On the 12th of May, Mr. John Thomas Carpenter, Chemist and Druggist, Brigstocke Road, Bristol. Aged 48 years.

On the 15th of May, Mr. Sampson Dunn, Chemist and Druggist, Fore Street, St. Austell. Aged 53 years. Mr. Dunn had been a Member of the Pharmaceutical Society since 1869.

On the 15th of May, Mr. Henry Elliott, Chemist and Druggist, Kimberley, Notts. Aged 32 years. Mr. Elliott was an Associate in Business of the Pharmaceutical Society.

On the 19th of May, Mr. Thomas Noxon Bishop, Chemist and Druggist, Cradley Heath, Staffordshire. Aged 79 years.

ANSWERS TO CORRESPONDENTS.

Errata.—On p. 943, col. ii., in the paragraph relating to the emulsifying properties of Irish moss mucilage, lines 36 and 38, for "water ʒij" read "water ʒij."

F. C. Fawn is thanked for calling attention to the mistake.

A Minor Man is requested to forward his name and address.

C. H. Snell.—Your letter has been handed to the Secretary, who will probably communicate with you on the subject.

W. F. Quick.—(1) *Ajuga reptans.* (2) *Smyrnium olusatrum.* (3) *Lychnis diurna.* (4) *Chærophyllum sylvestre.* (5) *Brassica campestris.*

T. F. Walker.—*Valerianella olitoria*, Moench.

E. E. Rowland.—See a paper on "Aquaria for the Preservation of Leeches," in the first series of the *Pharmaceutical Journal*, vol. XV., p. 453.

J. Babb.—We have not found the colour of the mixture, when made according to the prescription with peppermint water, disappear in half-an-hour, nor in forty-eight hours, but the mixture very slowly deposits a yellow flocculent matter from decomposition of the cochineal colouring of the tinct. card. co. in the tinct. chlorof. co. When distilled water was used the colour became paler with a flocculent precipitate as above. It is impossible without examination to explain why there should have been a difference in the behaviour of the two samples of bromide of ammonium; but the bromide is no doubt an important factor, and plays an important part in the changes which take place. Probably the aq. destill. was not a good sample, and one or other of the samples of bromide could hardly have been B.P. Your letter of the 25th has been handed to the Secretary.

E. S.—If practicable the impossibility of dispensing the prescription exactly as written should be brought under the notice of the prescriber. But the difficulty may be less satisfactorily met by dissolving the pot. cit. ʒij in five ounces of water with ʒiv of fresh mucilage of gum arabic; adding the tinct. quin. ammon. ʒij and shaking the bottle. The quinine that would otherwise separate out is diffused, and will remain so a reasonable time.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Boa, Hill, Thompson, Wallbridge, Humphrey, Hodges, Pervell, Rowland, K. K.

THE DISTRIBUTION OF SAFROL.

BY PROFESSOR FLÜCKIGER.

The prevailing constituent of the essential oil of sassafras root is *Safrol*, as will be seen in the text-books; for instance, in 'Pharmacographia,' second edition p. 536. In the crude oil, safrol is held in solution by the hydrocarbon safrene, $C_{10}H_{16}$, and may be separated either by fractional distillation or by cooling the oil. Safrol liquefies at 12° (53°·6 F.) and yields very large and fine prisms, which I caused to be exactly investigated crystallographically by Professor Arzcuni, as mentioned in 'Pharmacographia.' The large crystals of safrol are very little softer than those of gypsum. Although they cannot be kept at a temperature exceeding their melting point, they were, curiously enough, known in England a century and a half ago.

As to the constitution of safrol it has been shown by Eykman* that by means of permanganate of potassium it yields piperonylic acid—

$$C_6H_3\left(\begin{matrix}O\\O\end{matrix}>CH_2\right)COOH,$$

safrol, therefore, may be represented by the formula—

$$C_6H_3<\begin{matrix}O\\O\end{matrix}>CH_2:$$
$$\quad\quad\quad

star-anise of Japan ; this tree belongs to the order of Magnoliaceæ. There the safrol is accompanied by eugenol, the formula of which

$$C_6H_3(OCH_3)(OH)(C_3H_5)$$

at once reveals its relation to safrol as also to anethol—

$$C_6H_4(OCH_3)(CH=CH-CH_3)$$

It would appear, therefore, that at least eugenol $C_{10}H_{12}O_2$ and safrol $C_{10}H_{10}O_2$ may be in some generic relation. The former has been met with by Stenhouse in the leaves of the cinnamon tree.* And, thirdly, anethol $C_{10}H_{12}O$, the chief constituent of the oil of true star-anise, *Illicium anisatum*, is there replacing safrol as occurring in the other variety.

It would be interesting to be able to convert one into the other of those three highly aromatic substances ; their empirical formulæ: $C_{10}H_{12}O$, $C_{10}H_{10}O_2$, $C_{10}H_{12}O_2$ would apparently indicate the probability of such transformations, but not their structure.

RECENT DONATIONS TO THE MUSEUM.

BY E. M. HOLMES, F.L.S.,

Curator of the Museum of the Pharmaceutical Society.

(*Continued from page* 903.)

American Sponges.

Cuban Sponges.—For specimens of this and of the Florida sponge the Museum is indebted to the kindness of Messrs. Cresswell Brothers, of 2, Red Lion Square, to whose courtesy is due also such commercial information concerning these sponges as I am able to give here.

According to Mr. Ernest Cresswell the Bahama sponges were first introduced into this country about fifty years ago, but were not then well received. A market for them, however, soon sprang up in France, and it was only when the Franco-German War broke out that the depression in the French trade led to the transference of the bulk of the Bahama sponge trade to Great Britain. During the last two years sponges have been imported also from Cuba to this country. These much resemble the Bahama varieties, but are relatively of finer mesh and stronger and more durable. The variety which is most esteemed is known as Cuban "*fine dure*" or "solids." It approaches the glove sponges in the density of texture and the reef sponge in the regular distribution of the few oscules on the upper surface. From both of these, however, it differs in the more flattened summit, the sponge having in consequence a more rounded outline, and is thus much more convenient to handle than the cup sponges. The specimen presented by Messrs. Cresswell Brothers is also of larger size than the Museum specimens of the Bahama glove sponges. It may, in fact, be regarded as the American equivalent of the Turkey solid sponge of the Mediterranean, of which it is only about one-quarter the price, and therefore cheaper than the Zimocca. Their specimen of the sheep's wool is equal in quality to the softest of the Bahama varieties, but seems rather tougher in fibre. The Cuban grass sponge, although not quite so soft as the Bahama specimens, seems to be less easily torn. The specimen of Cuban yellow is not easily distinguishable from the Bahama kind.

Florida Sponge.—This is almost the only cup-shaped sponge found in American waters. In structure it resembles the Turkey cup sponge, but is of coarser texture. It is often found in cups of tolerably large size, and is then cut up into flat pieces for the sake of convenience in toilet use. The Florida sponges have been imported into this country for about four or five years. They are chiefly collected in the neighbourhood of Key West. The specimen of Florida cup sponge presented by Messrs. Cresswell Brothers is a remarkably fine one, being nine inches high by twelve in diameter at the top of the cup. In hardness it approaches the Zimocca sponge. In the grouping of the oscules in the centre of the cup and in the shape it resembles the true Turkey cup sponge, but externally it presents a likeness to the grass sponge in the thin projecting tufts of fibre.

Of the above sponges, the finest varieties of the Bahama sheeps' wool and velvet and the Cuban "fine dure" are the best for toilet use, and the glove sponge for surgical purposes ; the second qualities of sheeps' wool and velvet are most suitable for household and cleaning purposes and carriage use, and the yellow and the hardhead for painters' use and for washing walls, etc.

According to Sir Augustus Adderley,* the sponge fishery in the Bahamas gives employment to some thousands of persons and some hundreds of vessels. The vessels employed are small, having crews of only six to twelve men. Provisions for about six weeks are taken on board, and the vessels then coast along the banks and reefs where the water is shallow and generally so clear that the sponges are readily seen, and are brought to the surface by a sort of hooked fork, consisting of two shepherd's-crook hooks on a long pole. The day's haul is spread out on the deck so as to kill the gelatinous slimy mass of animal matter, which, in dying, emits a most unpleasant smell. To free the decaying matter from the fibrous horny skeleton, the sponges are taken on shore where the water is rough, and placed in a pen or crawl made of stakes, so that the softer portion may be washed away by the action of the waves and tide, this process being assisted by pounding the sponge with a piece of wood. When the sponges are thus freed from gelatinous matter, which usually takes about a week, they are strung on strips of palmetto, three or four to a strip, which is called a bead. They are then taken to Nassau to be sold in the sponge market, under certain conditions and regulations, no one being allowed to sell his cargo except through the sponge exchange. On the conclusion of the sale the sponges are taking to the packing yard, where they are sorted, clipped, soaked in tubs of lime water, and spread out to dry in the sun. They are then pressed by machinery into bales containing 100 lbs., and in this state are shipped to England or the United States.

According to Mr. Ernest Cresswell, the West India sponges are packed tightly in bales by means of lever pressure, the same means being used to give the bales a square or rectangular form, each bale containing usually about 70 lbs. Lately, however, small bales weighing about 20 lbs. have been introduced to suit the convenience of buyers who prefer to receive the sponges unbleached as imported. Turkey sponges are imported in cylindrical bales,

* 'Pharmacographia,' 527.

* 'Fisheries Exhibition Literature,' vol. v., pt. ii., p. 369.

which are formed by putting the sponges in a sack held by two men, while a third tramples them down, further pressure being obtained by placing a heavy stone on the top of the bale when filled. The bales of Turkey sponge usually contain 50 or 100 lbs. The value of the export of sponges in 1883 from the Bahamas was estimated at £60,000, the largest quantity being shipped to the United States, although a considerable export takes place to Great Britain. A gradual increase in the trade has taken place since 1874, when the exports amounted only to £16,000.

A few notes on the natural history and chemistry of sponge may perhaps form a useful appendix to the above remarks.

Commercial sponges are confined, so far as at present known, to the Mediteranean and Red seas, and to the waters of the Caribbæan islands, Bahaman archipelago and the South-west and West coasts of Florida. Australia, however, affords a few forms,* and others have been stated to be found on the Atlantic Coast of Brazil. Those of Bermuda, according to Mr. Hyatt, appear to be much coarser than those of Key West, and are just about intermediate between these and those of Australia.

The species show an extreme susceptibility to vary under any change in external conditions, the greatest number of forms and species being produced in tropical or subtropical seas, and occurring most abundantly in archipelagos, or off seas bordered by a number of islands or long reefs, where the floating food of the sponges becomes concentrated in channels between the islands; a continuous current of aerated water and a plentiful supply of food being essential to sponge growth. Temperature also affects their geographical distribution, which appears to be limited by a minimum temperature of 55° F.; sponges flourishing best where the average aerial temperature in winter is between 63° and 70° F. The nature of the bottom on which they are found also modifies their growth and properties. Mr. Saville Kent points out that no sponges of the finest quality have yet been found in seas productive of reef corals. Sandy or clayey bottoms and river sediment are also prejudicial, or any situation wherever there is much gritty matter suspended in the water; the clearer the water the finer the fibre. The depth at which the sponges grow affects greatly the fineness of the threads and the strength and elasticity of the sponge. The best Turkey cup sponges are fished at a depth of not less than 8 to 30 fathoms, some being obtained from a depth of even 40 fathoms. In the American waters sponges are rarely fished below a depth of 5 fathoms. In Mr. Saville Kent's opinion it is possible that sponges equal to the finest Turkey varieties may yet be found in greater depths in the Bahamas.

The variation in the form of the sponge depends in some degree on the position and ramification of the oscules and upon the character of the base to which they are attached, and the force of the current to which they are exposed, and, possibly, also on the depth at which they grow. The cup-shaped sponges are found at the greatest depth. When growing on a sandy or muddy bottom they sometimes become loosened, and are known as "rollers," and are recognized commercially by their rounded bases and the dark tint of the lower half of the sponge.

The reproduction of the sponge takes place from the egg-like bodies which are found about midsummer in the interior of sponges, either aggregated in a sac or scattered through the tissue. Each egg contains, enclosed in a thin membrane, a substance corresponding to the yolk and another like the white of an ordinary egg. The egg increases in size by segmentation of its contents, becomes oval in shape, forms a covering of delicate cilia, and then swims about, ultimately settling down, and developing cells at the lower end, which become fixed to the rock, when the upper end develops in the form of a nipple, and the cilia fall off. The lower end gradually spreads over the rock, the nipple becomes depressed and ultimately perforated; this perforation forming the first oscule or excurrent aperture, smaller incurrent openings or pores being formed around it. The development of amœbiform particles, and the deposit of fibre leads to the multiplication of oscules and pores, or, in other words, to a colony of individuals resembling the first, but connected intimately with each other. The fibres which are formed around the oscule in a more or less vertical direction are called the primary fibres, and those which connect the fibres together, and which appear to originate from the primary fibres by a process of budding, are known as the secondary fibres.

In the living sponge the primary fibres are found to shade off like the mouth of a trumpet into the gelatinous membrane which forms the outer surface of the sponge. The fibre itself consists of concentric layers made up of fine fibrillæ. These may often be observed at the broken end of the fibres under the microscope. In some localities the dermal or exterior membrane of the sponge is loaded with foreign matter, which by the growth of the sponge becomes drawn into the trumpet-shaped end of the fibres, and ultimately imbedded in their substance.* Much of the brittleness and coarseness of fibre of inferior sponges is due to this cause, and in some degree the dark colour also, although this is also due to too cold a temperature and an unfavourable situation, as in shallow water. The reason that the secondary fibres are not usually gritty is evident from their not coming in direct contact with the external membrane, so that foreign matter cannot readily enter their structure.

The fibre or keratose of which the sponge skeleton is formed contains as a principal ingredient a substance named spongin, resembling the fibroin of silk in its composition, but differing from it in not yielding tyrosine when heated with sulphuric acid, but only glucosine and leucine.† It is insoluble in alcohol, ether and ammonia, but is dissolved slowly by strong alkalies, and is reprecipitated by dilute acids, but only concentrated acids attack it.

The method of bleaching sponges has already been described (*Pharm. Journ.*, [3], xiv., p. 88, and xv., p. 85). The strength of sponges does not appear to be affected much by the process, the brittleness of sponges depending much more upon the structure of the original sponge.

* It has been suggested that the coast of Queensland, inside the great boundary reef, must be exceedingly favourable for the growth of sponges.

* Hyatt, 'Revision of the North American Poriferæ,' part ii., p. 482.

† Stadeler, *Am. Chem. Pharm.*, cxi., 12.

The Pharmaceutical Journal.

SATURDAY, JUNE 4, 1887.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

SIR DOUGLAS MACLAGAN ON PHARMACEUTICAL EDUCATION.

SINCE calling attention to the reports of the Government Visitor of Examinations in London, which were laid before the Council at its meeting in April last, a further report on the pharmaceutical examinations in Edinburgh has been forwarded from the Privy Council, and will be found at p. 1002 of the present number. It relates to a period extending from the early part of the year 1883 down to January, 1886, and in regard to the general character of the examinations, Sir DOUGLAS MACLAGAN again expresses an opinion in accordance with that so often expressed by Dr. GREENHOW as to these examinations constituting a satisfactory test of qualification to undertake the duties of chemists and druggists. On this point there has always been a perfect agreement between the officers who represent the Privy Council at the examinations, and so far as the welfare of the public is concerned their repeated testimony that those who pass the examinations possess the requisite practical skill and knowledge of their business may be taken as conclusive evidence that in this respect the provisions of the Pharmacy Acts have been efficiently and beneficially carried out. We have only recently had occasion, in speaking of Dr. GREENHOW'S reports for the last two years, to point out that as regards the candidates who present themselves for examination, he is of opinion that no undue stringency is exercised, but that the action of the examiners is uniformly characterized by fairness and impartiality. The same view is expressed also by Sir DOUGLAS MACLAGAN in the report now presented, inasmuch as he finds the decisions of the examiners to be justly apportioned to the quality of the answers given, while the interests of the candidates meet with due regard. These concurrent expressions of opinion are of especial importance at the present time, when there is a tendency in some quarters to suggest that candidates are sometimes harshly and even unfairly dealt with, and though the opinions of the Government Visitors of the Examinations do not in any degree differ from those hitherto expressed by them in this respect, it appears desirable to point to them as thoroughly disposing of the complaints that have been put forward on grounds which are obviously inadequate. The accounts given by unsuccessful candidates of the circumstances which they imagine to have been the cause of their rejection cannot safely be relied upon as furnishing a correct representation of the case, and in the face of the contradictory evidence, afforded by the reports of impartial authorities, acting as the Government Visitors of Examinations, it may, we think, be regarded as certain that such accounts are likely to be exaggerated and incorrect.

In the report now presented to the Privy Council by Sir DOUGLAS MACLAGAN, attention is especially directed to the results of the examinations in Edinburgh, as shown by the large proportion of failures, both in the Minor and the Major examinations. Upon the basis of the returns for the three years referred to, there is again occasion for stating, as had previously been stated, that a large number of candidates present themselves ill-prepared for satisfying the just requirements of the examiners. Not only is this still the case, but on comparing the returns with those relating to the previous three years, it appears that the number of such ill-prepared candidates is actually increasing so much as to indicate on the part of candidates, and of the persons who are responsible for their training, a deplorable ignorance of what is to be expected from those who desire to obtain a pharmaceutical qualification. Sir DOUGLAS infers from the facts which he has observed in visiting the examinations, that as regards pharmaceutical education very serious deficiencies exist which leave candidates without any adequate appreciation of the means of qualifying themselves. In connection with this point we may refer to a statement in one of his former reports bearing upon the subject of apprenticeship. On that occasion he gave it as his opinion that to a large extent members of the pharmaceutical profession do not do their duty properly to their apprentices. This is a grave charge, but it was supported by reference to the failures in the subjects of dispensing and pharmacy, and it was urged that if the apprentice is to learn only the routine duties which fall on anyone standing behind a counter, the three years' term of apprenticeship might be abolished with advantage. As is well known, Dr. GREENHOW strongly advocates adherence to the system of apprenticeship as a means of pharmaceutical education, but he does so on the assumption that it affords an opportunity of acquiring practical acquaintance with drugs and manipulative skill in compounding them. It is from this view of the advantages of apprenticeship that he has always expressed regret that a compulsory apprenticeship was not made necessary by the Pharmacy Act. If, however, young men during their apprenticeship do not learn pharmacy and dispensing, we can well imagine that he would agree with his colleague, Sir DOUGLAS, in asking what good purpose is served by apprenticeship.

This subject of apprenticeship appears to be one

that demands careful attention on the part of all connected with pharmacy. There can be no doubt that the arguments put forward by Dr. GREENHOW in favour of the system have great force, and that, provided proper facilities are afforded for gaining the knowledge and practical skill which long and constant practice is best able to confer, there can be no better form of pharmaceutical education. A correspondent in this week's Journal well insists upon the obligation of those who take apprentices to instruct them fully in their art, and he contends that the deficiences which are expressed by failures to pass the examination are less due to unwillingness on the part of apprentices to learn and to be taught than to the neglect of their masters to give them the training they require. Much has been said at various times about the difficulty of obtaining apprentices, and the probability that this was being enhanced by the supposed increase in the stringency of the examinations. We have never seen any reason for regarding these complaints as well founded, and Sir DOUGLAS MACLAGAN'S report will, we think, show very clearly that the cause of any difficulty that may exist in obtaining apprentices may more reasonably be sought for in other directions. We trust that the discussion of this important subject, which has been started by Mr. HUMPHREY, will be taken up by others, and that it may have the effect of establishing a better state of things under which the period of apprenticeship may justly be looked upon as constituting an indispensable and most valuable part of the pharmaceutical curriculum.

The retirement of Mr. Williams from the seat on the Council which he has now filled for some eighteen years will doubtless be learnt with deep regret by everyone who is aware of the laborious zeal with which he has served the Society in the various capacities of member, member of Council, Treasurer, and President, and by which he has acquired a claim to the gratitude of all connected with the Society and with the trade at large. That feeling of regret will certainly be enhanced by the knowledge that the state of his health renders it impossible for him to continue such active participation in the work of the Council as he deems to be now necessary on the part of a member resident in London. We feel sure that the tribute of esteem expressed for him by his late colleagues will be re-echoed throughout the country, and that the good wishes expressed towards him will be as widely endorsed.

* * *

The retirement of Mr. Borland will also be a cause for regret, not only in Scotland, but also on this side of the Tweed, where his able services and amiability were equally well appreciated. Fortunately, in his case there is no more serious reason for retirement from official duties than want of time; but we trust that both Mr. Williams and he may long be enabled to watch with satisfaction the progress of the work to the promotion of which they have both contributed so much.

It will be seen from the report of the discussion at the recent meeting of the Council, that the list of subscriptions and donations in response to the special decennial appeal for the Benevolent Fund will be kept open for two months longer. Remittances should be sent to the Secretary, Mr. Richard Bremridge, and they will be acknowledged in a supplementary list that will be published in this Journal. The kindly award of a "Jubilee" gift of five pounds to each of the annuitants and to the unsuccessful candidates at the last election will doubtless commend itself to the friends of the Fund, and it may be hoped that such approval will result in some special contributions towards meeting the expenditure of £240 involved in carrying out the resolution of the Council. In fact there would be no difficulty in raising the entire sum were the example of Mr. Allen in canvassing the chemists and druggists of his immediate neighbourhood followed in other localities. We feel sure that, in a very large number of instances, it needs only some personal effort on the part of local secretaries or others in order to obtain a very material addition to the Fund.

* * *

We are able to state that the sum of nineteen guineas has been received as a legacy to the Benevolent Fund, under the terms of the will of the late Mrs. Eleanor Hallows, widow of Mr. William Ayscough Hallows.

* * *

The Pharmacopœia Committee appointed by the General Medical Council at its recent session consists of Dr. Quain (Chairman), Sir Dyce Duckworth, Dr. Aquilla Smith, Sir Walter Foster, Mr. Brudenell Carter, Mr. Collins and Mr. Macnamara.

* * *

Some of our readers whose interest extends to the more curious constituents of the materia medica may be glad to have their attention directed to an article in the new number of the *Contemporary Review* on "Strange Medicines," by Miss C. F. Gordon Cumming. The article has its ostensible origin in a *rencontre* with some of the crude remedies of Japan that are fast being displaced under the influence of Western scientific methods, but the authoress has extended the range of her observations sufficiently to demonstrate that any assumed superiority of European medical practitioners in respect to the remedies they now employ depends rather upon an earlier emancipation from the incubus of coarse and disgusting customs than upon any great dissimilarity in experience.

* * *

The first annual dinner in connection with the Brighton Association of Pharmacy is to take place on Thursday next, the 9th inst., in Booth's Restaurant, East Street, at 8 p.m., when Mr. W. D. Savage, J.P., will preside. We are requested to say that tickets may be obtained from the Honorary Secretary, Mr. Marshall Leigh.

* * *

A meeting of the London Section of the Society of Chemical Industry will be held on Monday, the 6th inst., when papers will be read on "The Alkaloids—the Present State of Knowledge concerning them, and the Method employed in their Investigation," by Dr. H. E. Armstrong; and "Notes of a Recent Visit to some of the Petroleum-producing Territories of the United States and Canada," by Mr. Boverton Redwood.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, June 1, 1887.

Present—Messrs. Allen, Atkins, Baildon, Bottle, Carteighe, Cross, Evans, Gostling, Greenish, Hampson, Hills, Newsholme, Radley, Richardson, Robbins, Savage, Schacht, Southall, Symes and Woolley.

Mr. MICHAEL CARTEIGHE took the chair.

The minutes of the previous monthly meeting, and of the special meeting on May 18, were read and confirmed.

ELECTION OF OFFICERS.

Mr. BAILDON, as a comparatively young member, asked whether there was any reason why names should not be proposed. Of course, while every member of the Council was eligible for the offices of President, Vice-President, etc., there were practically only a limited number who would be able to perform the more important duties, and he would suggest that those who were able and willing to perform them should be announced, so that members might not throw away their votes.

Mr. CARTEIGHE said the plan hitherto followed of voting by ballot was that which generally prevailed under similar circumstances. No nomination was required, each member being, in fact, nominated, and it would be extremely invidious to mention anyone specially. It was quite true, as had been said, that some gentlemen were not in a position to discharge the duties of President; but he could conceive of the Council electing a gentleman as a compliment, although it might not be sure of his being able to serve.

Mr. EVANS asked how long the late President had held office, and whether it was the custom to re-elect, or to make a fresh choice, because, as a new member, he should wish to act in accordance with the usages of the Council.

Mr. ATKINS, as a country member, wished to point out that the choice of President was practically restricted to the London members, no one else being able to fulfil the constant and arduous duties which devolve upon the head of the Society.

Mr. CROSS thought it very probable that if a nomination were made, the choice would be unanimous, and that such a method would be more in accordance with public business generally. He cordially seconded Mr. Atkins's remarks, for no country member could perform the onerous functions which devolved on the President.

Mr. WOOLLEY entirely disagreed with the remarks of Mr. Baildon and Mr. Cross, as to the present mode of election not being in conformity with that generally followed in public bodies. All those with which he was connected elected their officers in the same way. With reference to Mr. Evans's question, if he would refer to the Calendar he would find that Mr. Michael Carteighe was elected President in 1882 and had held that office ever since.

ELECTION OF PRESIDENT.

The ballot being then taken,

MR. MICHAEL CARTEIGHE

was re-elected President.

The PRESIDENT thanked the members most cordially for this renewed mark of their confidence. If he had consulted his own feelings, he should have been glad to see one of his colleagues buckle on the armour and set himself to the work, but he was bound to accept the vote as a command to do his best for the interests of the Society. In conformity with that command he accepted the position with every mark of gratitude, and with the assurance that he could rely on the friendly co-operation of all his colleagues on the Council.

ELECTION OF VICE-PRESIDENT.

On a ballot being taken—

MR. THOMAS PRESTON GOSTLING

was re-elected Vice-President.

The VICE-PRESIDENT thanked the Council for the honour conferred upon him. The work he had had to do during the past year had been exceedingly interesting, and he had had the advantage of working with a President who was exceedingly active, diligent and competent. For some time he had been unable to attend regularly, owing to ill-health, but he received every consideration from the President and Secretary, and he hoped during the coming year he should be able to give all the time and attention which were required.

ELECTION OF TREASURER.

A ballot having been taken—

MR. JOHN ROBBINS

was re-elected Treasurer for the ensuing year.

Mr. ROBBINS thanked the Council for the honour it had again conferred upon him. He feared the Treasurer in future would not be able to show such good balances as in the past, but he was satisfied that the outlay which was being made in the direction of a building for a research laboratory and other purposes would do more to increase the influence and usefulness or the Society than if the money were left to accumulate.

HONORARY MEMBERS.

Letters of acknowledgment for election as Honorary Members had been received from Sir Henry Acland, Professor Fraser, Professor Ladenburg, Professor de Bary, Dr. Brunnengräber, Professor Pasteur, Dr. Méhu, Dr. Lauder Brunton, Mr. von Waldheim, Mr. Thiselton Dyer and Professor Maisch.

A resolution was passed authorizing the seal of the Society to be affixed to the certificates of membership to be forwarded to the Honorary Members.

VOTING PAPERS.

Mr. RICHARDSON drew attention to the fact that seventy-four voting papers had been rejected through having been received too late, and suggested that the notification should be made more explicit that they must be received on the Monday before the Annual Meeting in order to comply with the provision of the Bye-law that they must be received "one clear day" before the election. Many voters thought that if the votes were delivered on the Tuesday morning it was sufficient. Pharmaceutical chemists could not be considered illiterate voters, and it was rather hard that seventy-four gentlemen should be disfranchised through a misunderstanding.

The PRESIDENT said he thought the voting papers were in the form prescribed by the Bye-law, which could not well be altered.

Mr. SYMES remarked that this matter had been discussed on two or three previous occasions, and he thought all were agreed that an alteration in the rule was desirable if it could be accomplished, and that voting papers might be received up to the day of election, but it could not be altered at present. At the same time if there were any means of making the present regulations more clear they should be adopted.

Mr. ALLEN, as a scrutineer on more than one occasion, said this question had several times arisen, and it had over and over again been pointed out that under the present Act of Parliament there was no option, though the "one clear day" provision, requiring voting papers to be received on Monday evening, sometimes worked hardship, owing to the Sunday postal regulations.

The PRESIDENT, having sent for a copy of the voting paper and the envelope sent with it, said he thought everything had been done to make the regulation clear.

Mr. HAMPSON said he supposed it would not be

possible to introduce a clause into the Bill now before Parliament to allow of votes being received up to the time of counting.

Mr. RICHARDSON suggested that the same words should be put on the voting papers as appeared on the envelopes, stating the day by which they must reach the office.

The PRESIDENT remarked that the number of voting papers rejected was not very large, considering that more than half the members did not vote at all. The object of the provision in the Bye-law was, no doubt, to prevent the possibility of a member voting twice. If all the voting were by post it would be quite simple; but as members had the option of attending and voting personally, it was thought desirable, at the time the Bye-laws were framed, to guard against the possibility of two votes being given, one personally and one by post.

The SECRETARY said votes were often received after the election was over.

STANDING ORDERS.

The Standing Orders of the Council were re-enacted for the ensuing year.

APPOINTMENT OF SECRETARY AND REGISTRAR.

Mr. RICHARD BREMRIDGE was re-appointed Secretary and Registrar for the ensuing year.

APPOINTMENT OF EDITOR AND SUB-EDITOR OF THE JOURNAL.

Dr. B. H. PAUL was re-appointed Editor and Mr. F. PASSMORE Sub-Editor of the Journal for the ensuing year.

APPOINTMENT OF CURATOR.

Mr. HOLMES was re-appointed Curator of the Society's Museum for the ensuing year.

APPOINTMENT OF ASSISTANT SECRETARY.

Mr. J. R. HILL was re-appointed an Assistant Secretary of the Society.

LOCAL SECRETARIES.

It was resolved that the nominations for Local Secretaries be referred to the Library, Museum, Laboratory and House Committee.

The Secretary reported that last year there were 321 towns entitled to Local Secretaries. Five towns had been added to the list this year and two had been removed. There were now 324 towns entitled to have a Local Secretary, from 201 of which votes had been received, leaving 123 towns which had sent no nomination.

Mr. RICHARDSON asked if there had not been some discussion about the mode of electing the Local Secretaries.

The PRESIDENT said a resolution had been passed last year referring the question to the Committee, and it was very carefully considered at three meetings, but in the result it was decided that no change could be made with advantage.

ELECTIONS.

MEMBERS.

Pharmaceutical Chemists.

The following, having passed the Major examination and tendered their subscriptions for the current year, were elected "Members" of the Society:—

Barrett, Arthur Albert .....Birmingham.
Blackburn, Albert Edwd. Hy...Eccles.

ASSOCIATES IN BUSINESS.

The following, having passed the Minor examination, being in business on their own account, and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society:—

Ellithorne, Arthur Henry .....Liverpool.
Filmer, John Honeywood .....Plymouth.
Hay, James .....Alford.
Jamieson, Simpson .....Cupar-Fife.
Jones, Ebenezer Owen .....Plymouth.
Loveday, Francis John .....Ryde, I.W.
Maynard, Henry Robert..... London.
Wheeler, William Robert .....Upper Norwood.

ASSOCIATES.

The following, having passed the Minor examination and tendered (or paid as "Apprentices or Students") their subscriptions for the current year, were elected "Associates" of the Society:—

Allen, Richard .....Ramsey.
Duplock, Walter .....Petersfield.
Humphrey, John Thurlbeck ...Sunderland.
Jago, Richard Edwin .....Glasgow.
Milbank, Sydney Thomas .....Bishop Stortford.
Northey, Edward John .....Truro.
Rutter, Clement Thomas .....Birmingham.
Stanley, James.....Bulwell.
Tonking, Wm. Oliver Hoskin...Camborne.
Viggars, George Daniel .....Stafford.
Wilson, John Grant .....Edinburgh.

APPRENTICES OR STUDENTS.

The following, having passed the Preliminary examination, and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Ashfield, Armishaw.....Stratford-on-Avon.
Boreham, Walter Herbert .....Lee.
Care, Harry Bristow .....London.
Cundall, Thomas Bowser .....Pocklington.
Dale, John Graves .....Stockton-on-Tees.
Davies, Richard .....Kidderminster.
Duck, William George .....Cardiff.
Dunn, Harold Stables.....York.
Everett, John Garwood .....Ipswich.
Golden, Alfred Percival .....Leicester.
Grayson, William Henry .....Kidderminster.
Hall, Charles Albert .....Peterborough.
Hughes, Richard .....Aberystwith.
Lucas, Edward William .....Ashbourne.
Macdonald, Reginald Edward...Edinburgh.
Metcalfe, Arthur Pollard .....Doncaster.
Morris, David .....Kidwelly.
Parry, Joseph .....Towyn.
Peers, Thomas Henry Parkes...London
Punch, James .....Sedbergh.
Reeve, George Dunn Reeve ...Portsmouth.
Salmon, Thomas William .....Stockton-on-Tees.
Shankland, David .....Govan.
Stratford, Horace Oliver.....Margate.
Taylor, Herbert Henry ..... Rugby.
Todd, Edwin.....Carlisle.
Turner, Charles Getting ..... Shirley.
Whitaker, William .....Accrington.
Whitwell, Frederick William...Peterborough.

Several persons were restored to their former status in the Society upon payment of the current year's subscription and a fine.

ADDITION TO THE REGISTER.

The Registrar reported that—

John Strawson, 80, Grange Road West, Birkenhead, having made a statutory declaration that he was in business before the passing of the Pharmacy Act, 1868, and this declaration having been duly supported, his name had been placed on the Register.

RESIGNATION OF MR. JOHN WILLIAMS.

The PRESIDENT read the following letter from Mr. John Williams:—

"*May* 30*th*, 1887.

"My dear Mr. President,—It is with extreme regret that I feel compelled to retire from the Council of the Pharmaceutical Society of Great Britain, and shall feel

much obliged if you will inform the Council of my resolution.

"I have been led to take this step by several considerations, but mainly, I may say, by considering the result of the last election of members of Council. I observe that the number of London members is becoming dangerously small, when we consider how important it is for the well-being of the Society that such members, who must of necessity be relied on to do most of the detail work, should be sufficiently numerous, and should also be ready, capable, and willing to do such work effectively.

"My health is unfortunately so bad that I feel it will not be possible for me to undertake my proper share of the duty, and thus by remaining on the Council I should really be keeping out some other more capable, although, perhaps, not more zealous, man who would be willing to sacrifice time and care to the general good.

"It is not for me to dictate to the Council who should be my successor, but I trust whoever it may be he will ever have the best interests of our body at heart. I need hardly add that it is with great pain that I have brought myself to place my resignation in your hands, but after mature reflection I have come to the conclusion that it is the proper thing for me to do, and can only add that if at any future time it is in my power to aid or advance the cause of pharmacy or of the Pharmaceutical Society I shall be most happy to do my best.

"I shall ever look back upon my connection with the Council as one of the happiest and most honourable periods of my life, and cherish the memory of the many men with whom I have had the pleasure of associating. With the highest esteem and warmest friendship,

"I remain,

"Yours very truly,

"JOHN WILLIAMS."

The PRESIDENT said Mr. Williams had been asked to reconsider his decision, but had declined to withdraw the letter, therefore he proposed to move a resolution expressing the regret of the Council at his resignation, and recording some of the work he had done for the Society. He should himself propose the resolution, as President, though of course he did not wish to prevent other members speaking upon the subject. He happened to be on the Council some twenty years ago when Mr. Williams first took a seat there. He sat as his colleague for some years, and of late especially had been in close contact with him. For three years Mr. Williams filled the office of Treasurer, and for another three years that of President, and altogether he had been for about seventeen years a member of the Council. During the whole of that time there was no member of the Council who had been so honorably independent or so emphatic in doing his best from his own point of view for the benefit and welfare of the body politic. Sometimes perhaps his manly independence had caused a little chafing among his colleagues; but in these days, when people were apt to get too much like machines, one ought to pay due and proper respect to individuality of character. As a London member he might say that Mr. Williams's time, as well as large sums of money for benevolent purposes, had been given to the Society unstintingly, and his interest had always been of the highest. His anxiety was that the Society should promote education in the widest sense, that it should take care not to move in any direction which might be looked upon as the protection of trade interests merely, but that it should always move on the lines of doing public good at the same time. This view he was sure would impress them all on looking back upon what Mr. Williams had written and said. Mr. Williams held that view very strongly, and was sometimes a little timid with regard to the action of the Council from this cause, but all who had been his colleagues—and many there had been his colleagues uninterruptedly for the seventeen years during which he held a seat at the Board—would be glad, whilst expressing their regret at his retirement, to bear testimony to the high esteem and affection in which he was held. The fact that Mr. Williams, one of the early students of the Society, had grown up to become a member of the Council, and was now retiring simultaneously with Professor Bentley, seemed to show that the Society was beginning to have a history. He begged to move—

"That the members of this Council desire to express their regret that their esteemed colleague, Mr. John Williams, has resigned his seat as a member of Council, and wish to record their sense of the great value of the services he has rendered as President of the Society for three years, as Treasurer for three years, and as a member of the Council for nearly seventeen years. They would further express the hope that the Society, in its efforts to promote the best interests of pharmacy, may still receive his advice and assistance."

The VICE-PRESIDENT had great pleasure in seconding the motion. His knowledge of Mr. Williams had been considerable during the last nine or ten years, and from the time of his first coming on the Council he had been particularly struck with the deep interest that gentleman took in the welfare of the Society, by his extreme courtesy to every member, and by the carefulness with which he pursued every work he undertook. He was much struck during his early experience of the Benevolent Fund Committee with the very great carefulness Mr. Williams exercised in considering every application for relief, and also with the great concern which he exercised towards the applicants, always bearing in mind the fact that the Benevolent Fund was really a Benevolent Fund, and that the Committee was not always called upon to take into consideration all the circumstances which rendered it necessary that an applicant should come for assistance. Unfortunately, many did come to grief, but the true benevolence of Mr. Williams's heart was so remarkable that he personally benefited by his intercourse with him. He felt that in every sense the Society was losing a great friend and supporter and a loyal member of the Council. He hoped Mr. Williams might still live for many years, and be able to give the assistance he was sure he would be glad to do when opportunity offered.

Mr. SAVAGE could not allow the motion to pass without saying a word or two. It had been his privilege to work with Mr. Williams when he was President, but it was not necessary to say a word on his behalf, so much were his good qualities appreciated. Mr. Williams entered the Council in 1868, and had really been eighteen years connected with it; a long period in any man's life, but the longer they had him the more they esteemed him, and the greater would be their regret at separating from him.

Mr. ATKINS said it was only fitting that he should say a word in supporting the testimony borne to the excellence of Mr. Williams's work. It was a recognition which a faithful servant on retiring from work might well receive from his colleagues. He agreed with every word the President had said about Mr. Williams's independence of character, which he had always greatly admired, even when he had dissented from his views. Mr. Williams was a man of great liberality in more senses than one; his time had been given, not as a retired man of business, but time which had been costly to him, being in the full swing of commercial life. He was a man who was connected with other scientific bodies, and was held in much respect by them as a scientific worker outside pharmacy. He was a man of strong common sense and of all-round faculty. As the Vice-President had said, the Council had sustained a very great loss in his retirement, and the least it could do was to express its great appreciation of his work and great regret at losing him.

Mr. BOTTLE could not allow the motion to be put without expressing his own sense of the loss the Council suffered by Mr. Williams's removal. The only redeeming feature about the matter was a feeling of satisfaction that he was

consulting his own health in this step. They all knew that he had many times been at work there when consideration for his own condition would have kept him at home. Mr. Williams had been an active worker in the interests of the Society, and a most independent one, and though he (Mr. Bottle) had occasionally had to differ from him it had always been with a feeling of the greatest respect for his opinion. He hoped that Mr. Williams would be spared to enjoy many years of life, and that they might have the privilege on many occasions of meeting him there and elsewhere, and of obtaining his advice in the conduct of the business.

Mr. HAMPSON said they would all feel that in losing the presence of Mr. Williams they had lost a very dear friend, and a serious gap was made in the Council Board by his retirement. It was unnecessary to say anything about his good qualities as a member of the Council, and they would all agree in expressing a hope that his health might be improved, and that he might continue to give them the benefit of his counsel and advice.

Mr. ROBBINS also wished to express his very great regret at the loss the Council had sustained. It had been his pleasure to have known Mr. Williams at the Council for a number of years, and to have worked with him on various committees ; he had also valued him very much as a personal friend, and had not failed to notice his great ability in various branches of science as well as his great earnestness in the work of the Society. There was no more conscientious member of the Council, and none more zealous to promote the best interests of the Society.

Mr. RICHARDSON said he must also add his regret at the loss the Council had sustained. He had had many years of friendship with Mr. Williams which led him to appreciate his great value as an adviser of the Council. He regretted his absence, particularly as Mr. Williams and himself were the only members of Council who had consistently opposed the alteration of the mode of investment of the Society's funds, and he now stood alone as an opponent of that scheme. Besides being a very honoured colleague at the Board, Mr. Williams, by his capacity, had built up a business firm second to none in the country for its high moral standing, and in that capacity he had known him many years, and all his business transactions were creditable to the firm he so ably represented. The Vice-President had alluded to one prominent trait in his character, his hearty benevolence, and to the fact that his heart was ever open, even to those who could not show a clean bill of health when they applied for assistance; in fact, he seemed to carry out the words of the poet—"Be to my faults a little blind, and to my virtues very kind." He sincerely hoped Mr. Williams would have better health in his retirement, and that they might still occasionally see him amongst them.

Mr. HILLS, as a young member, though it was hardly necessary to add anything, wished to say how thoroughly he agreed in what had been said that in Mr. Williams's retirement the Council had lost a man of great independence of thought, of very considerable scientific attainments, and of great generosity. He trusted that Mr. Williams would live many years to aid the Society with his counsel.

Mr. GREENISH said he had been on terms of intimate friendship with Mr. Williams for twenty years, and for fifteen of those he had been a member of the Council. He did not know a man whom he more highly appreciated. Mr. Williams had the courage of his convictions ; he was an independent minded man, and though he might have been wrong on many occasions, he always spoke from strong convictions and always spoke with firmness. Mr. Greenish added that he felt that Mr. Williams's absence would be a permanent loss to himself, and that the Council would have some difficulty in filling up his place.

Mr. SYMES said he hoped it would be understood that those gentlemen who had not spoken fully appreciated the merits of Mr. Williams, and the loss the Council had sustained.

The PRESIDENT, in putting the motion, said he was quite sure he expressed the feeling of every member, even the new ones, when he said that those who had not risen to speak had the same feeling of regard for Mr. Williams as those who had.

The motion was then carried unanimously.

THE RETIREMENT OF MR. BORLAND.

The PRESIDENT said he had another resolution to propose of a similar character, viz. :—

> "This Council regrets that Mr. Borland was unable to accept nomination for re-election as a member of Council, but hopes that his retirement is only temporary, and that it may have on a future occasion the benefit of his valuable assistance in its deliberations."

The Council had always considered such a step as that taken by Mr. Borland as tantamount to retirement from the Council, and had usually thought it becoming to have a resolution on the minutes expressing its value of the retiring gentleman's services. On this occasion he did not wish to trespass on ground which might be fairly occupied by some gentleman north of the Tweed, though it so happened that they had not now a Scotchman on the Board, but he might perhaps be able to throw a little enthusiasm into this proposition, for these reasons. He had been thrown into contact with Mr. Borland officially and semi-officially for some years. He had had the pleasure of meeting him in the north in the examination room some years ago, when a member of the Board of Examiners for Scotland, and had a knowledge of the high respect and esteem in which he was held by those competent to form an opinion in Edinburgh at that time. Mr. Borland was very much like Mr. Williams, a man who was an excellent pharmacist, a good botanist, a good microscopist, and interested in every branch of science. He was perpetually working as a student, and whilst he possessed knowledge of a high scientific order he was not ashamed to do the most menial work in his pharmacy, and encourage everybody to put his hand to the plough. He could suggest no reason for his retirement except want of time. No doubt the claims the Council had to make on those who lived a long distance from London were very considerable. It was a thing which those who lived in London could hardly realize. It often involved for those who came long distances two nights' travelling in one week, and very often two hard days' work, which was no light matter once a month, and he could well understand that Mr. Borland might feel it necessary to save himself for a time from the fatigues incidental to these duties. His services both as a member of the Board of Examiners in Scotland and on that Council deserved warm recognition, and the members of Council would be pleased to find him once more amongst them by and bye. At any rate the experience they had gained of him as a colleague would lead them all to hope that such might be the case.

The VICE-PRESIDENT had great pleasure in seconding the motion. Having sat by the side of Mr. Borland for several years as a member of the Council he had formed a very high opinion not only of his knowledge, but also of his general good qualities. He was a kind friend, a clever pharmacist, and a loyal member of the Council.

Mr. BAILDON said he could hardly say he had pleasure in supporting the motion, because he much regretted the necessity for it. It was to him almost a thunderbolt when he received a note from Mr. Borland saying that he had decided not to stand again for the Council. The words of the President had possibly fallen short of the truth, for Mr. Borland was a man of very exceptional culture and ability, and would furnish a most excellent model of what a pharmacist ought to be. As regarded the reasons of Mr. Borland's resignation he understood they were those which had been stated, viz, that his business

engagements were such that he had not the time to devote to the Council, and he also felt the great strain which the frequent night journeys from Scotland involved. He was quite sure Mr. Borland appreciated the honour of being on the Council, and it was a matter of great regret that they were no longer to be represented by him.

The motion was then carried unanimously.

Appointment of Committees.

Mr. Allen suggested that it would be well if the President gave some explanation of the work of the various Committees for the benefit of the new members. The Library, Museum, Laboratory and House Committee had a great deal of work to do, and though it was sometimes complained that too much work was done in committee, it was utterly impossible that a great deal of the work could be done in any other way. On former occasions it had been very usual for country members to say that they could not attend this Committee, but it would not be necessary for them to attend always if the Council felt it could rely on them when specially summoned.

Mr. Symes protested against any idea that the country members did not work as hard as those living in London. He considered the time spent in travelling was given quite as much to the Society as if he were sitting on a Committee, and he thought it a pity that the list should be published annually stating the attendances of members on Committees.

The President said he did not think it was the intention of anyone to raise a question about the relative amount of work done by town and country members. Those who were not on the Council were quite unaware of an immense deal of work which was done which was quite incapable of being reported. A great deal of it was of a routine character, and had necessarily to be done by members resident in London. Neither the reports nor the discussions represented one twentieth part of the work which was done.

The Council then went into committee to consider the arrangement of the different Committees, as the result of which the following arrangements were made.

General Purposes.—The whole Council. To meet at five o'clock on Tuesday evening before the meeting of the Council, excepting in September, and at such other times as may be required.

Finance.—The President (Mr. Carteighe) and Vice-President (Mr. Gostling) and Messrs. Allen, Evans, Hills, Savage, Schacht, Southall and Woolley. To meet on the day preceding the Council, excepting in September, at half-past three o'clock, or as may be required.

Library, Museum, Laboratory and House.—The President (Mr. Carteighe) and Vice-President (Mr. Gostling) and Messrs. Allen, Atkins, Bottle, Cross, Greenish, Hampson, Hills, Robbins, Savage, Schacht and Symes. To meet at twelve o'clock, noon, on the second Wednesday in each month, excepting in August and September, or as may be required.

Benevolent Fund.—The President (Mr. Carteighe) and Vice-President (Mr. Gostling) and Messrs. Atkins, Baildon, Bottle, Cross, Greenish, Newsholme, Radley, Richardson, Robbins and Symes. To meet at half-past three o'clock on the day preceding the Council Meeting, excepting in September, or as required.

Law and Parliamentary.—The President (Mr. Carteighe) and Vice-President (Mr. Gostling) and Messrs. Allen, Atkins, Baildon, Bottle, Cross, Hampson, Hills, Newsholme, Richardson, Robbins, Schacht, Symes and Woolley. To meet as occasion requires.

Evening Meetings.—The Professors, the Editor and the Curator were requested to assist the President (Mr. Carteighe) and Vice-President (Mr. Gostling) in making arrangements for the Society's Evening Meetings in London.

Building Committee.—The President (Mr. Carteighe) and Vice-President (Mr. Gostling) and Messrs. Allen, Bottle, Hampson, Hills and Robbins. To meet as occasion may require.

Reports of Committees.

FINANCE.

The report of Messrs. Allen, Hills and Woolley, acting as the Finance Committee, was presented, recommending certain accounts for payment.

The President moved the adoption of the report.

Mr. Richardson asked if the expense of the Conversazione was included, and if the question had ever been raised whether the Council had a right to spend the money of the Society in this manner.

The President replied that a portion of the expense had been included and that the question as to the legality of the expenditure had been raised. There was no doubt the Council had such power.

Mr. Greenish asked if any dissatisfaction had been expressed this year with regard to the refreshments supplied by the contractor. He happened to have heard on this occasion more dissatisfaction than usual.

The President said no complaints had been received officially.

Mr. Hampson asked how much had been advanced to the building contractor up to the present time.

The Secretary said the amount included in the present report would make £2000.

The motion was then carried unanimously.

BENEVOLENT FUND.

The report of this Committee included a recommendation of the following grants :—

£10 to a member (aged 65) from 1853 to 1886, and subscriber to the Fund from 1865 to 1886. Applicant had been in business for twenty years, but failed, and is without resources. (Devon.)

£5 to the widow (aged 41) of a registered chemist and druggist, having two children dependent upon her. (Kent.)

£5 towards the support of an orphan girl in a training home.

Three other cases had been before the Committee, but were not entertained.

The report and recommendations were received and adopted on the motion of the Vice-President.

The Examinations.

Mr. Symes then moved the following resolution, of which he had given notice :—

> "That whilst this Council entertains a high opinion of the manner in which the members of the Boards of Examiners perform their duties, it would suggest for their consideration the desirability of adopting a regulation to the effect that no candidate be rejected on examination in one subject only."

He said his object was that the candidate should not be rejected in the first subject he was put to on entering the room.

Mr. Schacht said he rose at this early stage before any opinion was expressed on the merits of the question to move that the discussion upon it be taken in committee ; it was a somewhat delicate point, and he thought anything affecting the conduct of the examiners ought to be discussed in committee before it was done in open Council.

Mr. Symes said he should divide the Council on this point.

Mr. Bottle said this motion would lead the Council to tender and very delicate ground, and it was far better that such a matter should be talked about in private before it came before the public.

Mr. Hampson thought it was very irregular for Mr. Schacht to interrupt a gentleman in the middle of his speech. He could not see any disadvantage in publishing the discussion on this motion. It was a question

which had been brought before the annual meeting, and he thought it would be a great mistake to have it discussed privately.

Mr. RICHARDSON agreed with Mr. Hampson. He thought Mr. Symes would not have put the motion on the paper had he thought it was going to be burked by a private discussion. No doubt it had arisen out of the discussion at the annual meeting, but it seemed to be the idea that whenever the examiners were mentioned that they should not be criticized in any way. He protested against that notion. The Council had to appoint the examiners, and he did not see why their work should not be criticized in an open and gentlemanly manner.

Mr. SYMES said he had no idea of criticizing the detailed work of the examiners, or of saying anything offensive to them in any way, or anything which he would not say openly if they were there. Of course he could not be responsible for what other members might say. This motion should certainly either be discussed in open Council or not at all, and he should object to carrying it forward if it was to be a question for the Committee.

Mr. BOTTLE asked if Mr. Symes would kindly point out to the Council what right it had to make such a suggestion, as he asked it to do, to the Board of Examiners?

Mr. WOOLLEY rose to order. The question was whether the Council should go into committee.

Mr. SYMES thought it was competent for any member to bring forward objections to this course.

The PRESIDENT said it was usual to put such a motion without discussion.

Mr. SCHACHT said the only point he wished to urge was the desirability or not of discussing such a question as this in open Council when the other party was not present to express its own views. In his opinion, it was not fair, and that, as a councillor, he should be doing wrong in taking part in such a discussion. He might have opinions on the subject which he should be happy to express at the proper time, and they might be identical with those of Mr. Symes, but he did not think it was proper to discuss such a point at all and to come to any resolution expressing a favourable or unfavourable view on the conduct of the examiners when only one party was present. He did not wish to discourage discussion, but there were times when things should be first entertained in committee and afterwards discussed in Council. Possibly it might be deemed well to refer the matter to a smaller committee, but he did not think, at present, speeches and expressions of opinion should be published on a subject so delicate as this was.

Mr. CROSS said he was at first in favour of as open and free a discussion as possible, but circumstances altered cases. Mr. Symes was not likely to say anything which would do any harm by being published, but he (Mr. Cross) was only a young member, and there were other young members who were perhaps not so well informed of the doings of the examiners, and they might in the course of the discussion say things which might perhaps do more harm than they would like. It was better to err on the side of caution.

Mr. SYMES said he thought Mr. Schacht could hardly have listened to the terms of the motion, which did not seek in any way to coerce the examiners or condemn them, or anything of the kind, but simply to suggest for their consideration the desirability of adopting a certain regulation. That meant that they should consider the suggestion and report to the Council. If they reported that the present usage was perfectly satisfactory the Council would proceed no further. He must protest against this method of going into committee, talking a thing over and arranging what they should say, and then publishing cut and dried speeches. He could not see any advantage in discussing the subject in committee, and then coming and saying it over again publicly. He had no particular wish for publicity, but the question had been made public at the annual meeting, and he regarded it as the duty of the Council to consider any important matter that came up at an annual meeting at the earliest possible opportunity.

Mr. HAMPSON thought going into committee would make it appear to their constituents that there was something more disagreeable in connection with this discussion than was really the case.

Mr. EVANS suggested to Mr. Symes that unless the motion was discussed openly, it was hardly worth while discussing it at all.

Mr. ATKINS said he must take exception to that view. Mr. Symes's idea was that if there were anything which could be improved, to improve it; but the best way to do that with regard to any question, was to carefully talk it over in a friendly way at an early stage in committee. He was not more prone than other men to rush into extreme utterances, but frequently, when speaking extemporaneously, he had said things which he would rather not have said, and sometimes omitted things which he might have said, and he would urge in the most friendly way on those who agreed with Mr. Symes, the desirability, from his point of view, of discussing the matter first in committee. By so doing the Council would be following numerous precedents. Over and over again a similar question had been raised, and at the close of the discussion he had heard it said what a pity it had not been taken in committee.

Mr. WOOLLEY said he came into the room wishing to have the motion publicly discussed; then his mind had been turned in the other direction by the influence of more experienced men than himself; but he had been re-converted by the remark of Mr. Evans. Rather than this subject should be bottled up and allowed to fester and do all manner of mischief he would wish to have it out.

The motion for going into committee was then put and carried by 13 votes to 7.

The Council went into committee accordingly.

The matter having been discussed for about an hour, the Council resumed, and Mr. Symes withdrew his motion.

THE JUBILEE.

The PRESIDENT moved that the Library, Museum and Laboratory Committee be requested to draw up a loyal and dutiful address to the Queen on the completion of the fiftieth year of her reign. He said addresses of this kind were properly presented by all corporate bodies created by Royal Charter, and under Acts of Parliament passed in Her Majesty's reign. Seeing that the Pharmaceutical Society was founded during Her Majesty's reign and its Acts of Parliament had been passed during that reign, and that it had grown up to years of discretion under her rule, it was only fit and appropriate that an address from a large Society like that should be presented in due course.

The motion was seconded by the VICE-PRESIDENT and carried unanimously.

Mr. BOTTLE then moved—

"That with a view to affording to the annuitants on the Benevolent Fund of this Society, and also to those recommended by the Council and unsuccessful at the last election, the means for the full enjoyment of the Jubilee of Her Most Gracious Majesty, it is ordered that the Treasurer be instructed to pay to each of them the sum of £5."

Mr. SCHACHT asked how much this would amount to.

The PRESIDENT said £240. There had just been a special whip for the Benevolent Fund, and though the amount received was not as great as it was ten years ago, still, having regard to all the circumstances, they might congratulate themselves on the result, £1200 having been already received. As the state of the subscription list had been criticized, and a good many condolences had reached him, he might say that he had looked into the receipts and found that although

the sum received at the previous period was larger in amount, still, during the ten years so many handsome sums had been received in donations, that he thought it could not be expected to find such large donations given every time. Having regard to all the circumstances, he thought this would be a very fit way of celebrating the Jubilee.

Mr. ALLEN said he agreed with the motion if the Fund admitted of this extra gratuity being given, which he believed it did. He was perfectly satisfied with the result of the dinner from one point of view, but when he looked at it in another way and recognized that whilst £1200 had been given by a little over 300 persons, the Fund was applicable to the relief of some 13,000, he could not say that the result was satisfactory. Feeling that, and knowing that to a certain extent the President disliked going round with the hat, he had during the last week called on some of his neighbours and without putting the slightest pressure on them had asked them to consider whether this result was satisfactory from the point of view he had just given, and with one single exception of a gentleman whom he had not seen he was successful in every application; in many cases the subscriptions were doubled, and in some substantial donations were given as well, so that he was able to bring down to the office yesterday eight or nine new subscriptions. If this motion were carried it would show the liberal spirit with which the Council administered the Benevolent Fund, which ought to be appreciated by every member of the Society, and he thought it was not too much to ask the Local Secretaries and others who were interested to take the trouble to put the question personally before their friends as it should be done once in ten years. He was satisfied that if that were done, and if the applications were prefaced by the statement that once in ten years it was customary to make a special appeal, they would be quite thankful the Jubilee had occurred.

Mr. RADLEY asked why this proposition was not brought before the Committee on the previous evening.

Mr. BOTTLE said he had it in his mind to do so, but he felt that it was not for the Committee to decide so much as for the Council. He felt that it would commend itself to every member. £1200 had already been received, and he believed more would come in when people saw the liberal spirit in which the Fund was distributed. This would take about £240, and there would be still about £1000 to invest permanently. It was the intention in all parts of the country to do something with reference to the Queen's Jubilee, and as he had not heard of anything in the way of a ball or dinner, he thought the Council would do itself honour in devoting this sum to gladdening the hearts of the poor annuitants on this occasion.

Mr. SYMES supported the motion, and thought Mr. Allen's remarks deserved special consideration. A personal canvass was the only way of efficiently increasing the Fund, and no doubt the hint given by him would be more or less adopted by the Local Secretaries throughout the country. Whilst supporting the motion he hoped that this liberality would not have any prejudicial effect on future applications for casual relief, for whilst they wished to gladden the hearts of these people, they would not desire to do it at the expense of other necessitous persons.

Mr. NEWSHOLME asked if the special list of donations was still open, and, if so, how long it would remain so?

The PRESIDENT said the complete list was being prepared and it was proposed to issue supplementary lists which the editors of the trade journals would be requested to insert. It would be kept open for at least another two months.

Mr. ATKINS supported the proposal, but hoped Mr. Symes's caution would be borne in mind.

Mr. ROBBINS also supported the motion. None of the annuitants, he thought, were likely to see an occasion of this kind again. He was glad the lists would be kept open for another two months, and had no doubt that a good number of subscriptions would come in.

The motion was then put and carried unanimously.

It was also resolved that £50 be placed in the hands of the Secretary for distribution amongst the clerks and servants of the Society on the occasion of the completion of the fiftieth year of the Queen's reign.

In putting the resolution, the PRESIDENT said he was glad to bear testimony to the zeal and ability with which the clerks and servants of that large establishment discharged their duties.

LIBRARY, MUSEUM, LABORATORY AND HOUSE.

Library.

The report of the Librarian had been received, including the following particulars:—

	Attendance.	Total.	Highest.	Lowest.	Average.
April	Day	394	26	4	17
	Evening	161	14	4	9

Circulation of books.	Town.	Country.	Total.	Carriage paid.
April	138	122	260	£1 11 1

The undermentioned donations to the Library had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

For the Library in London—

Medical Register, 1887.
Dentists' Register, 1887.
From the GENERAL MEDICAL COUNCIL.

London University Calendar, 1887.
From H.M. GOVERNMENT and the UNIVERSITY.

Royal Institution, Proceedings, No. 80.
— List of Members, etc., 1886.
From the INSTITUTION.

School of Mines, Ballaarat, Annual Report, 1886.
From the SCHOOL.

Pharmaceutical Society of Australasia, Annual Report, 1887. From the SOCIETY.

Bentley (R.), Text-Book of Organic Materia Medica, 1887. From the AUTHOR.

Roberts (F. T.), The Officinal Materia Medica, 2nd ed., 1887. From the AUTHOR.

Holmes (E. M.), Botanical Note Book, 1878. 2 copies. From the AUTHOR.

Fontaine (G.), Des poisons de flèches et d'épreuve en général et de l'inée en particulier, 1887.
From Professor SOUBEIRAN.

The Committee recommended the purchase of the undermentioned works:—

For the Library in London—

Bentley, Organic Materia Medica, 1887.
Southall, Organic Materia Medica, 4th ed., 1887.
Stewart and Gee, Elementary Practical Physics, vol. 2, 1887.
Worthington, Elementary Practical Physics.
Beckurts and Hirsch, Handbuch der praktischen Pharmacy, 1887.
Robins, Technical School and College Buildings.

For the Library in Edinburgh—

Bentley, Organic Materia Medica.
Bentham, British Flora, 5th ed.
Ganot, Physics, latest ed.
Medical Directory, annually.

Museum.

The Curator's report had been received, and included the following particulars:—

	Attendance.	Total.	Highest.	Lowest.	Average.
April	Morning	517	36	10	21
	Evening	103	14	1	4

The following donations had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

Specimens of the bark of *Xanthoxylum Culantrillo*, from Brazil, and of *Gonioma Kamassi*, from Natal.
From the DIRECTOR, Royal Gardens, Kew.

A section of the tree of *Gonostylus Miquelianus*.
From the DIRECTOR of the Buitenzorg Botanic Gardens, Java.

A specimen of False Chiretta (*Ophelia alata*).
From Mr. W. ELBORNE.

Specimen of the stems of *Strychnos Nux-Vomica* and *S. potatorum*. From Dr. TRIMEN, Ceylon.

Specimen of Strophanthin.
From Messrs. BURROUGHS and WELLCOME.

Specimen of Strophanthin. From Mr. H. HELBING.

Specimens of the following Cuban sponges, "fine dure" or solids, wool, grass, and yellow, and a fine specimen of the Florida Cup sponge.
From Messrs. CRESSWELL BROTHERS.

Specimen of the oil of Trichilia Dregeana, or "Umkuhla oil" from Natal.
From the CURATOR, Botanical Gardens, Natal.

Specimen of the root of a Jaborandi (*Piper sp.*) from Pernambuco.
From Messrs. T. CHRISTY and Co.

Specimen of a bitter bark from the Bahamas.
From Messrs. HALE and SON.

Specimen of Tu-chung bark from Japan.
From Mr. W. E. CROW, Hong Kong.

Specimen of the leaves of *Gymnema sylvestre*.
From Dr. BIDIE, Madras.

Specimen of "Cerise" gum from Alexandria.
From Messrs. LANGTON, EDDEN and CLARK.

Specimens of Hamama, Mucherus, of the roots of *Cybistax scariosa*, of the bark of *Beilschmiedea sp.*, and a number of unidentified Indian and Corean drugs. From Dr. DYMOCK, Bombay.

The following donations to the Museum of the North British Branch of the Society had been reported by the Assistant-Secretary, Mr J. Rutherford Hill :—

A specimen of Palembang Benzoin (1691) recovered from the sea in Table Bay.
From Mr. C. F. HENRY, Edinburgh.

Thirty living plants of *Gelsemium nitidum*.
From Dr. SQUIBB, Brooklyn, New York.

The Curator had further reported that a log of the Fiji sandal wood, presented by the Executive Commissioner of the Fiji Court at the late Exhibition, had through the kindness of Mr. Umney been submitted to distillation, and that the oil proved to be of exceptionally fine quality and large percentage. The Committee directed that a special letter of thanks should be forwarded to Mr. Umney for the trouble that he had taken in the matter.

In response to applications received from the President of the Pharmaceutical Society of South Australia, the Permanent Secretary of the Massachusetts State Pharmaceutical Association, the Leicester Chemists' Association, and Professor Clowes, of Nottingham, for specimens of materia medica, the Curator had been directed to send such specimens as were at his disposal.

The Professors had attended and reported on their respective classes.

Professor Bentley's letter to the Council had been considered, and it was decided to recommend the Council to appoint Professor Bentley Emeritus-Professor of Botany and Materia Medica at a salary of £100 per annum. The Committee had discussed at some length the future arrangements for the teaching of botany and materia medica, and the further consideration of the matter was adjourned.

At a subsequent meeting the last-mentioned subject was further discussed, and it was decided to recommend that in future the chair of botany be separated from that of materia medica, and that the latter be taught by practical demonstrations. It was also recommended that the botany chair have an endowment of £150 per annum, with the class fees, and that the demonstrator be allowed the class fees for materia medica.

The PRESIDENT moved the adoption of the report. With regard to Professor Bentley, the Committee recommended that in consideration of his long services, not only as a lecturer, but in many other ways, he should be appointed Emeritus-Professor of Botany and Materia Medica, and that £100 be allotted as his salary, the meaning being that he would not necessarily be called upon to do any work. Professor Bentley had been associated with the Society as a teacher since 1844, and while the Committee regretted that the state of his health made it necessary for him to retire, it felt that it would be at least an honour to the Society to pay him the compliment of asking him to become an Emeritus-Professor. He might go further, and say that he was sure if the Council, consisting of so many of the Professor's old pupils, had had the power of doing more, it would have been very glad to do it. The way in which Professor Bentley won the hearts of his pupils was well shown in the case of the Committee, where there was but one universal feeling of respect and affection for him. With regard to the future teaching it was thought that it would be better to separate the chair of botany from that of materia medica, as it often happened that very suitable men were available for the purpose of teaching botany, who might not be so well qualified to demonstrate materia medica This subject as now taught for the purpose of the examinations was very much restricted compared to what it was in early days. In the time of Dr. Pereira it was treated very much the same as it had been in the medical schools. Now, as they knew from the observations of the medical press on the new Pharmacy Bill, it was treated in a different way, and was more conveniently taught by demonstration. The pupil wanted to handle the specimen and examine its structure, and did not necessarily require a course of lectures upon it. Having regard to the means at the disposal of the Society, and of the interests of the school, the Committee thought this separation of the two subjects would be the most convenient course.

Mr. GREENISH seconded the motion.

Mr. CROSS said if there was one professor connected with the school to whom he owed a deep debt of gratitude it was Professor Bentley, for he was his first teacher, and his lectures were the only ones he had the pleasure of attending, and a more courteous, painstaking teacher it would be difficult to find. Professor Bentley had a remarkable faculty for making his pupils love their subject, and did not allow them to feel that they had done with it when they left him. Coming from the country, where there were many facilities for pursuing botany, he must say that he often thought of Professor Bentley in his country rambles, and on taking up a specimen was reminded of what he had said about that particular species. It had often struck him what a great influence was often exercised by men who pursued a certain study from pure love of it.

Mr. HILLS said it was only necessary to attend an evening meeting in October to see how very popular Professor Bentley was with the students, and as an old student he should like to add a word in support of what had been already said to show how much he appreciated Professor Bentley's work in the past, and to corroborate what had been said about the earnest desire he had always shown to engrain in his pupils a love for that subject which he had made so entirely his own.

Mr. SCHACHT said his own time of studentship was rather anterior to Professor Bentley's appointment. He was at the school when the duties which he afterwards so efficiently discharged were performed by two very eminent men, Dr. Anthony Todd Thompson and the great Dr. Pereira. Still it was not less desirable that he should say how universally he had heard Professor Bentley praised by those who had been his pupils, and he was quite sure that those praises were well deserved. He was glad, therefore, to approve of that portion of

the report, and he was also glad that the conclusions with regard to the future teaching of botany and materia medica were not yet final. Referring to his own experience he could not forget how nearly the whole of his own botanical knowledge was gained through Dr. Pereira, Professor of Materia Medica, rather than through the Professor of Botany; not that there was any doubt of Dr. A. Thompson being a perfect master of his subject, but Dr. Pereira had an extraordinary faculty of making difficult things seem easy, and of approaching the uninformed mind in such a fashion as to enable it speedily to acquire knowledge. Besides that he for the first time in the teaching of materia medica was able to distinguish between it and therapeutics, and he led the way so splendidly that he (Mr. Schacht) could not help thinking that in that house at least there was still room for a Professorship of Materia Medica. He did not much like the idea of relegating this subject, in that house at all events, which represented pharmacy in its highest aspects, to anything short of full professorial dignity. He hoped the subject, therefore, would be further considered.

Mr. SYMES desired to support all that had been said in praise of Professor Bentley, to whom he owed a great deal. He also supported the separation of materia medica from botany, and took rather a contrary view to Mr. Schacht on the matter. Both subjects had made great advances since the former professors were appointed, and they wanted a professor of botany now who would adopt certain modern views, go in for histology and so forth. On the other hand, if materia medica could be taught at all it was an eminently practical subject, and unless the teacher could put specimens into the student's hand and encourage him to ask questions about them, he would fail in his teaching to a great extent.

The PRESIDENT remarked that Mr. Symes had very well expressed the views of the Committee, but the members of it were not tied to any special plan. All they wanted was for the Council to sanction the principle of separating the two subjects.

Mr. ATKINS said as he had already taken part in two interesting discourses on this question in committee, he did not desire to say any more upon it; but he wished to pay his personal tribute to Professor Bentley. He felt that the Council ought not to allow thirty-eight years of good service to close without a very warm recognition, and though there was always the risk of tautology in these matters he must say he felt very warmly about it. The whole course of Professor Bentley's connection with the Society had reflected credit upon it, especially by his large influence with medical men; his writings had been accepted as text books, and this again had reflected credit on the School of Pharmacy.

The PRESIDENT said the broad question involved in the acceptance of the report was that there should be a separation in the teaching of these two subjects—that one man should not necessarily teach both. Chemistry and botany had each pushed into the domain of materia medica since Pereira's time, when, in fact, materia medica was very much what you liked to make it. On the whole, the Committee thought that demonstrations would be better for the students than a set of lectures; but there was nothing to prevent making the demonstrator a lecturer or even a professor if thought desirable. He would promise Mr. Schacht that his suggestions should be well considered by the Committee.

Mr. EVANS said he supposed if the subjects were divided the fees would also undergo revision.

The PRESIDENT said, Yes; they would be rearranged after consultation with the professor and demonstrator.

The motion was then put and carried unanimously.

BENEVOLENT FUND DINNER.

The report of this Committee stating what detailed arrangements in connection with the Dinner had been made was received.

THE EXAMINATIONS IN SCOTLAND.

The following report from Sir Douglas Maclagan was ordered to be entered on the minutes :—

Report on the Pharmaceutical Examinations at Edinburgh.

BY SIR DOUGLAS MACLAGAN.

(*April*, 1883, *to January*, 1886, *inclusive.*)

"I regret that I have been unable till now to make my report on the pharmaceutical examinations, which was delayed much beyond the time when it ought to have been rendered, by a long period of personal suffering coming upon me along with domestic bereavement.

"My present report, as on the two preceding occasions, embraces a period of three years, namely, from April, 1883, till January, 1886, inclusive.

"Before making any observations in detail on the results of the examinations, I have to make the general statement of my satisfactfon with the manner in which the examiners have discharged their duties.

"There have again been some changes in the *personnel* of the Board, but there has been no change in the quality of the examinations, and I can only repeat what I have formerly had reason to say, that the decisions of the examiners appear to me to be justly apportioned to the quality of the answers given, and that a due regard is held alike to the welfare of the public and the interests of the candidates. I believe that those who pass the Minor examinations are duly entitled to obtain the certificates, and qualified to undertake the duties of chemists and druggists.

"Of the three classes of candidates whe have come up for examination, I need refer only to the Majors and the Minors.

"The Modified examination candidates are now practically an extinct species, only one candidate having appeared in each of the three years to which this report refers; two of these passed and one failed.

"The results of the examination of the two other classes are shown by the following table :—

Class.	Candidates.	Passed.	Failed.	Per cent. of failures.
Majors.....	25	10	15	60
Minors.....	522	234	287	54·1

In the previous triennium the numbers were :—

Class.	Candidates.	Passed.	Failed.	Per cent. of failures.
Majors.....	29	15	14	48·2
Minors.....	292	166	126	43·15

"It will be seen from a glance at these figures that I am called upon, much to my regret, to repeat what I had occasion formerly to say, that so far from the number of ill-prepared candidates diminishing, it is actually increasing, which circumstance manifests a deplorable ignorance on the part of candidates, and of the persons who are responsible for their training, of what is to be expected from those who desire to obtain a pharmaceutical qualification, and of the means of qualifying themselves for it.

"I had hoped that remarks which have been made not only in my reports but elsewhere would have enabled me considerably to depart from the line of observation made by me in my last report, and to take a more hopeful tone as to the progress of pharmaceutical education in Great Britain, but the facts are against me. I can do little else than repeat what I said formerly, and express my belief that pharmaceutical education is on a wrong basis altogether, and that some radical change is called for.

"Three years ago I expressed my concurrence in the views of those who desire to see a regular curriculum established for students of pharmacy, and from that opinion I do not resile.

"I am led to understand that the position of the Pharmaceutical Society, as defined by the existing law, prevents the adoption of a curriculum. If this be the case, all I can say is, that however difficult to obtain,

some legislation to amend this state of matters is decidedly called for.

"It may be said that if the North British Branch of the Pharmaceutical Society has been able, during the last three years, to send out 234 men with certificates in their hands, all of whom may, so far as public safety is concerned, be entrusted with the responsible duties of chemists and druggists, the wants of the country are fully supplied, and that we may rest content with things as they are. This would be all very well if the protection of the public from unqualified druggists were all that is to be sought for from pharmaceutical examinations, but there is another and at least equally important object to be kept in view, namely, the raising of the character of the pharmaceutical profession generally throughout the country.

"When I gave evidence before Jacob Bell's Committee of Parliament in reference to pharmaceutical legislation, that which bulked most largely in my view was the elevation of the character of British pharmacy, and the bringing it up to some such level as that which it had attained in continental countries. My experience as a student and practitioner of my own profession, and still more as a lecturer for many years on materia medica, had shown me that there were plenty of excellent pharmaceutical chemists in Britain, as there are at this day, but I held that continental pharmacy was ahead of British pharmacy to an extent it ought not to be, and I continue to hold that opinion.

"I shall, I daresay, be accused of harping on one string, but I believe that the string gives the true keynote to what ought to be heard on the subject of pharmaceutical education. If the character and status of the pharmaceutical profession can be raised by bringing into its ranks a larger number of men of higher scientific attainments, of whom no doubt not a few exist among us, the public requirements will be all the more fully and safely met, and the interests of the Pharmaceutical Society of Great Britain advanced.

"I have to make some observations on the special subjects of failure on the part of candidates, under the two heads of Majors and Minors.

"*Majors.*

"The following table shows the percentage proportion of subjects in which the 15 unsuccessful candidates failed :—

Subject.	Per cent. of failures.
Botany	13·3
Materia materia	13·3
Practical chemical working	60·
Failure to obtain pass numbers	13·3

"*Botany.*—This truly scientific subject is one on which many candidates for the Major qualification make very indifferent appearances, though now and then a candidate appears who has thoroughly studied botany and knows it. I hear many candidates describe botanical structures very fairly, but I have no assurance that they know them, if I may so say, personally, so as to be able to apply their botanical knowledge practically.

"I must here refer to a subject on which I have already freely expressed my opinion, namely, the absence from this examination of the microscope. I cannot understand why no demand should be made on candidates, at all events for the Major qualification, to show that they know the use of an instrument which is essential to any investigation of botanical structure ; without which no cultivator of natural science can move a step ; which is appealed to in almost every number of the *Pharmaceutical Journal* ; and which in not a few instances is mentioned as a means of determining the quality of drugs in the British Pharmacopœia.

"*Materia Medica.*—The Major examination in this department is satisfactory, demanding a much larger amount of pharmaceutical knowledge than is to be expected from the Minors. This subject does not call for further remark.

"*Practical Working.*—I have as usual to point out that the large proportion of failures in this subject is due to the fact that candidates come up for 'Practical Working' a day before the oral examinations, and if they fail in the practical work they proceed no further. The substances selected for analysis are in general exceedingly suitable for the purpose, but I have had occasion to remark that when these substances or mixtures have been more of the pharmaceutical than of the merely chemical type, the failures are more frequent.

"I infer from this that there is a neglect, or perhaps rather want of opportunity for candidates extending their knowledge of pharmaceutical chemistry after they have finished their more elementary chemical instruction. The candidates are frequently set to perform analysis by volumetric processes, which is very important, but if it were not for considerations of expense I could wish that the time for practical working extended over more than one day, so that there might be better opportunity for candidates working by the gravimetric method, and showing their familiarity with the use of the balance.

"As the general result of the Major examination, I repeat my desire that it were raised in character, but as matters now stand, I am of opinion that the decisions are equitable, and that those who do pass—only 40 per cent.—are fairly entitled to bear the higher denomination of pharmaceutical chemists. I would be glad, however, to see it become the expression of a higher stamp of attainment than at present.

"*Minors.*

"I refer to what I have said above as to the great and increasing proportion of failures in the examinations. These remarks apply specially to the Minors.

"There is one point to which I wish to call attention as worthy of consideration.

"The rule is that no candidate can reappear for examination till three months after his remission, but there seems to be no power on the part of the Examining Board to refer the candidate to his studies for a longer period. It seems to me to be a waste of the time of examiners, and an encouragement to remitted candidates to take a perfunctory view of what they require in the way of study, to allow men who are absolutely ignorant to come up again before six months at least. There is little hope that three months' study, even if devoted to the one subject, would make much of a botanist of a man who did not know the stamens on the male catkin of a willow, and who thought that the pollen of a plant became its seed ; or anything but a very indifferent chemist of one who could not explain why such and such a quantity of a base was required to saturate such and such an amount of an acid, who in fact seemed never to have learned so rudimentary a chemical doctrine as that substances combine in definite proportions. I am not in the least degree afraid that by a little more severity in the way of the length of the period of remission candidates would be so deterred as to diminish the supply of chemists and druggists required for the wants of the country.

"On the details of the Minor examinations I need not say much, as I have little else to do than to repeat the remarks made in former reports.

"The following table exhibits the percentage of the special subjects in which failures took place during the triennium now under consideration, as contrasted with the two previous triennia.

Subject.	1877-80	1880-83	1883-1886
Botany	32·12	20·80	16·30
Chemistry	23·08	17·44	14·90
Materia medica	6·41	6·71	5·90
Prescription reading	1·92	5·38	3·10
Dispensing	15·38	12·08	16·30
Pharmacy	23·08	12·08	4·50

"It will be seen that these numbers present some satisfactory features. I am disposed to draw from the facts all the good augury I can, for instance from the circumstance that the rejections in botany and chemistry have decreased, and I would wish to derive the hope that we are at the beginning of a period of greater attention to these important scientific branches. All this, however, does not enable me to depart from what I have expressed above as to the general deficiency in the education of candidates at present existing. These actual numbers of failures in individual subjects are liable to great variation from a variety of causes, but I need not say that if these improvements were continued through another triennium it would give substantial promise of better things. The inefficiency of the present state of pharmaceutical education must be judged of by the general result, which points not so much to failure in special subjects as to general deficiency all round, on account of which candidates do not come up to the pass number of marks (600). That the number is increasing not diminishing in the case of the Minors is evidenced by the following comparison of the last three triennia:—

Years.	1877-80	1880-83	1883-86	Years.
Per cent.....	37·8	43·15	54·1	per cent.

"There is one special subject on which I desire to make a remark. This is dispensing, in which—the most practical of all and that which has the most direct bearing on the welfare of the community—the failures are exactly as numerous as in the purely scientific province of botany. I have had occasion to direct attention to this before, and have appealed to the consciences of those who have young men under them as apprentices, but no general satisfactory result has followed. I am myself persuaded that in a large majority of instances the time spent in apprenticeship is time lost. Of course, I know that there are many exceptions to this, and that there are establishments, an apprenticeship in which is (if we put out of view botany and pure chemistry) a complete pharmaceutical education. In the more numerous instances, however, I think a young man would be more usefully employed in attending lectures and reading books, than in standing behind a counter, and retailing drugs, with few opportunities of really learning how to dispense, and no opportunities of practising the making of the galenical preparations of the Pharmacopœia.

"There are two circumstances which appear to me to have an evil influence in lessening the opportunities of the student of pharmacy for learning practical dispensing. The first of these is the system of medical practitioners dispensing their own medicines. In Scotland we have comparatively little of this, except, of course, in rural districts and among an inferior class of practitioners in some of the larger towns, who are to be regarded rather as druggists possessing a medical qualification than as medical men dispensing their own medicines. This is not the place to discuss the merits of the above practice, except in so far as it has a bearing on the student of pharmacy, and I can hardly see how the fact of medical men sending out medicines to their own patients instead of writing a prescription and sending it to the pharmaceutist to dispense, can fail to lessen the opportunity of the apprentice of the latter to learn practical dispensing.

"Of course he may, though not in possession of a pharmaceutical diploma, act as a dispenser, but is it possible for him to have, in the surgery of a busy practitioner, that supervision and guidance which will enable him really to dispense *cito, tuto et jucunde*?

"The other circumstance which appears to me to be inimical to the interests of him who wants to learn practical dispensing is the system of proprietary preparations of recognized medical substances, which seems to be attaining to large proportions, if one may judge from the gigantic system of advertising now in vogue. Of course both the parties to whom I allude are strictly within their rights. The medical man may if he chooses the functions of the pharmacist to those of the practitioner, and the druggist remembering that pharmacy is both a trade and a profession may take the former view of it in preference to the latter, and carry on his trade by the aid of advertising his goods, with the help of commercial travellers and the free distribution of samples. But if this practice is to become general, and if the public are to prefer to the physician's prescription dispensed by the duly qualified pharmaceutical chemist, the proprietary preparation for whose qualities they have only the assurance of the advertiser, it follows that the chemist's apprentice must be shorn of much of his opportunity for learning the practical art of dispensing.

"If any relief in these respects is to accrue to the pharmaceutical profession it must come from the side of the profession of medicine.

"I have thought it my duty, as acting on behalf of the Privy Council, to point to some suggestions for the amelioration of pharmaceutical education. The fact that for several years no improvement has taken place in the average qualification of candidates seems to me sufficient warrant for a demand for such improvement. The most important of these suggestions, that which has given and will give rise to much discussion, is the having a more systematic method of instruction, whether that shall take the form of a regular curriculum or not.

"I care little for a hard and fast curriculum, provided that some security is had that, at least in the scientific departments such as botany and chemistry, it shall be secured that each candidate has had methodical instruction.

"The second suggestion to which I would point is that the Major examination should be raised in character, and that as an instalment towards this end candidates should be made to show that they can recognize plant structures and medicinal substances under the microscope, and that they should have more time for practical work in the laboratory.

"As regards the Minor examination I do not ask for more stringency. The examinations are perfectly good in this respect, but I would wish to see, as the result of a better education, that a higher style of questioning would be not merely not too severe, but would be within the compass of all candidates who desire to give proof of having really been students of pharmaceutical science. Lastly I would draw attention as above to the suggestions as to giving examiners some discretion as to remitting for a longer period to their studies candidates who come up altogether unprepared.

"I do not expect that all or any of these suggestions will be speedily adopted, but I throw them out as at least deserving of consideration.

(Signed) "Douglas Maclagan.

"*Edinburgh, November* 24, 1886."

The Address to the Students.

It was resolved that the Library Committee be authorized to make the necessary arrrangements for the delivery of the Sessional Address to the students in October next.

Dover Chemists' Association.

A memorial from the Dover Chemists' Association with reference to some of the regulations of the Inland Revenue Department was referred to the General Purposes Committee.

The New Building.

The Council went into committee to receive the report of the Building Committee, which on resuming was adopted unanimously.

Chemists and Druggists' Trade Association of Great Britain.

A special meeting of the Executive Committee was held on May 25, at 23, Burlington Chambers, New Street, Birmingham, to consider the position of the Association.

Mr. W. G. Cross (Shrewsbury), President, in the chair.

Present—Messrs. Andrews (London), Arblaster (Birmingham), Barclay (Birmingham), Bell (Hull), Chapman (Scarborough), Churchill (Birmingham), Harrison (Sunderland), Holdsworth (Birmingham), O. Jones (Llanrwst), W. Jones (Birmingham), Laird (Edinburgh), Mackenzie (Edinburgh), Parker (Nottingham), Symes (Liverpool), Walker (London), and the Solicitor of the Association.

Communications were read from Messrs. Maltby (Lincoln), Crook (Eastbourne), Hampson (London), Jervis (Sheffield) and Paterson (Aberdeen), regretting their inability to attend.

The minutes of the previous meeting of the Committee were read and confirmed.

The following report was then read.—

Report of the Finance Committee.

Your Finance Committee met on April 18 last, when the Secretary's cash statement and all books of account were examined and passed for audit, and several accounts were examined and ordered to be paid. The financial statement, duly audited by the official auditors of the Association, showing a balance of £302 15*s.* 10*d.* to the credit of the Association, appears as an exhibit to this report, but from this amount will have to be deducted some outstanding accounts and the current expenses of the Association.

Receipts.	£	*s.*	*d.*	£	*s.*	*d.*
Balance brought forward from last Account, viz.:						
Balance at Lloyds, Barnetts and Bosanquets Bank, Limited	305	0	11			
Ditto in hands of Treasurer	8	3	9			
	313	4	8			
Deduct—Law costs unpaid	19	12	2			
				293	12	6
2216 Subscriptions at 5*s.* each				554	0	0
Donations				469	1	0
				£1316	13	6

Payments.	£	*s.*	*d.*	£	*s.*	*d.*
Advertisements				10	11	6
Auditors' Charges				12	12	0
Canvassing Expenses				3	18	2
Hire of Room for Public Meetings				3	15	0
Law Costs, viz.:—						
Solicitor's Charges	213	11	5			
Ditto Travelling Expenses	11	10	4			
Witnesses' Charges and Expenses	45	18	9			
				271	0	6
Office Expenses, viz.:—						
Cleaning	1	3	6			
Gas	4	16	6			
Rates and Taxes	2	11	4			
Rent	25	2	8			
				33	14	0
Postages				104	8	1
Reporting				46	10	6
Salaries, viz.:—						
Secretary	200	0	0			
Assistant Secretary	91	0	0			
Clerk	22	9	0			
				313	9	0
Stationery and Printing				69	12	3
Sundries				17	0	9
Travelling Expenses, viz.:—						
Executive Committee	92	1	5			
Secretary	30	6	6			
Assistant Secretary	4	18	6			
				127	5	11
Balance carried forward to next Account, viz.:—						
Balance at Lloyds, Barnetts and Bosanquets Bank, Limited	286	15	4			
Ditto in hands of Treasurer	16	0	6			
				302	15	10
				£1316	13	6

It was moved by Mr. Barclay, seconded by Mr. Chapman, and unanimously resolved :—

"That the Report of the Finance Committee be received, adopted, and entered on the minutes."

The following Report was then read :—

Report of the Urgency Committee.

Your Committee presented a printed interim report to the Exeeutive on the 18th ult. as an annex to the Secretary's circular of the 21st ult., since which date your Committee have held two meetings.

At the first of these, which took place on the 29th ult., your Committee carefully considered the replies received from the Executive to the above-named circular and the proposed circular to the trade was unanimously passed subject to the insertion of dates, two verbal alterations, and one transposition of a sentence. The following resolutions were also unanimously passed :—"That the Secretary be instructed to issue the special circular as now amended to the wholesale and retail trade." "That the Executive, having approved of the recommendation of this Committee that the Secretary be refunded the expenses consequent upon the issue of his special circular to the trade in January last, the Treasurer be requested to hand to the Secretary the sum of £39 1*s.* 2*d.* for that purpose."

At the second meeting of your Committee, held on the 20th inst., your Committee considered the replies received from the trade to the circular issued by the officers of the Association on the 6th inst., when the following resolution was unanimously passed, and the Secretary instructed to convene a meeting of the Executive for Wednesday, the 25th inst., to consider the position of the Association :—"That it having been reported by the Secretary that 1,348 replies have been received in response to the circular issued to the wholesale and retail trade by the officers of the Association on the 6th inst., this Committee is of opinion that the effective working of the Association requires at least 2000 subscribing members of half-a-guinea each. They, however, feel that if the trade were thoroughly canvassed that number might be obtained."

The President proposed that the report of the Urgency Committee be received. He apologized for the short notice of that meeting which the members of the Executive had received, remarking that the Urgency Committee thought that the sooner they consulted the Executive the better. When they last met they passed a resolution to the effect that Mr. Haydon should make a canvass of the members of the trade to get money to meet their liabilities, and to carry them on to the end of the financial year. A more unsatisfactory state of things could scarcely have existed. Mr. Haydon, he thought, very loyally took upon himself to disobey their instructions, and issued circulars both to the wholesale and retail members of the trade.

The Secretary: Not disobey.

The President: Well, to interpret in his own manner our instructions.

The Secretary: That is better.

The President, continuing, said the Secretary issued two circulars, the result of which was that sufficient money was subscribed to put them in a sound financial position for the present year. But after that there remained the very important question as to how they were to proceed. It would be remembered that at the last meeting they passed a resolution that in future the annual subscription to the Association should be half-a-guinea instead of 5*s.*, an alteration which was wise and proper. He had had the pleasure of attending two or three meetings with the view to laying before the Executive some scheme of re-organization, and having agreed upon that scheme, and having got the approval of the Executive, they proceeded to tackle the situation to the best of their ability. He believed they all thought that rather than have an association that could not speak out its mind and was weakly they had better have no associa-

tion at all. If the trade would not support the Association it was no use their endeavouring to go on. If the trade allowed the Association to fall through, upon the trade the responsibility would lie. He contended that every member of the Association had had his full money's worth, and as a proof of that assertion he had it from the Secretary's notes that each member who subscribed 5*s.* cost the Society 7*s.* 8*d.*, the balance being made up by donations. The question now came before them, Having obtained sufficient money to pay their way up to the end of the financial year, how were they going to proceed in the future? They had issued circulars to the trade the result of which was before them. Between 1350 and 1360 replies had been received to those circulars, some of them being the result of a personal canvass, and after the second circular was sent to the Local Secretaries, signed by himself, asking them to make extra efforts. He thought they might take it as a basis of agreement that unless 2000 subscribing members joined—that was unless their income was £1000 a year—it was not possible to satisfactorily carry on the work of the Association. He was there to hear the remarks of the Executive, and any ideas he had on the subject would be fully expressed in the course of the discussion. He thought, however, they might take it as a basis of operations, that unless they had at least 1000 guineas a year to carry on the work they could not possibly do it. That Association, so long as it was an association, must neither degenerate into a mere assurance society nor into a better class of trade's union. They must pursue their work with the dignity that belonged to an association of that character. If they agreed with him to the extent they had gone, he thought they would be of his opinion that the resolution passed by the Urgency Committee was worthy of the support of the Executive.

In reply to Mr. Arblaster, the President said he had received several replies to his circular, and with the exception of a few they were all satisfactory.

Mr. Glaisyer at some length explained the circumstances under which he and Mr. Haydon had issued the circular announcing the possible formation of a Chemists' Defence Agency, stating that there was no idea of interfering with the future of the Association. He was of opinion that the answers to the circular were not sufficient to warrant the Executive in continuing the work of re-construction. If, however, the Committee thought otherwise, so far from there being any contest between Mr. Haydon and himself on the one part, and the Association on the other part, they would abandon their project entirely and give loyal support to the Committee in endeavouring to make their scheme a success.

In reply to a question the Secretary gave the following statistics showing the number of promises of support that had been received in response to the officers' circular, as far as they had been dissected :—

	Number of promises received.	Number of chemists on Kelly's Directory.
London	209	1200
Birmingham	63	182
Hull	13	82
Leeds	16	97
Liverpool	31	231
Manchester	41	235
Nottingham	19	90
Sunderland	12	41
Sheffield	7	103
Scotland	31	780

With regard to the sixty-three promises from Birmingham, he might say before that town was partly canvassed there were only twenty-six promises.

Mr. Holdsworth: Which is the same proportion as the other towns.

The Secretary: Yes.

Mr. Bell spoke of the apathy which characterized chemists in the country towns. They would not take any action unless they thought they would get something out of it.

Mr. Parker said there was an uncomfortable feeling abroad that the Association was going to be wound up. One old member after the receipt of the circular told him that it was a nice thing for him (the speaker) to be soliciting subscriptions for an Association that was bankrupt and insolvent.

Mr. Symes said the impression he had formed with regard to Liverpool was that a canvass would bring a large number of members. He was rather inclined to endorse Mr. Parker's statement as to the lugubrious feeling which had gone abroad. The tone of the circular sent out by the Secretary when he was instructed to make a personal canvass showed that the Association was in a bad way. He did not mean to make a sweeping condemnation of that circular, but he thought it was a little premature. That, and the subsequent circular urging the necessity of an increased subscription had gone to create the impression that the Association was really a thing of the past. Under these circumstances the replies had been very largely discounted. He was sanguine for the future of the Association. He was willing to join in the consideration of any scheme that might be put forward. If the society died there would be a great difficulty in commencing it again. They had now all the machinery in working order, and it was easier to keep it going than to re-start such an organization. At the same time he was not very sanguine of getting voluntary subscriptions every year to the extent which would justify them in continuing.

The Secretary said the remarks of the last speaker would, he feared, leave an impression on their minds that his (the Secretary's) circular of January last had been the first means of conveying to the trade the fact that the financial condition of the Association was unsatisfactory. He thought that was a sweeping condemnation of the circular, and a condemnation that it did not merit. He then read from the report of the proceedings of the Executive at their previous meeting, as published in the trade journals prior to the issue of the circular to which Mr. Symes had referred, extracts from speeches of members of the Executive, showing that the Association was at the time of that meeting (January 14 last) unable to meet its liabilities. At the same meeting the Executive passed a resolution authorizing him to visit London and other towns to endeavour to raise money to get them out of their difficulties. He visited London. He canvassed the wholesale houses, and by that means raised about £80. The time at his disposal did not allow him to visit the provincial towns, and he had distinctly told the Executive that he could not undertake such a personal canvass. He sent out a circular in his own name and on his own responsibility. That circular, whatever might have been its demerits, at all events relieved them of their financial difficulties, and they were now in a position to wind up their affairs if they desired to do so with a perfectly clear sheet. Their position now was infinitely better than it was in January last. At that time they had collected subscriptions from the trade for a twelve months' work. Five months of that was unexpired, and they were unable to meet their engagements. At present they could carry on the work and pay their way until June 30 next, the termination of the financial year. He did not think it could fairly be argued that the Association had been injuriously affected by the issue of his circular in January last. As far as he was personally concerned he certainly should not feel disposed to run an agency against the present Executive of the Association. If they decided to carry on the Association he was prepared, should they desire to retain his services, to act as loyally in their interest in the future as he had done in the past.

Mr. Symes expressed the opinion that the wholesale branch of the trade should not have been appealed to.

Mr. Barclay said, that if the Secretary had not canvassed the wholesale trade for subscriptions he would most certainly have been told that he ought to have done so.

Mr. Andrews asked if, in the event of the Association continuing, it would be possible to reduce the expenses.

The President said they would be able to make but very slight reduction, no matter how economical they were.

Mr. Andrews firmly believed that a material increase in the subscriptions might be effected by means of a personal canvass.

Mr. Harrison said he had not much faith in a canvass. The circulars issued placed the affairs of the Association as fairly before the members of the trade as possible. What had been the result? One thousand three hundred odd people had responded. He took it that these represented the number of people who felt there was any necessity for an Association at all. If they went beyond that and canvassed they simply pressed people into the Society. Bearing this in mind, what probability was there that they would renew their subscriptions? The concluding paragraph of the last circular issued by the officers of the Association was as follows:—"In conclusion, we have to add that should the response to this circular show that there is a sufficiently general and wide-spread desire on the part of the trade that the Association should continue to exist, the Executive will endeavour to so re-organize the Association as to carry on the work on the lines above indicated, subject to the confirmation of the members. If, however, the response does not warrant such a conclusion, they will immediately convene a special general meeting of the members for the purpose of winding up the Association."

Mr. Owen Jones (Llanrwst) said he must candidly confess that if a personal canvass were made of the principality it would rouse the people up. The Welsh people wanted rousing. Many of his fellow tradesmen in Wales had expressed regret at the probability of the Association going out of existence. He considered that a canvass would raise the promises from 1300 to 2000.

Mr. Holdsworth reminded the Executive that 2000 promises did not mean a subscription of 1000 guineas a year. He was certain they would find a great many of those gentlemen who had promised slow in coming forward. Men would make promises under pressure which they would not fulfil.

Mr. Symes said that if men doubled their subscriptions they would expect a more liberal expenditure on their behalf. As it was, if a man was attacked, the Urgency Committee had been careful in guarding the purse, and if it was a doubtful case they had declined to defend. If a man doubled his subscription, he would expect more from the Association.

Mr. Walker said Mr. Symes had stated the case as it appeared to him. The state of affairs had been placed before the members as plainly as possible in the circulars which had been issued. His opinion was that they should bury the Association as decently as possible.

Mr. Bell felt that the members were making a great mistake in not sustaining the Association in the valuable work it was doing, which it had done in the past, and would do in the future. He agreed that it would be difficult to get men to subscribe in the future who now subscribed under pressure only, and expressed the opinion that with an increased subscription the members would expect that more should be done on their behalf. That was a very important aspect of the case, and one they must not lose sight of. He felt exceeding sorry at the deplorable position of the Association.

In reply to Mr. Mackenzie, the Secretary said that last year 2216 members paid subscriptions of 5*s*. each to the Association.

Mr. Harrison: That is less income than our replies represent.

Mr. Mackenzie said he always thought one of their weak points was, that they had not a rule by which the Association could be a working success. They ought to have had a rule by which they should only have defended those who were, or who had been, members of the Association. He thought it was not too late yet if they should decide to go on to make a rule to defend only those who were members, and only to defend new members who had been three months on the list from a certain date.

The President said the suggestions of Mr. Mackenzie were embodied in the scheme of re-organization. With regard to going back to a 5*s*. subscription, he felt sure they could not do that after what had taken place.

Mr. Holdsworth said it should not go forth, in case the society went down, that it was through defending non-members. Their greatest liabilities were incurred in the cases of members. They had taken up but very few cases of non-members. It might be said, and, doubtless, would be said in case they broke up, that they had got into difficulties through having too wide a sphere of operations.

Mr. Symes said that on some occasions the Association had defended chemists whether members or not, on account of the principle involved.

Mr. Glaisyer said that as a rule the cases of non-members and members had occurred on the same day, and they did not want one to run in the front of the other.

The President pointed out the number of replies that had been sent to the circular, and expressed the opinion that if they were to canvass they might get the required number.

Mr. Symes: Can you work with pressed men?

The President: That is a question to be considered.

Mr. Barclay said they all felt that trade just now was in a very depressed condition, and very well knew that institutions which relied on voluntary subscriptions were suffering acutely. They must not, therefore, take too gloomy a view of the situation. He most thoroughly appreciated and supported Mr. Harrison's remarks in regard to the lethargy of members of the trade. The men who had not subscribed would be the first to cry out when the Association had gone down, but if the Association was dissolved the blame would be theirs. It was curious how people who had the best interests of the Association at heart did not respond to the circular. He suggested for their consideration that they should wait until a canvass had been made, fixing a reasonable limit, and that the Urgency Committee, in case the response was not beyond a certain number, should proceed either to wind up the Association, to elaborate or re-organize the Association somewhat on the lines proposed in the circular which had been sent out.

After some further discussion, Mr. Harrison (Sunderland) moved—

> "That in consequence of the inadequate response to the circular of the Executive Committee of May 6, a special general meeting of the members of the Association be convened at an early date to consider the expediency of winding up the Association."

Mr. Barclay, he said, would note that in the proposition there was a little further reprieve. Circumstances might arise which would stimulate those who had hitherto been apathetic between then and the date fixed for holding the proposed meeting. If they found that gentlemen had made a sufficient and adequate response to their circular, then they might consider that it was not expedient to wind up the Association. It was utterly impossible for them to go on with the material at present at their hands.

Mr. W. Jones (Birmingham) seconded the proposition.

Mr. Owen Jones (Llanrwst) said no doubt the report of that meeting going forth would stimulate a lot of the members of the trade to increased action.

Mr. Parker thought it was useless to send out circulars

They had already been sent out warning and entreating people to send in their subscriptions.

Mr. Symes said he was sorry they had not heard both sides of the question put forward by their Secretary and Solicitor; he further stated that having heard all that had been said that day, he did not think if it were reported it would affect the membership. If they voted for the motion, they would appear to turn their backs upon those who thought that another chance was desirable. If they did not vote for the motion, they would do so against their best convictions that the Association would come to an end.

Mr. Mackenzie (Edinburgh) moved as an amendment—

"That a final circular be issued to all the trade who have not responded to the former one, stating the necessity of an immediate reply, as to whether they will join the Association upon the amended lines, and a 10*s.* 6*d.* subscription, within seven days."

Mr. Jones (Llanrwst) seconded the amendment.

Upon the amendment being put to the meeting six voted for and seven against it, three remaining neutral. The motion was then put and carried by ten votes to three.

After a short discussion it was decided to hold the special general meeting in London, on June 17, at 3 p.m.

Provincial Transactions.

MIDLAND COUNTIES CHEMISTS' ASSOCIATION.

A meeting of the above Association was held at the Grand Hotel, Colmore Row, Birmingham, on Thursday, evening, May 26. It took the form of a musical and social evening, and Mr. Councillor Barclay occupied the chair. Songs, piano solos, and recitations were given by the members. At the close Mr. Barclay alluded to this meeting as being the last of the session, and hinted at the pleasures of an excursion, and suggested that members should think over the matter and endeavour to promote the carrying out and success of what, in the past few years, had become an enjoyable institution.

Obituary.

Notice has been received of the death of the following:—

On the 24th of May, Mr. Robert Buxton, Chemist and Druggist, Cavendish Street, Barrow-in-Furness. Aged 40 years.

On the 25th of May, Mr. John Mealmather Lyon, Chemist and Druggist, Murraygate, Dundee. Aged 29.

On the 30th of May, Mr. Samuel Maskery, Pharmaceutical Chemist, West Derby, Liverpool. Mr. Maskery was a Member, and one of the Founders of the Pharmaceutical Society.

Correspondence.

A Plea for Apprenticeship.

Sir,—In your report of the annual meeting, the President is represented as speaking of examinations as necessary evils, necessary in the Pharmaceutical Society's case because of the impracticability of a thorough training under the modern system of apprenticeship. He believes, however, that the old method was the better one, and that a real training of some years is preferable to an examination lasting but a few hours, as a means of ascertaining one's capabilities. Then he advocates the proposed "curriculum" as a remedy for the evils of the newer method, and enlarges upon the advantages likely to follow its adoption by the Society.

Now it has occurred to me that, granting the possibility of these benefits ensuing, and that the enforcement of a course of study in chemistry, botany and materia medica may lead to the attainment by students of a more satisfactory knowledge of the subjects, according to Mr. Carteighe's own confession there will yet remain a flaw in the education of pharmacists. This defect may be most clearly disclosed by referring back to the reports of the Government Visitor on the examinations for the past two years. I find that by far the greatest number of failures occurred in practical dispensing, pharmacy coming in a bad second, and chemistry, an admittedly difficult science, taking the third place. This is followed in order by prescription reading, and materia medica and botany bring up the rear. I note, also, a very disproportionate increase in the total number of failures in the first, second, fourth and fifth subjects, and a notable decrease in those in chemistry and botany during last year as compared with the previous one. In other words, assuming the examinations to be moderately fair tests of knowledge, we find men coming up less and less fitted to succeed in the three subjects which undoubtedly ought to be studied practically in the shop, and in the one, materia medica, which in its most important part (recognition, tests of quality, etc.) is also best practised there, whilst the sciences, for the better apprehension of which the "curriculum" is specially designed, are evidently better known than before. This being so, one is inclined to ask "how is the 'curriculum' to effect all the wonderful and desirable results expected by its supporters on its adoption?" Without at all depreciating the value of a more thorough acquaintance with the sciences upon which our art is based, may we not rather anticipate that this knowledge may possibly be gained at the expense of the already neglected practical work, and that exact scientists may prove to be but poor pharmacists. Theory is useless to us except we can apply it in practice, and it seems plain to me that the enforcement of the "curriculum" will but show more clearly where the real difficulty lies, and that it is not pupils and students who require to see the errors of their ways so much as principals. For in spite of Mr. Carteighe's idea that apprentices nowadays cannot expect to be trained as of yore, I maintain that those employing them are morally bound to instruct them in their craft in a much greater degree than they actually do at present. Should it be urged that many have not the facilities for so doing, I reply that such as have not do great wrong in receiving apprentices at all. Wrong to the lads in that they deceive them as to the necessities of the business, wrong to themselves by deadening their moral sense, and wrong to the public in sending forth as assistants men who ought to be practically trained, but are only partially fitted for their work. Whilst the examination, passed after a longer or shorter spell of work in library, laboratory and museum, comes as a crowning mockery which no "curriculum" can dignify.

It would appear then that we must look for the root of the evil in the conduct of those already established in business, rather than blame the raw material of our profession. My own experience of pharmaceutical students, which is confirmed by that of successful teachers, is that they work as hard and as thoroughly as any other class. But their rights have been too much neglected in time past. They may fairly demand to be dealt with honestly, and to be taught that which is essential to their future business existence. Instruct them fully in their art, and I venture to prophecy they will gladly acquire the complementary science.

Some few individuals already act towards their apprentices "as they would be done by," and are to be honoured accordingly. When all or the majority follow suit our standing as a profession will be assured. Until then no outcome of any mere expediency system will serve as a remedy to a deeply-rooted moral disease.

Sheffield. John Humphrey.

Communications, Letters, etc., have been received from Dr. Smith, Messrs. Abraham, Saul, Brownen, Highlander, Senex.

NOTE ON CATHA EDULIS.

BY DR. B. H. PAUL.

The use to which the leaves of *Catha edulis* are applied by the Arabs and the accounts that have been given of their stimulating effects naturally suggest the probability that they may resemble, in containing caffeine, the vegetable products that are used for similar purposes, such as coffee or tea, etc., or perhaps have some resemblance to coca leaves. Having been provided with a small quantity of the leaves of this plant, which are known in Arabia by the name of gat or kat, I undertook their examination, specially for the purpose of ascertaining whether they contained caffeine or any analogous substance. The leaves operated upon had been presented to the Pharmaceutical Society by Mr. Redhouse, through the hands of Mr. C. B. Allen, who gave an account of them at the Society's Evening Meeting last February (*ante*, p. 656). The bundle of leaves, as received, corresponded exactly with the drawing given by Daniel Hanbury* to represent the Subbare kat presented to him by Mr. Vaughan, and according to the account given by him it appeared to be the produce of *Catha edulis*.

On digesting the leaves with ether a very dark coloured tincture was obtained, of a deep bluish-green colour by transmitted light when in a thin layer, and in larger masses brownish-red. By evaporating off the ether a very dark green waxy residue was left that was only partially soluble in alcohol. This appeared to consist chiefly of chlorophyll mixed with a waxy substance, and after precipitating the chlorophyll from the alcoholic solution by lime the filtrate gave no indications of the presence of caffeine.

The leaves, after having been treated with ether, were digested for some time with strong alcohol at a moderate heat, and on evaporating the clear tincture about 10 per cent. of a dark coloured aromatic extract was obtained, for the most part soluble in water. The water solution of it contained a considerable proportion of substance which formed a yellow precipitate with acetate of lead, and after that had been separated the clear liquor left on evaporation a brown syrupy residue. Treatment of this residue with chloroform failed to extract from it any caffeine, even after the addition of ammonia.

If the leaves had contained caffeine indications of its presence should have been obtained either in the ethereal or the alcoholic extract, and consequently it may be inferred that the leaves do not contain this substance. So far as I am able to judge from the results of my examination I am disposed to think that the stimulating effects attributed to the leaves when chewed may be due to ethereal oil or some other aromatic and volatile constituent, but to determine this point a larger supply of the leaves would be required. One point to which reference may be made in a general way is the presence of a form of tannic acid in the leaves of *Catha edulis* closely analogous to that met with in tea, coffee, maté and coca leaves. It is indeed possible that the physiological action of these articles of food may be in some measure due to the astringent substances they contain, as well as to the presence of caffeine, theobromine, or cocaine; and from this point of view the further examination of those different analogues of tannic acid may be worth attention.

Analytical Laboratory,
1, *Victoria Street*, *Westminster*.

* *Pharmaceutical Journal*, [1], xii., 269.

OBSERVATIONS ON SOLAR ACTINISM. ITS CAUSE AND EFFECT.

BY WILLIAM CORDUKES STABLES.

The important chemical changes, both of combination and decomposition, produced by the action of the solar rays on many compounds, both organic and inorganic, are well known to every practical chemist. These changes appear to be caused by a general agitation of the atoms of which the body is composed; and this agitation may possibly be more or less intense according to the degree of chemical affinity existing between the elements concerned. But this is doubtful. Dr. Hermann Vogel says, "Decomposition is effected by light, when the atoms of a body are agitated by its undulations, that is to say, are made to vibrate, and if these vibrations are unequal, a separation of the parts takes place, and the body falls to pieces." He also goes on to say that "Red is the colour which gives the fewest vibrations, it is the lowest tone in colours, and violet is the highest, giving vibrations nearly twice as rapid as red." This theory when carefully considered may be made to explain many of the phenomena of daily life, in the domain of operative chemistry, as well as in nature. The author was induced to devote special attention to the matter through observations and experiments made in the preservation of syrup of iodide of iron. It may not be generally known that this syrup, when it has become brown through the separation of free iodine, may be effectually decolorized by exposure for a few days to a powerful light, that is to say daylight. The bottle, however, containing the syrup should be of white glass, and must be kept quite full, so that atmospheric air is entirely excluded. An experiment made by exposing an aqueous solution of iodine gave evidence of the formation of hydriodic acid. This, however, was anticipated, as bromine is known to behave in a similar manner, thus :—$2Br_2 + 2H_2O = 4HBr + O_2$.

This leads to the inevitable conclusion that though water itself is not decomposed by the action of light, this is certainly the case when in the presence of free haloids. The necessity for the exclusion of atmospheric air is sufficiently obvious. The sun is doubtless a powerful oxidizer, especially in the presence of moisture, therefore a most valuable disinfectant. The question arises, as to whether oceanic ozone is not formed by this means, that is to say, by the action of sunlight on water charged with haloid salts, and containing perceptible quantities of free iodine. Again, common chlorinated lime and other similar disinfectants owe their value to the same cause. They are most effective when in the presence of moisture and light; the water being decomposed by the chlorine, and oxygen liberated. It is quite possible that in direct sunlight traces of ozone may also be formed. There is some evidence to the effect that oxidation may be produced by the solar rays in the absence of any perceptible quantity of water, but this is probably due to the presence of atmospheric moisture. The lower oxides of arsenic and lead are instances of this, also sulphide of lead, which becomes oxidized into sulphate when exposed for some time to the sun. The salts of iron furnish us with some remarkable examples of the influence of actinism. Some ferrous salts are converted into ferric, whilst certain ferric salts are reduced to the ferrous state.

Ferric oxalate is an instance of the latter, and can probably be explained as follows :—

$$2Fe_2(C_2O_4)_3 + 2H_2O = 4(FeC_2O_4) + 2H_2C_2O_4 + O_2.$$

A good instance of the former is furnished by ferrous sulphate, which, especially when in solution, becomes rapidly converted into the ferric state, much to the annoyance of the photographer.

Instances of simple combination induced by actinic rays are less frequent, but some are well known. Chlorine and hydrogen combine with explosive violence when exposed to direct sunlight, but not otherwise. The haloid salts of certain gaseous hydrocarbons can only be prepared in the sunshine; and for the preparation of chloracetic acid the same condition has to be observed.

A very useful list of the more important substances acted upon by light has been published by Mr. J. Vincent Elsden, B.Sc., in a communication to one of the photographic year-books.

These instances of simple combination can be readily explained by the theory of atomic agitation produced by the undulatory vibration of the solar rays; the individual atoms being thereby physically intercommingled, and atomic combination accordingly accelerated.

The absence of light produces some of the most curious results in operative chemistry, as well as in nature. Mr. Vincent Elsden, in his most valuable communication above referred to, says that "ferric chloride, tartaric acid and gelatine, dried in the dark, are insoluble, but become soluble in sunlight." Perhaps it may be, that, being dried in the dark, the molecules of the compound combine in a more solid and compact form, their solidification not being retarded by undulatory vibration and consequent agitation of the particles.

Another peculiarity connected with the actinic rays is the powerful attractive influence exercised, not only on vegetation, but also on most volatile solids. A pea or bean, grown under a large box with a single small hole bored in the side to admit light, will travel for several feet in order to effect an exit through this aperture, however small it may be. Tulips, daisies, dandelions and numerous other flowers close themselves in the absence of light; probably owing to the cessation of the chemical decomposition of the sap. Light is absolutely necessary for the assimilation of carbonic acid, and consequent production of chlorophyll, carbon, and, of course, oxygen.

Many volatile substances, such as iodine or camphor, when exposed under a glass shade, invariably condense upon that side through which the light enters. In this case the particles already suspended in the enclosed air are, of course, influenced by undulatory vibration, which, by a mechanical process not difficult to conceive, may rapidly induce undulatory locomotion. Many metallic salts, other than those of silver and gold, are slowly reduced by the action of sunlight. This appears to be the case with uranium nitrate, and this circumstance, in addition to the fact of its reaction with potassium ferrocyanide being interfered with by the presence of ammonia, renders the use of the acetate, in the quantitative estimation of phosphates in urine, eminently preferable.

The instantaneous decomposition of the haloid salts of silver in photography by the action of actinic light, may be readily explained by the theory of unequal atomic agitation, and consequent decomposition. The influence of light upon the various colouring matters is a very wide subject, and one that cannot be entered into here. The general observation may, however, be made, that in nature the brightest and most beautiful colours are to be found in those parts of the world where the light has the greatest chemical intensity. In the tropical regions, where the sun's rays are almost vertical and actinism at its maximum, we find luxurious vegetation with its matchless colour and variety, gorgeous plumage of the birds, magnificent and beautiful animals; all pointing to the existence, not only of higher temperature, but to an activity in solar actinism immensely increased.

The part played by light in the earlier history of our globe is thus beautifully explained by that eminent scientist, Dr. Hermann Vogel, of Berlin. He says :—

"There was a time when the atmosphere was much richer in carbonic acid gas than now. When the incandescent and fluid masses that once formed our earth gradually solidified, when the aqueous vapours were condensed as seas, the atmosphere contained almost all the carbon of the earth, combined with oxygen, as carbonic acid gas. The air was, therefore, at that time, infinitely richer in carbonic acid gas than now. When, at length, the earth had cooled sufficiently for vegetation to be developed, gigantic plants shot forth from the warm ground under the influence of sunlight. They flourished exceedingly in an atmosphere so rich in carbonic acid. The carbon of the carbonic acid passed over into the form of wood, and thus for thousands of years the carbonic acid in the atmosphere was continuously diminished. Revolution of the earth's service succeeded, whole tracts were buried under sand and clay, and these forests decomposed and changed into coal. A fresh vegetation sprouted forth from the newly-formed soil, and again absorbed under the influence of light the carbonic acid of the atmosphere, to become once more engulphed. Thus the carbon from the carbonic acid of the atmosphere was stored as coal in the depths of the earth. Thus the atmosphere, by the chemical effects of light, became continually richer in oxygen, until, at length, after countless ages, it attained that wealth of oxygen which made the existence of man possible."

NOTE ON A MIXTURE CONTAINING SULPHATE OF QUININE AND BICHLORIDE OF MERCURY.

BY T. H. POWELL.

The incompatibility of sulphate of quinine and bichloride of mercury is, I think, not very generally known, and was first brought to my notice a few weeks ago when dispensing a prescription, of which the following is a copy :—

Tinct. ferri perchlor.	℥vj.
Quin. disulph.	48 grs.
Acid. hydrochlor. dil.	q.s.
Liq. hydrarg. perchlor.	ʒiv.
Aqu. dest. . . . . ad	℥xij.

M.

The quinine (Howard's) was dissolved in the tincture of perchloride of iron and half a drachm of dilute hydrochloric acid added; this was diluted with water, and finally the solution of perchloride of mercury poured in, a perfectly clear straw-coloured mixture resulting. After standing a few minutes, however, a heavy white granular precipitate began to form, a considerable quantity ultimately collecting at the bottom of the bottle, and remaining undissolved after the addition of

a drachm more dilute acid. The same result followed when the mixture was made a second time, the sulphate of quinine being first dissolved in an increased quantity of acid. On examination I found the clear liquid still gave evidence of bichloride of mercury in solution, and the precipitate, as might have been expected, proved to be a double chloride of mercury and quinine. We may, perhaps, infer, as the dispenser is directed to use "a sufficient quantity" of dilute hydrochloric acid, that the writer of the prescription was aware of the formation of a precipitate, but believed it was merely due to the inability of the tincture to retain the quinine salt in solution; the addition of the acid, however, does not effect the desired result. I find no mention of the incompatibility of these salts in Squire's 'Companion,' and Pereira merely says a salt of quinine is precipitated on the addition of tannic acid, ammonia, perchloride of mercury and perchloride of platinum, a statement likely to mislead when the character of the respective precipitates is taken in consideration.

I would, therefore, draw attention to the fact that when mercuric chloride and quinine salts are combined in a mixture they form a very sparingly soluble double chloride, which, unless the quantities are small, will be partially precipitated even in the presence of free hydrochloric acid. The dispenser should therefore direct the bottle to be shaken, for however bright the mixture may be when first made up, a precipitate, dangerous because of its weight, may separate after the lapse of some little time.

MEDICATED TABLETS.*

BY G. H. DUBELLE, PH.D.

(*Concluded from page* 929.)

Eucalyptine Tablets.

	Parts.
Powdered double-refined sugar	700
Extract of eucalyptus	120
Rose conserve	80
Mucilage	70
Triple extract of rose	20
Tincture of eucalyptus	10

Gingerine Tablets.

	Parts.
Powdered double-refined sugar	800
Powdered Jamaica ginger	80
Mucilage	70
Grated fresh lemon peel	20
Tincture of vanilla	20
Essence of cinnamon	10

Ginger-Malt Tablets.

	Parts.
Powdered double-refined sugar	600
Extract of malt	200
Powdered ginger	70
Mucilage	70
Grated fresh lemon peel	30
Essence of lemon	20
Triple extract of roses	10

Indian Tamar Tablets.

	Parts.
Powdered double-refined sugar	600
Pulp of tamarinds	200
Powdered senna leaves	100
Mucilage	70
Essence of coriander	20
Essence of lemon	10

* From the *Druggists' Circular*, March.

Japanese Cinnamon Tablets.

	Parts.
Powdered double-refined sugar	800
Powdered cinnamon	80
Mucilage	70
Powdered vanilla	20
Triple extract of roses	20

Lactart Tablets.

	Parts.
Powdered double-refined sugar	700
Lactart	140
Mucilage	70
Orange blossom conserve	20
Rose conserve	20
Powdered vanilla	20
Extract of orange flower	20
Essence of lemon	10

Lacticine Tablets.

	Parts.
Powdered double-refined sugar	700
Lactic acid	200
Mucilage	70
Essence of orange peel	30

Lacto-Iron Tablets.

	Parts.
Powdered double-refined sugar	800
Lactate of iron	80
Mucilage	70
Powdered cinnamon	20
Essence of peppermint	20
Essence of cinnamon	10

Lavender Blossom Tablets.

	Parts.
Powdered double-refined sugar	600
Lavender blossom conserve	200
Rose conserve	100
Mucilage	70
Essence of lavender	20

Milan Vanilla Tablets.

	Parts.
Powdered double-refined sugar	800
Powdered vanilla	80
Mucilage	70
Powdered cinnamon	20
Tincture of balsam Peru	10

Mitcham Peppermint Tablets.

	Parts.
Powdered double-refined sugar	800
Mucilage	70
Conc. essence of peppermint	60
Corn starch	50
Acetic ether	10
Essence of Jamaica ginger	10

Orange Blossom Tablets.

	Parts.
Powdered double-refined sugar	600
Orange blossom conserve	120
Grated fresh orange peel	120
Mucilage	70
Rose conserve	60
Triple extract of roses	20
Essence of cinnamon	10

Orange-Malt Tablets.

	Parts.
Powdered double-refined sugar	600
Grated fresh orange peel	150
Extract of malt	150
Mucilage	70
Extract of orange flower	20
Tincture of vanilla	10

Pancreatine Tablets.

	Parts.
Powdered double-refined sugar	600
Extract of malt	150
Pancreatin	150
Mucilage	70
Essence of aromatic spice	30

Peach Blossom Tablets.

	Parts.
Powdered double-refined sugar	600
Peach fruit conserve	300
Mucilage	70
Extract of peach blossom	20
Essence of bitter almonds	10

Pepsin-Bismuth Tablets.

	Parts.
Powdered double-refined sugar	600
Powdered vanilla chocolate	120
Subnitrate of bismuth	120
Mucilage	70
Saccharated pepsin	60
Essence of cinnamon	30

Pepsin-Malt Tablets.

	Parts.
Powdered double-refined sugar	600
Extract of malt	180
Saccharated pepsin	120
Mucilage	70
Essence of aromatic spice	30

Pinusine Tablets.

	Parts.
Powdered double-refined sugar	600
Extract of liquorice	120
Pine-needle extract	90
Mucilage	70
Extract of malt	60
Powdered opium	30
Essence of fennel	30

Red Carnation Tablets.

	Parts.
Powdered double-refined sugar	600
Red carnation conserve	200
Rose conserve	100
Mucilage	70
Extract of rose carnation	20
Essence of cloves	10

Rose-Malt Tablets.

	Parts.
Powdered double-refined sugar	600
Extract of malt	150
Rose conserve	150
Mucilage	70
Triple extract of roses	30

Seidlitz Tablets.

	Parts.
Powdered double-refined sugar	600
Powdered sulphate of magnesia	180
Mucilage	70
Powdered sulphate of soda	60
Powdered bicarbonate of soda	60
Triple extract of rose	20
Essence of orange	10

Serapion Tablets.

	Parts.
Powdered double-refined sugar	600
Extract of liquorice	200
Chloride of ammonium	100
Mucilage	70
Essence of anise	30

Sicily Lemon Tablets.

	Parts.
Powdered double-refined sugar	700
Grated fresh Sicily lemon peel	150
Mucilage	70
Sicily lemon juice	50
Essence of Sicily lemon peel	30

Sevilla Fruit Tablets.

	Parts.
Powdered double-refined sugar	700
Grated fresh orange peel	90
Mucilage	70
Grated fresh lemon peel	60
Orange juice	50
Triple extract of roses	20
Citric acid	10

Stomachine Tablets.

	Parts.
Powdered double-refined sugar	600
Powdered aromatic spice	180
Grated fresh orange peel	90
Mucilage	70
Powdered vanilla	30
Tincture of cardamom	30

Tonic Malt Tablets.

	Parts.
Powdered double-refined sugar	600
Extract of malt	150
Mucilage	70
Extract of cinchona	60
Grated fresh orange peel	60
Citrate of iron	30
Compound tinct. of cinnamon	30

Vanilla-Malt Tablets.

	Parts.
Powdered double-refined sugar	600
Extract of malt	200
Mucilage	70
Powdered vanilla	70
Powdered cinnamon	30

Extract of Almond Blossom.

	Parts.
Deodorized alcohol	400
Extract of heliotrope	300
Extract of orange flower	100
Extract of jasmin	100
Conc. ess. of bit. almond (1–9)	60
Extract of rose	30
Oil of lemon	10

Extract of Cherry Blossom.

	Parts.
Extract of peach blossom	840
Extract of violets	140
Conc. essence of bitter almond	20

Extract of Lavender Blossom.

	Parts.
Conc. essence of lavender (1–7)	700
Triple extract of rose	300

Extract of Peach Blossom.

	Parts.
Deodorized alcohol	430
Extract of orange flower	400
Extract of jasmin	100
Conc. essence of bitter almond	30
Oil of lemon	20
Tincture of balsam Peru (1–9)	20

Aromatic Spice Powder.

	Parts.
Powdered cassia	500
Powdered Jamaica ginger	200
Powdered cloves	100
Powdered cardamom	100
Powdered galangal	100

Essence of Aromatic Spice.

	Parts.
Deodorized alcohol	800
Powdered coriander	60
Powdered cinnamon	40
Powdered pimento	40
Powdered calamus root	20
Powdered cardamom	20
Powdered long pepper	20

Macerate for two weeks and filter.

Extract of Red Carnation.

	Parts.
Triple extract of rose	450
Extract of orange flowers	200
Extract of acacia	200
Tincture of vanilla	100
Conc. essence of cloves	50

THE BITTER WATERS OF HUNGARY.*

Patriotic Hungarians are grateful to nature for having made the capital of their country the source and centre of many and varied mineral springs. No city is more favoured than Buda-Pesth in this respect. In other countries than Hungary the inhabitants of the capitals have to leave them, and they must often make long journeys if they wish to drink and bathe in mineral water at the fountain head. The inhabitants of Buda-Pesth have many and some unique healing springs almost at their doors, while strangers travel far to profit by the benefits which they can enjoy without leaving home. The capital of Hungary is one of the best frequented watering-places in the world.

The springs in and near to Buda-Pesth consist of three classes. First, there are sulphurous springs ; secondly, there are ferruginous waters ; and thirdly, there are the bitter waters, which cannot be found in greater strength, purity, and abundance elsewhere. Though my intention is to give a detailed account of these bitter waters and of the place where they abound, I may preface it with some particulars about the other springs, which are less known out of Hungary than they deserve to be.

For those readers who have not visited Buda-Pesth it may be useful to state that the city is divided into two parts by the Danube, and united by three bridges. Pesth is on the left bank of the river, and, though the handsomer and more imposing of the two parts, has no mineral spring of importance. Between the two and above the bridge, higher up the river, is Margaret Island, where mineral water issues from the earth at the rate of 180,000 cubic feet in the twenty-four hours. On the right bank is Buda, or Ofen as it is called in German, and here the most important, as well as some of the oldest, springs are to be found. Margaret Island is about a mile in length by about a quarter of a mile in breadth. In olden days it was a royal hunting ground, and was known as Hare Island. At the middle of the thirteenth century King Béla IV. built a church and a convent on the island ; the ruins of both still remain. Margaret, the king's daughter, entered the convent, and died there in the odour of sanctity in 1271. The island was named after her. As is well known, the virtues of good Catholics, like those of good wine, mature with age ; besides, they become magnified by tradition, and thus it was, perhaps, that nearly three centuries after Margaret's death she was elevated to the dignity of a saint.

The hot mineral water which is now the chief attraction on Margaret Island is a discovery of comparatively recent date, and was the result of sinking an artesian well. The water is sulphurous in character, and is used both internally and externally. Though smelling strongly of sulphur it has not an unpleasant taste. The bath house is a large and handsome building, and the Hungarians think that there are few finer establishments of the kind. It contains upwards of one hundred separate baths in stone, marble, porcelain and metal. The floors of the bath rooms are formed of red marble. Besides the mineral water baths electric and other baths are contained under the same roof. Indeed, it is not without justice that this bath house is pronounced one of the finest and most comfortably arranged to be found anywhere. The grounds in front of it are beautifully laid out and kept in perfect order. Archduke Joseph, who has been the proprietor of Margaret Island for several years, deserves credit for what he has done there, all the improvements being due to him. Besides beautifying it and providing luxurious bathing accommodation, he has built two hotels for the reception of visitors who prefer living on the spot to journeying backwards and forwards by boat from the city. At the end nearest the city, and adjoining the first landing-stage for the steamers plying between it and the island, there is a large restaurant and concert room. Here people come to hear the music, to dance and enjoy themselves, so that the island is a place of daily resort for amusement, as well as one to which invalids go for relief.

Another island, smaller than this one, and connected with it and the left bank of the river by two iron bridges, also contains a mineral water bath house, to which the mineral water is conveyed through pipes from an artesian well. It is called Palatine Island ; the artesian well is in the Stadtwäldchen. This well took upwards of nine years to sink, and is reputed to be the deepest artesian well in the world. The mineral water issues from it at a temperature approaching boiling-point, a cloud of steam showing the place where the water rises. Far more noteworthy for the historical student is the fact that near the spot where this well has been bored is the meadow wherein from the tenth to the fourteenth century the Hungarian Parliament met and deliberated under the canopy of heaven. There is no record of any member complaining of the ventilation being bad, and the sittings being too protracted.

In Buda or Ofen the baths and springs have many historical associations. They have been known and used for eighteen centuries. Remains from the time that the Romans occupied this place indicate considerable physical changes in the ground. Nevertheless, some of the baths used by them are in use now, and the sulphurous water which they considered curative retains the same reputation. Chief among these baths is the Kaiserbad. After the Roman occupation was over, this bath was beautified by the Hungarian King, Matthias Corvinus. When the Turks were masters of Buda this bath was enlarged by Mahomed Pasha. Not far distant from the Kaiserbad is to be seen, in the midst of a vineyard, the tomb of a Turkish holy man, which is still an object of pilgrimage for pious Mahomedans out of the remote East. Centuries have elapsed since the tomb was erected. Its preservation is owing to a special provision in the treaty of peace made in 1699, after the rule of the Turks in Buda was ended by the victories of the Christians. The Romans, the Tartars and the Turks have waged war in turn at Buda-Pesth. Both the Romans and the Turks have left behind them some not unpleasant memories, and many tokens that they were civilized and versed in the arts of peace and the pleasures of life. The Tartars, on the contrary, have left nothing to mark their passage and power save traditions of their savage cruelties, and of their ferocity as destroyers.

The Kaiserbad contains not only mineral water, but also Roman and vapour baths, and a large swimming bath. Everything is designed for comfort, and pleasure is combined with it. A band plays several times daily during the season, which lasts from the middle of May till the middle of September. During the winter the chief frequenters of it are the citizens of Buda-Pesth, and the vapour bath is then chiefly used. The purposes for which persons resort to the baths I have named, and others of less importance which I need not describe, are to obtain relief from chronic gout and rheumatism, catarrh of the chest and stomach, constipation and intermittent fever. I should add that there are some iron springs in Pesth which are used for bathing, but they are not specially remarkable. Wherever one travels in the Austro-Hungarian Empire one finds Gies-hübler water, which comes from a place of that name in Bohemia, the favourite drink at table, where it is taken plain or mixed with wine. Many other table waters are in rivalry with it, and the citizens of Buda-Pesth lay much store upon one which was discovered in 1879 at Moha, and which is

* From the *Times*.

called St. Agnes water. Being assured that it was quite as good as Giesshübler I tried it, but I was not convinced. St. Agnes water is a pleasant beverage, but Giesshübler is pleasanter still, and, I should think, much more wholesome.

Having briefly described the principal mineral baths and springs in the Hungarian capital I shall proceed to describe the bitter waters, which possess even more general interest and which are a short distance from it. Half an hour's drive on the right bank of the Danube brings one to the spot where these waters are found. They are in a wide plain, and on the slopes of the hills which rise on one side are vineyards, where the grapes grow from which the wine Ofen Adelsberg is made, a wine which is classed among the best produced in Hungary. Unlike several mineral springs nearer the city, the bitter waters were not discovered till the year 1853. The famous Sprudel at Carlsbad is said to have been accidentally made known by a dog; the spring at Teplitz is said, probably with as great truth, to have been found by an intelligent pig; at Homburg the fondness of horses and cattle for the water in the marsh where the Elizabeth, Louisa, Ludwig and other springs now attract drinkers first made known the fact that the water had peculiar virtues. Indeed, some fable or strange tale is associated with the discovery of most mineral springs. No miracle was wrought when the existence of the bitter waters was made known. The story is both simple and true. About the year 1853 an inhabitant of Buda or Ofen was the proprietor of the ground upon which the Queen Elizabeth Salzbad now stands. He was named George Schleiss, and he was a market gardener. The only water accessible was at some distance from his garden, and he required much of it in the hot weather to water his vegetables. Unless the ground be plentifully watered during the hot months no plants will thrive in this locality. Accordingly he dug a well to the depth of thirty feet and found water in abundance. As it had a salt taste he did not use it for drinking purposes, but applied it solely to irrigate the ground. One day a gentleman who had been out hunting was returning home, and being thirsty he drank of the water, which he at once pronounced to be highly mineralized, and he advised the proprietor of the well to have this tested by analysis. George Schleiss took some to a chemist named Francis Unger, who was so much impressed with its medicinal properties that he entered into partnership with him, and from the year 1853 the bitter water became an article of consumption and commerce.

Before the fame of this water was noised throughout the land the inhabitants of Buda-Pesth became frequent drinkers of it; they bathed in it also, and many derived much benefit. In consequence of this a bath-house and pump room had to be erected, and a few rooms were provided for those who desired to pursue the treatment on the spot. Medical men all over the Continent soon learned the medicinal value of this water and prescribed it to their patients; thus a demand sprang up for it, and searches were made for other places where it might be obtained. Several other wells yielded bitter water; but many wells were sunk in vain, and much money was wasted in attempts to find it where Nature had not been generous. As in the case of the petroleum wells in the State of Pennsylvania and the Province of Ontario, so was it in this one. For one petroleum spring which yielded a fortune, two absorbed capital. Now, however, the limits of the bitter water yielding ground have been determined, so that no one thinks of wasting time and losing money by seeking for it outside a particular area.

At present about forty wells yield bitter water, and seven persons or companies are their proprietors, and superintend the bottling and sending of it to market. The one first discovered is nearest the city; the one best known in England is the furthest from it. This belongs to Herr Andreas Saxlehner, and bears the name of Hunyadi János. If not actually introduced into England by the company which supplies Apollinaris water, this bitter water has been chiefly pushed by that company, which contracted to take a certain number of bottles yearly. Before noticing the wells separately I may remark that the water from one resembles generally that from another. The differences are in the respective quantities rather than in the nature of the ingredients. In certain cases the bottling is conducted with greater care than in others, and this causes the water to keep longer and in better condition. Some of the wells are decidedly weaker than others. The possessors of the weaker waters cannot help themselves; but those who have several wells can combine the waters of each, and thus produce a good average strength. This is done, I believe, by Herr Saxlehner, who bottles more water than any competitor, and who has several wells on his property. It is with this bitter water as with Vöslau, the celebrated Austrian wine. The demand for one brand of that wine, called Vöslauer Goldeck, is larger than for any other; yet though the wine of one year may vary in quality, there is never any appreciable difference between one bottle of Vöslauer and another. This is understood to be arrived at through what is styled "blending." Hungarian bitter water can be, and sometimes is, "blended" also.

Next to the Hunyadi János comes the Rákóczy well, the water from which is stated to be so strong that it bears mixing largely with plain water or milk without detriment to its aperient qualities. The proprietors of this well produce a salt by evaporation which has many of the properties of Carlsbad salt. The proprietors of the Victoria well say that the water from it is stronger still. I may remark, in passing, that over the area where the bitter water is found, and in close proximity to a well containing it, a well sunk to the same depth will yield potable water which is free from all trace of mineral substances. The explanation doubtless is that all the water at a certain depth is uniform in character and is non-mineralized, but that the water in particular spots derives its mineral constituents from the strata in which it lies, or through which it passes. Three other wells may be named. They are—first, Franz Josef; secondly, Hunyadi László; and, thirdly, Æsculap. The second belongs to a French, and the third to an English company.

The principal constituents of all these bitter waters are the sulphates of magnesia, soda, and lime, chloride of sodium, and bicarbonate of soda. The percentage of carbonic acid gas is small. It is owing to the large proportion of sulphate of magnesia contained in them that they are called bitter waters, sulphate of magnesia being called "bitter salt" in German. At one time English children, as well as grown-up persons, were painfully acquainted with this salt under the name of "Epsom." But the sulphate of soda and other ingredients cause the Hungarian bitter water to be a pleasanter aperient than Epsom salts and quite as effective. Abernethy had a great dislike to the employment of Epsom salts. He used to compare the effects of taking a dose to the irruption of wild and sanguinary Arabs into a peaceful village. On the other hand, the operation of Hungarian bitter water may be likened to the action of a policeman, directing and compelling obstructionists to move on. Had Sydney Smith been alive he would have welcomed this bitter water as a blessing to men. He delighted in mild yet potent remedies. In one of his humorous passages he ridiculed an assumed attempt to cripple the French army by prohibiting the export of rhubarb. Certainly the French are fond of and, it may be presumed, are good judges of aperient medicines, and it is natural, then, that the sale of Hungarian bitter water in France should be very large. All over the Continent the annual consumption is enormous, being relatively far greater than in England, where the water is not yet so well known. I am informed that the demand increases in foreign countries at a rapid rate, and that many million bottles are dispatched annually. I have before

me a large number of testimonials from medical men in favour of this water. It seems to cure or benefit as many forms of disease as any quack medicine. I note that it has been used with remarkable results in the Imperial and Royal Hospital for Lunatics at Vienna. I fancy that none of it has yet been drunk by the Bulgarians.

I should not advise any visitor to Buda-Pesth to proceed to the place which yields bitter waters if there were nothing more to be seen than water pumped from wells and poured into bottles. Even this monotonous spectacle cannot be enjoyed at every establishment I have named, as the proprietors of some wells seem to fear lest strangers should discover hidden secrets if admitted within their premises. They certainly need not dread any one betraying an unquenchable thirst for the water itself and trying to drink a well dry. A very little bitter water goes a very long way. In this case moderation is a necessity rather than a virtue. Nor is the scenery particularly beautiful. What I found to interest me, and what might interest others also, was the fine bathing establishment belonging to Messrs. Mattoni and Wille, and called the Elizabeth Salzbad. It was here, as I have already said, that bitter water was first discovered. Here, too, persons requiring treatment went from Buda-Pesth to bathe in the water and drink it. Till the year 1881 all the arrangements were rude and primitive; now everything is done that the most fastidious visitor can desire. The baths are excellently arranged, and there is good accommodation for residents during the season, which begins on May 1 and closes on October 1. During the season omnibuses ply every half hour from five in the morning till eight at night between the Elizabeth Salzbad and Franz-Josefs-Platz in Buda-Pesth.

During the summer months many hundreds of persons sojourn at the Elizabeth Salzbad for the purpose of regular treatment under the care of the physician attached to it. Ladies are in the majority. It seems that this water is quite as efficacious in many female maladies as that of Franzensbad. Year after year the number of patients increases, and the supply of rooms is not equal to the demand. On this property, which covers eleven acres, there are ten wells. It has been ascertained that bitter water abounds all over it, so that more wells could be sunk if required. The original spring is used for drinking. It is the mildest of all the springs, and on that account can be employed with the greater ease and advantage. The water is not one to be drunk from choice, but when taken on the spot it is less unpleasant than when drawn from a bottle. As the dose is half of a small tumbler, not much time need be wasted in taking it.

The medicinal action of the bitter water when employed for a bath is said to be marked and useful in cases of gout, rheumatism, diseases of the bowels, nervous diseases, and female complaints. I took a bath, and found that the skin was slightly irritated, and also that the whole body was strengthened; but I have felt the same effects from a hot salt water bath. However, as there is no salt water near Buda-Pesth, this bitter water may be an excellent substitute, even if it be nothing more. A band plays every day near the pump room. There is also a reading room and library for the use of visitors, and a restaurant where one can dine as well as in the city. In one respect the dwellers at the Elizabeth Salzbad are better off than those who put up at a Buda-Pesth hotel, for they are not worried with too much music. At the hotels and restaurants in the city music is provided every way in over abundance. The national dance of the Hungarians is called Czardas, and resembles a Scotch reel in many things, and among them in its interminable length. Now, when a Hungarian band begins to play it never seems to know, any more than the dancers, when to stop. If a musician be tired he rests, but the others continue to produce a variety of sounds having much resemblance to the weird and wearying strains of bagpipes. Hungarian music, like Hungarian bitter water, is pleasantest in moderate doses.

Visitors to the Queen Elizabeth Salzbad have the opportunity of seeing the whole process of preparing the water for export. They may drink as freely of it as they please, a privilege which, I understand, they never abuse. There are no secrets, nor is there any affectation of mystery in this establishment. Every question I put was readily answered. I learnt that this bitter water is less known in England than others which are extensively advertised; still there is some demand for it, owing to the *Lancet* and *Medical Times and Gazette* having praised it highly. It bears two names, one being "Royal Hungarian Bitter Water," the other "Hunyadi Matthias." In Germany and Austria, where it is known as "Ofner Königsbitterwasser," the sale is large, and a considerable quantity is sent to Italy and America. In France, however, the sale is largest, owing to the Academy of Medicine having pronounced it very good, and to the leading French medical men prescribing it. It is one of the few foreign mineral waters which patriotic Frenchmen drink with satisfaction, and they drink it under the name of "Eau Purgative Hongroise."

Whether the attractions of Buda-Pesth in the shape of mineral waters are sufficient to warrant an invalid making the journey in order to undergo treatment there cannot easily be determined. It is probable that in certain cases the labour would be repaid. The city itself is well worth a visit, and the hotels are quite as fine as those of Vienna. Hungarian wine is renowned, and Hungarian cooking is, to my mind, far better than that of Germany, and in some respects superior to that of France. As is well known, the Hungarians are as proud of their language as of their country, and they speak it in preference to German. But the larger proportion of them know German also and are quite ready to converse in it. In Prague and other parts of Bohemia, where the Czechs are striving to substitute their language for that of the country at large, great reluctance is shown to speak German even by those who understand it perfectly. The visitor to Hungary is glad to find that this foolish form of patriotism is not displayed there, and he will be at no loss if he have a colloquial knowledge of the German tongue.

Considering the superabundant supply of mineral waters in and around the Hungarian capital, it may appear strange that any one should fall ill there, or, being ill, should not rapidly recover. Perhaps there would be less need for using mineral water if the ordinary drinking water were wholesomer and if drainage were better. In many streets the odours are as overpowering as the music in some of the restaurants. The drinking water is taken from the river. It is infinitely preferable to sail upon than to drink the waters of the beautiful blue Danube.

ADULTERATION OF OLIVE OIL.

In a report on the trade of Leghorn for the year 1886, Mr. Consul Inglis says: —

"The exportation of adulterated oil, in what are commonly known as Florence flasks, continues, and has indeed received a fresh development. Whereas formerly the practice of certain firms was to put in these flasks the lowest quality of olive oil (not produced in Tuscany, but coming from other districts, such as the Romagna), mixed with cotton-seed oil, of late the cotton-seed oil pure and simple has been sent, the cases being branded 'olive oil' of superlative quality. But as cotton-seed oil is to be had cheaper in England than in Italy, things have culminated logically enough in exporting the empty flasks packed in the usual cases to London, there to be filled with cotton-seed oil, and, of course, palmed off upon the public as 'olive oil' of fine quality. The reason for this state of things is not far to seek. At one time really pure and good olive oil was exported in these flasks, but over-competition and the beating down of prices by importers in England—who, be it said, care nothing

about quality, and insist only on low prices—led at first to inferior olive oil being substituted, and next to adulteration with cotton-seed oil, not to mention short measure in the flasks. Neither the flasks nor the cases in which they are packed have at any time borne the brand of the exporter, this not being allowed by the importers, as prejudicial to their particular interests; hence it followed that the best firms in the Leghorn export trade have stood exactly on the same level with the English public as the firms who resort to the practices described above, both being alike unknown to the English consumer.

"The result is now apparent. The Florence flask trade—a speciality of Leghorn, these flasks not being procurable out of Tuscany—is utterly discredited, and has been totally abandoned by the leading firms engaged in the export trade in olive oil, who refuse to lend themselves to such discreditable practices. Therefore, persons buying oil in Florence flasks may know what to expect now.

"It is not an easy matter to get the genuine Lucca oil of fine quality in England; the demand is chiefly for cheap oil, the ignorance of the public being traded upon to a great extent. If the public wish to get Tuscan, or Lucca oil, as it is generally termed, pure and of the best quality, they must look to the standing and reputation of the firm by whom the oil has been imported and bottled, and whose brand can be considered a sufficient guarantee, since, unfortunately, the leading firms in the export trade from Tuscany are unknown to the public in England. Failing these precautions they will probably get rubbish."

THE BLACK BEES OF TASMANIA AND THEIR MEDICINAL HONEY.*

In a recent communication to the Paris *Académie de Médecine*, which is published in the 'Progrès Médical' for April 16, Dr. Thomas-Caraman, of Forges-les-Eaux, reported upon a matter which must be regarded as among the most notable of the therapeutic novelties of the day, being nothing less than the discovery of a sort of honey possessing in a remarkable degree the medicinal properties of the *Eucalyptus globulus*, or of some species of *Eucalyptus*.

It seems that about three years ago a distinguished French naturalist, M. Guilmeth, who was travelling in Tasmania, came suddenly upon a grove of gigantic eucalyptus trees, from 260 to 390 feet high, and with a trunk so large at the base that it took forty of his Kanackas, joining hands, to reach around one of them. High in these lofty trees he discovered what he at first took to be enormous galls, but which he soon ascertained were the dwelling places of swarms of small black wild bees, of a variety before unknown to him. Dr. Thomas-Caraman proposes for this bee the provisional name of *Apis nigra mellifica*. Besides being black and smaller than the ordinary honey bee, this wild bee has its languet rather more developed than that of the domestic bee. M. Guilmeth attempted unsuccessfully to domesticate it in Tasmania. He caused some of these immense trees to be felled, and secured the honey. The largest individual store of honey weighed as much as 11,000 pounds avoirdupois.

The honey is described as a thick, homogeneous, somewhat transparent, syrupy liquid, of a deep orange colour; having an odour suggestive at once of its containing eucalyptus principles; very soluble in water, in milk and in wine, but much less soluble in alcohol; and very difficult of fermentation. Its specific gravity is 1·44, and it rotates the polarized ray 22°. In round numbers 1000 parts contain 611 of invert sugar (mostly levulose), 2 of ash, 215 of water, and 171 of active principles, including eucalyptol, eucalyptene, terpene, cymol, and odorous, resinous and colouring matters. Its taste is described as very pleasant. Administered to dogs, to the amount of from 2½ ounces to 5 ounces a day, it slows the heart's action, and this effect soon becomes so pronounced as to suggest, in Dr. Thomas-Caraman's words, a struggle between the pneumogastric nerve and the cardiac ganglia. At the same time the temperature falls about 1° C. The effects last for at least twenty-four hours, and include a slight tendency to sleep, but without any symptom of toxic depression. As the result of experiments on himself and on one of his friends Dr. Thomas-Caraman states that on taking a tablespoonful of the honey in a little tepid water or milk, after a few minutes one perceives a gentle agreeable warmth take possession of the whole person. At the end of half an hour the elimination of the active principles by the air passages having begun, the voice becomes clearer and the breath perfumed; the lungs feel more elastic, more supple. Having continued the use of the honey for a week, four tablespoonfuls daily, the author who speaks of himself as respectably fleshy, found that he could go up two pairs of stairs, two steps at a time, without stopping to take breath or feeling at all blown. At the same time there was slight diuresis with an increase of urea, and the urine had a decided odour suggestive of that of the *Acacia farnesiana* (the plant from which the perfume called "new mown hay" is made).

Besides his observations of the physiological action of the honey, the author cites certain trials of it as a medicine. These data lead him to consider it a valuable aliment; an efficient and palatable substitute for cod liver oil; an anticatarrhal; an agent affecting the heart in a manner comparable to the action of digitalis, but free from the inconvenient properties of that drug; a febrifuge; an antiparasitic specially applicable to the destruction of the micro-organisms of tubercular and scrofulous neoplasms, the *Leptothrix vaginalis*, and oxyures; and, finally, an antiblennorrhagic, by virtue of its being more actively eliminated by the uro-genital tract than either copaiba or sandal oil. It is destined, he thinks, to play a great part in the treatment of laryngeal, bronchial, pulmonary, cardiac, and scrofulous affections; in malarial and typhoid fevers; in whooping cough and influenza; and in renal, vesical, and vaginal troubles.

It may be said that Dr. Thomas-Caraman holds up to our view a somewhat rose-coloured picture, but it must be confessed that there is no inherent improbability in the notion that an animal organism like that of the bee may be able to elaborate the medicinal principles of the eucalyptus in greater perfection than the art of pharmacy can furnish them. Should his impressions be confirmed, however, the practical question at once comes up as to the extent to which commerce can supply us with the genuine wild honey of Tasmania, and it is much to be feared that in case of any considerable demand, we shall witness a repetition of what took place in connection with the supply of Chian turpentine, and more recently that of alveloz—the substitution of products more or less adulterated, if not wholly factitious. It would be interesting to know to what particular species of the genus *Eucalyptus* the gigantic trees found by M. Guilmeth belong. Perhaps the active principles of the tree may yet be made available without the intervention of the *Apis nigra mellifica*.

* From the *New York Medical Journal*.

FORMATION OF ALBUMINOIDS.

Herr K. O. Müller has investigated the mode of formation of albuminoids, especially of asparagin, in a variety of plants, and has arrived at the following conclusions. Asparagin is formed in the dark, and disappears again in the light, but has no pathogenic properties. Its formation does not appear to depend on the absence of carbohydrates. Its formation commences as soon as the process of assimilation is suspended; it is a secondary product of assimilation, being formed out of the carbohydrates, and the nitrogenous inorganic constituents of plants.

The Pharmaceutical Journal.

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Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

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POLLEN GRAINS AND HAY FEVER.

THREE years ago attention was called, in these columns, to a pamphlet containing the substance of an interesting lecture on hay fever that had just previously been delivered by Dr. MORELL MACKENZIE. In that lecture, after discussing some of the multitudinous theories that have been put forward from time to time in respect to the cause of this apparently trivial—but to those who suffer from it decidedly inconvenient—complaint, Dr. MACKENZIE showed a decided leaning towards one which pointed to a relation of cause and effect existing between pollen grains and hay fever. The intervening three years have not only sufficed to develop the pamphlet into a respectable volume,* but they have also yielded a considerable increase to previously existing knowledge on the subject, part of which has been contributed by Dr. J. N. MACKENZIE, of Baltimore, whilst within the last few days Sir ANDREW CLARK has devoted a "Cavendish Lecture" to the treatment of hay fever. Sir ANDREW CLARK, while recognizing the value of the investigations of Drs. BLACKLEY and MACKENZIE, does not agree that the pollen of grasses is the sole factor, though he admits it is a most important exciting agent of paroxysms of hay fever, and he lays more emphasis upon the conditions obtaining in some persons which render them more susceptible to the influences that provoke hay fever. Dr. MACKENZIE, however, now unhesitatingly defines hay fever as "a peculiar affection "of the mucous membrane of the eyes, nose and air "passages, giving rise to catarrh and asthma, almost "invariably caused by the action of the pollen of "grasses and flowers, and therefore prevalent only "when they are in bloom." Further investigation has also confirmed the opinion that sufferers from hay fever are victims to an idiosyncrasy, though in what the idiosyncrasy consists has not been satisfactorily made out. Not only does the complaint seem to have originated in this country, and to be practically limited to members of our particular branch of the human race, especially those resident in this country and in the United States, but it shows a marked preference for persons of cultivation. Sir ANDREW CLARK refers to it as choosing the man before the woman, the educated before the ignorant, the gentle before the rude, and the courtier before the clown; further, as preferring the temperate to the torrid zone, the city before the country, and the Anglo-Saxon before all other races. It may be that in this there will be found some compensation for the infliction, and it has been somewhat banteringly suggested that when this idea of the intimate connection between hay fever and culture has been firmly grasped by the public mind, the complaint will, perhaps, come to be esteemed, like gout, as a sign of breeding. Dr. MACKENZIE, moreover, considers that it has now been clearly shown that the complaint is of quite recent growth, and that it is doubtless one of the earliest products of the "plague of nerves" which seems to have fallen on this country, though it is hardly consistent with popular views as to the distribution of this "plague" to learn that men are three times more liable to the disease than women. However, now that the cause of the complaint is better understood, it follows that methods of treatment for its prevention and cure should become more rational, and an important part of the new volume, as well as of Sir ANDREW CLARK'S lecture, is devoted to this subject. But since it does not lie with us to discuss medical methods, it must suffice here to say that some of them depend upon the mechanical prevention of access of pollen grains to susceptible mucous membrane, and others upon the use of agents for the relief of irritation already set up, among which the ubiquitous cocaine stands prominent.

Of course, if it be granted that pollen grains constitute the determining cause of hay fever the source of the mischief must be looked for among the plants that depend for their fertilization upon the action of the wind, of which the Graminaceæ form an important group. At one time it was thought that the sweet-scented vernal grass (*Anthoxanthum odoratum*) and the oat-like soft grass (*Holcus avenaceus*) were especially pernicious in this respect. But there seems now to be no good reason to suppose that their pollens are more active than those of the meadow foxtail (*Alopecurus pratensis*) and of some species of *Poa* and *Lolium*. The pollen of rye is considered to be still more potent than some of these, and the pollens of wheat, oats, and barley are said to be also very active. The six grasses named by Dr. MACKENZIE as the most productive of hay fever in this country are *Anthoxanthum odoratum*, *Holcus avenaceus*, *Alopecurus pratensis*, *Poa fertilis*, *Poa trivialis*, *Poa nemoralis* and *Lolium perenne*. To the pollen grains of these plants and their allies the greater part of the mischief is thought to be attributable, for although some cases of hay fever occurring early in the year may be referable to pollen

* 'Hay Fever and Paroxysmal Sneezing: their Etiology and Treatment.' With an Appendix on Rose Cold. By Morell Mackenzie, M.D. Lond., etc. Fourth Edition. London: J. and A. Churchill.

from pines and other anemophilous trees, it is estimated that during the period of the year in which hay fever chiefly prevails as much as 95 per cent. of the pollen grains suspended in the atmosphere is derived from Graminaceous plants. Some attempts have been made to estimate the number of pollen grains diffused through the atmosphere by counting with the aid of a microscope the grains deposited upon slips of glass coated with a sticky composition and exposed to the atmosphere under varying conditions. The numbers were found to be largely affected by time of the year, temperature, wind and rain, as well as by locality. Even in the midst of a vast expanse of meadow land and in the middle of summer they fluctuated greatly within a short time, rising gradually to the highest point at the end of June and falling off rapidly in July. In June the number of grains deposited daily on a square centimetre of exposed glass varied from 20 on the 17th to 1250 on the 25th. The former day was rainy, with a temperature of 103° in the sun ; the latter day was showery and windy, with a temperature of 67°, but it had been preceded by one that was extremely fine and hot and hay-cutting had been commenced in some of the neighbouring fields. Glasses exposed in the early morning on the 12th of July, during a two hours' railway journey from London to Bognor, showed a deposit of 28 grains to the square centimetre, and later in the same day 37 to the square centimetre were deposited during a journey from Bognor to Brighton. Even in the "long unlovely" streets of Marylebone deposits of 14 and 15 grains to the square centimetre were observed on the 24th and 27th of June. Across the Atlantic, however, the pollens of grasses do not appear to exercise so powerful an influence, their place as the alleged chief factors of hay fever being taken in the United States by the pollen of a composite plant, the *Ambrosia artemisiæfolia*. This plant, which is widely distributed and grows abundantly, blossoms in August and September, the time when hay fever most prevails in the United States. It is not an European plant, but Dr. MACKENZIE suggests whether some cases of hay fever that occur in this country near the seaside may not be due to the pollen of the nearly-allied plant *Artemisia maritima* or its variety *Artemisia gallica*. Another plant that is credited with being an offender in this direction is the rose, and several cases are reported in which an analogous catarrh, known as "rose cold," was coincident with and apparently dependent upon the neighbourhood of roses in bloom.

In explanation of the mechanism of the disease it has been suggested that the granules of the pollen cells, which are much smaller than blood corpuscles, enter the blood vessels by actual penetration of the walls, and that it is not improbable that the *malaise* experienced in hay fever is due to the presence of this granular matter in the general circulation. But Dr. MACKENZIE thinks it probable that the action of pollen in producing hay fever is dependent more on its vital than on its chemical or physical properties, and that as a living organism, capable of undergoing some degree of development when deposited on mucous membrane more or less exposed to the air, it possesses exceptional characters. Experiments have shown that even on persons not ordinarily subject to hay fever pollen is capable of exercising a peculiarly irritating action. The pollen of any of the previously-mentioned grasses, when rubbed into the nasal mucous membrane of a healthy person, has been found to produce a feeling of stuffiness in the nose that comes on in the course of an hour or two and lasts several hours, the sensation being like that experienced at the commencement of a cold, but without sneezing or running from the nose. Indeed the effect thus produced by pollen upon "non-susceptible" persons is said to exceed that resulting from the use of tannin, alum, and many substances of much stronger chemical character.

The motion for going into Committee on the Pharmacy Acts Amendment Bill now stands among the House of Commons' orders of the day for Tuesday next.

* * *

Last week, in calling attention to the announcement that the list of subscriptions and donations in response to the special decennial appeal on behalf of the Benevolent Fund would be kept open for two months longer, we expressed the hope that the liberality of the Council in setting aside the sum of £240 for "Jubilee gifts" to the annuitants would be compensated by further special contributions to the Fund. We are able to state that during the week several donations from firms have been received, and one of these, for the handsome sum of one hundred pounds, was accompanied by a letter written in so admirable a spirit, that we are pleased to have the opportunity of reproducing it here:—

"56, Hanover Street, Liverpool,
"*June* 7, 1887.

"Richard Bremridge, Esq.,
"Secretary, Pharmaceutical Society of Great Britain,
"17, Bloomsbury Square, London, W.C.

"Dear Sir,—We shall have much pleasure in giving a donation to the Benevolent Fund of the Pharmaceutical Society, and this being the Jubilee year of Her Majesty's reign we have decided to give more than we would have done under ordinary circumstances. You can therefore put the name of our firm down for £100 (one hundred pounds).

"The claims of this Jubilee year are numerous, but our feeling is that all firms in showing their appreciation of any prosperity they may have enjoyed during Her Majesty's reign, cannot do better than support any benevolent institutions which may exist in connection with their own particular business. We trust others in the trade may see their way this year to give special subscriptions, and in this way help to put the Benevolent Fund of the Pharmaceutical Society on a thoroughly good basis. "Yours faithfully.

"EVANS, SONS AND CO.

"P.S.—We will hand you the cheque on Jubilee day, June 21."

* * *

An inability on the part of vendors to distinguish clearly the dividing line between alcoholic medicines and alcoholic beverages has occasionally entailed in this country inconvenient interposition on the part of the Inland Revenue authorities. But the

inconvenience is infinitesimal compared to what must obtain in Kansas, where a new liquor law requires that any person wishing to open a drug store must secure—not an educational qualification, but—the signatures of twenty-five women to a petition to that effect! The explanation of this strange anomaly is that, in the words of the *Texas Druggist*, in States where prohibitory liquor laws have been enacted, drug stores have largely taken the place of drinking saloons. Our contemporary, contemplating the possibility of similar legislation in Texas, says it will be followed by the doubling of the drug stores in every town, the proprietors of which will keep a small stock of drugs to make their calling plausible. But their chief commodity will be a stock of ready-written prescriptions for "spiritus frumenti, Oj.," requiring only the name of the patient to be filled in as an authority for dispensing. As to finding medical men in the towns of the State who will, for a consideration, sign such blank prescriptions by the dozen, there seems to be no doubt.

* * *

A correspondent writing from Victoria says that during the last few months a number of assistants have landed in Australia, probably induced to leave England by some correspondence that appeared in this Journal, some of whom would probably like to be home again. It has come within his knowledge that one wholesale house in Melbourne has the names of twenty-four assistants wanting situations, twelve of whom were qualified, and most of whom had recently arrived from home.

* * *

Glasgow is to furnish the site of an international exhibition to be held next year under the immediate patronage of Her Majesty the Queen, the guaranteed fund for which has already reached nearly a quarter of a million sterling. The site which has been granted by the city corporation extends to about sixty acres, of which about ten acres will be covered by the exhibition buildings; it comprises the western portion of the Kelvingrove Park and the slopes of Gilmorehill, which are crowned by the University buildings. The exhibits will be grouped in twenty-two classes, of which probably those most interesting to the readers of this Journal will be "Class XII., Chemistry and Apparatus, Processes, and Appliances connected with Applied Chemistry and Physics; Philosophical Instruments and Apparatus;" and "Class XIII., Food (including drinks)."

* * *

A meeting of the Chemical Society will be held on Thursday, June 16, at 8 p.m., when a ballot will take place for the election of Fellows, and the following papers are to be read:—"The Thermal Constants of a Liquid Mixture," by Professor W. Ramsay and S. Young; "Derivatives of Hydrindonaphtene and Tetrahydronaphthalene," by Dr. W. H. Perkin, jun; "The Formation of Closed Carbon Chains in the Aromatic Series," by F. S. Kipping, B.Sc., and W. H. Perkin, jun.; "The Action of Ethylene Bromide on Ethylic Sodacetoacetate," by P. C. Fraser, Ph.D., and W. H. Perkin, jun.; "Derivatives of Pentamethylene," by H. G. Colman, Ph.D., and W. H. Perkin, jun.; "Derivatives of Hexamethylene," by P. C. Freer, Ph.D., and W. H. Perkin, jun.; and "An Attempt to Synthesise a Carbon Ring containing Seven Carbon Atoms," by P. C. Freer, Ph.D., and W. H. Perkin, jun.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The stated monthly meeting of the Council was held on Wednesday, the 1st inst.

Present—Messrs. Wells, Beggs, Brunker, Hayes and Simpson.

As a quorum failed to attend, no business was transacted.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The last general meeting of the thirty-eighth session was held at the Royal Institution on Thursday evening, April 28. The President, Mr. A. C. Abraham, F.C.S., in the chair.

The minutes of the previous meeting were read and confirmed and several donations announced. A vote of thanks to the respective donors was passed unanimously. A special vote of thanks to the Pharmaceutical Society for a donation of cinchona stems was passed, and the Honorary Secretary was requested to convey the same to the Pharmaceutical Society.

The President now delivered the following—

Valedictory Address.

BY A. C. ABRAHAM, F.C.S.

Gentlemen,—In vacating the chair which I have had the honour of filling as your President during the last two sessions, I cannot claim, as some of my predecessors might perhaps have done, any lack of subject material for a few remarks to you. The past two years have, indeed, supplied ample material for consideration. In the domain of pure chemistry there has been a fair amount of advance, and in that of pharmacy there has been much of novelty.

With regard to pure chemistry I feel hardly competent to say much. Among those of you interested in this branch each would regard those investigations which are of special interest to himself as the most noteworthy, and it is really only those who are themselves engaged almost exclusively in pure chemical research who are in a position fairly to award the palm amongst the discoveries made and the investigations carried out. I may perhaps, however, allude to the discovery by Winkler of the last new element, germanium, which fills one of the gaps in what is known as Mendlejeff's system. The discovery of this element is, of course, of greater interest on account of its existence having been to a certain extent foretold; and, as a comet, which, having been invisible for hundreds of years, reappears at the exact time calculated by the astronomer, proves the accuracy of his calculations and the theories upon which they are based, in the same way the discovery of this element is an almost perfect proof of the accuracy of the theories upon which its existence, or, rather, the probability of its existence, was calculated.

I think I may fairly include the wonderfully complete investigations of Warington upon nitrification amongst the most important of recent investigations. As Darwin showed the wonderful value of the earthworm as a means of promoting the life of plants, so Warington has shown us that without the minute organisms with which the soil teems the life of plants such as now cover the earth would be impossible. He has indeed shown that without the aid of these organisms the nutriment necessary for the development of plants obtainable from the *debris* of previous growths as well as from the inorganic constituents of the soil would be entirely unavailable for their requirements.

I will not detain you further upon questions of this nature, but pass on at once to matters of more interest to those present. I have not hitherto alluded in any

way to the advances made in the domain of analytical chemistry, but I think we should hardly forget that the last year or two has seen some striking changes in this department of chemistry, many of them indeed of great interest both to the analytical chemist and to the pharmacist. Among the former I may mention Adams's method of milk analysis which has been adopted by the Society of Public Analysts. This process, which is founded upon a principle introduced by myself in a paper which I had the honour of reading before this Association in 1883, has received general approval, and, although I believe capable of improvement, seems likely entirely to supplant the process previously generally employed, viz., Wanklyn's, which although defended for a long time by those who had been in the habit of relying upon it, was necessarily an exceedingly crude and uncertain one. It is indeed surprising, after the many demonstrations of its uncertainty, that it should so long have held its ground.

Among the many new analytical processes of special interest to pharmacists, Allen's process for the supposed estimation of nitrous ether in the spiritus ætheris nitrosi of the British Pharmacopœia is conspicuous. I say, "supposed estimation of nitrous ether" in this preparation, because I venture to think that it has yet to be proved that nitrous ether is the only, or perhaps even, I may say, the most important nitrogenous compound present in that preparation, and estimated by it. The process is, however, undoubtedly a most convenient one for estimating certain compounds present in it when freshly made by the process of the Pharmacopœia, and also many other compounds, for example nitrite of amyl, whilst the apparatus is extremely convenient for the estimation of peroxide of hydrogen, urea, the carbonic acid in many carbonates, and in spirit of sal volatile. The processes adopted in the new Pharmacopœia for standardizing the preparations of nux vomica, opium, and cinchona bark, mark a most important advance in pharmacy, whilst the many comparatively simple processes which have been perfected, or, at least developed, for the estimation of emetine and the alkaloids of belladonna must not be overlooked.

Before leaving the subject of analytical chemistry, one should hardly omit to mention the various investigations respecting an interesting class of poisonous bodies of an alkaloidal nature, the so-called ptomaines, respecting which much investigation has recently gone on, resulting amongst other things in the isolation of a body of this nature from tinned fish, which at once enables us to account for some of the mysterious cases of poisoning hitherto thought, on the very slenderest grounds, to have been due either to the solution in minute quantities of tin, from the chloride of zinc employed in soldering the vessels, or by some imputed to the paint used for coating the outside of such vessels. These theories were extremely weak, and of course did not account for the cases of poisoning from fish which had never been tinned, and they will hardly now be resorted to after the discovery which I have named.

Pharmacy has been enlarged, if not altogether enriched, during recent years by a remarkable number of additions to the classes of bodies acting as antiseptics and antipyretics, sedatives, and also by a number having an action upon the heart. Among the former most have been discovered in the so far futile endeavour to find a process for the artificial production of quinine. They are therefore chiefly more or less closely connected with phenol. Amongst these may be named antipyrin, antifebrin and antithermin, and, although less directly antifebrile, salol. The synthetical preparation of quinine has indeed been directly claimed as the result of the researches of a countryman of our own, but so far it cannot be said that his promises have been realized. At the present price of quinine it is indeed doubtful whether if it could be manufactured artificially it could be produced at a lower price than when prepared from cinchona bark.

The number of products having, or said to have, properties either similar to, or superior to quinine, can hardly be equalled by the number of sedatives of all kinds which have recently come into use. These have been derived from very various sources. Amongst them I may name urethan, cocaine, hypnone, paraldehyde, whilst bromide of sodium has much increased in favour in this country. The heart, too, has received an immense amount of attention, most of the compounds which have been used either in the pure or crude forms to regulate its action being, like the active principles of digitalis, of a glucosidal nature. Amongst these may be named convallaria and strophanthus, whilst sparteine, derived from one of the brooms, is an alkaloid. Convallaria, although introduced for use in dropsical heart affections, seems now to be used, when it is used at all, simply for its action upon the heart without the other actions which accompanied it, and rendered it valuable in dropsy, and it becomes an important question whether its preparations should not be devised so as to contain those principles only which have a direct action upon the heart. Strophanthus has been the source of much discussion, and a good deal of trouble to many of us, and even yet the tincture now universally adopted cannot altogether be regarded as an entirely satisfactory preparation, unless, indeed, the bitter principle left in the marc is different from that extracted, not only in composition, which seems pretty certain, but in its action, which is not yet clear. Among local anæsthetics cocaine has almost monopolized attention, and its uses seem hardly yet to have found their limit, while more recently drumine has had claimed for it a similar action, although little or no opportunity has yet been afforded for experiment with it in Europe in consequence of the plant from which it is said to be derived being a native of Australia, and being, I believe, unobtainable in this country. Among antiseptics suitable for the surgeon may be named iodol, for which it is claimed that it has all the advantages of iodoform without its objectionable odour. This body seems to be increasing in favour, but its high price will necessarily restrict its use. Asceptol, or rather its solution, and other bodies with whose names you are familiar, have a'so been used to a limited extent.

Ether suitable for producing general anæthesia has probably received more attention from a chemical point of view during the last two years than had been its lot previously. Warden showed that the absolute ether of the Pharmacopœia commonly contained an impurity which liberated iodine from a solution of iodide of potassium, and finding that such samples as he examined which had this property also yielded a deposit of what appeared to be aldehyde resin when distilled from caustic potash, and then ceased to give this reaction, concluded that the impurity in question was aldehyde. This has since been shown to be a mistake, and it has been found that two impurities, one of which appears to be a product of oxidation, and the other aldehyde, may, and often do, exist independently.

Manufacturers, or some of them, while able to produce an article free from the oxidized products, maintain that it is impossible, at least on the manufacturing scale, to produce an article free from aldehyde. With regard to this contention, I may say not only that I have been able to produce an article free from both impurities myself, but that such an article can actually be obtained commercially. Whether, however, our Pharmacopœia does not make a great mistake in insisting upon such a perfect absence of water and alcohol in the unfortunately named æther purus is, to my mind, a great question, and I believe that the very low gravity required tempts manufacturers to employ powerful chemicals which produce these impurities. In this connection I may point out that in the United States, where the employment of ether for the production of anæsthesia was persisted in, when in this country chloroform was almost solely used, an article of much less low gravity has,

I believe, always been employed, the corresponding preparation of the United States Pharmacopœia only being required to have a gravity of ·725 at 15° C., equal to, say, ·724 at 60° F. Saccharin, a highly vaunted substitute for sugar as a sweetening agent in diabetes and also as a means of covering the nauseous taste of some drugs, has, owing to the lack of supply, not had much trial.

To turn for a moment to the new Pharmacopœia, I think it will be generally admitted that notwithstanding the many hostile criticisms to which it was subjected on its appearance, and the many faults which it necessarily embodies, it is upon the whole a satisfactory work, and a decided advance upon its predecessor.

The pecuniary interests of pharmacists have been affected to some slight extent by the passage of the Shop Hours' Regulation Act, which prohibits the employment of young persons under eighteen years of age for a period of more than seventy-four hours in a week. The more recent Bill of Sir John Lubbock, which has not yet become law, proposes to limit the hours during which a shop can be actually kept open, and respecting the application of this Bill to chemists, great difference of opinion has been expressed. Although not in a position myself to form a correct judgment as to how it would affect the interests of the trade at large, I cannot but think that the excessive hours of labour are exceedingly detrimental to the health and happiness of employer and employed, and that only by means of an Act of Parliament can the difficulty be got over without waiting many years. My own opinion is that the passage of Sir John Lubbock's Bill, if it included chemists, would do more in one year to improve the members of our profession in mind, body, and "status" than the Pharmacy Acts Amendment Bill will effect in ten years. I fail to see how even a curriculum can be of much benefit to those who have not leisure to keep up and add to the knowledge which they may acquire as students, by constantly reading the current literature.

The Pharmacy Acts Amendment Bill has also been a source of much discussion, in which the members of this Association have had the opportunity of joining. Whether we may agree with the principles of this Bill or not, it seems probable that it will very soon be passed. The appointment by the Pharmaceutical Conference of an Unofficial Formulary Committee is a new departure which may lead in time to very important results.

Now, gentlemen, in thanking you personally for the regular attendance of most of those whom I see here to-night, and the cordial assistance which I have received from you, I have only to regret that the number of those who attend our meetings regularly has not been greater, and to hope that should such alterations in our constitution as have been suggested be carried into effect, a marked improvement may result in the future.

The meeting was now adjourned for four weeks, for the election of President.

The adjourned meeting was held at the Royal Institution on Thursday evening, May, 26; the President, Mr. A. C. Abraham, F.C.S., in the chair; at which meeting Mr. A. H. Samuel, F.C.S., was unanimously elected President for the ensuing year. The meeting then terminated.

NOTTINGHAM AND NOTTS CHEMISTS' ASSOCIATION.

The annual meeting of this Association was held on Wednesday evening, May 25, at the Milton's Head Hotel, Nottingham, Mr. Councillor Fitzhugh, J.P. (President) in the chair. Among those present were Messrs. Bolton, Dennis, T. Fletcher, Gill, Holgate, Jackson, Norweb, Parker, Smith, W. Widdowson, Wilford and A. Middleton, Hon. Secretary.

The Council's annual report was presented, and showed an accession of five new members during the year. The Council lamented the loss of one of its auditors, Mr. J. Lewis, who had been a member since the foundation of the Society. The interest of the associates had been unusually well maintained, and four students had passed the Minor examination, two of them, Mr. Allen (with Mr. Dixon) and Mr. Stanley (with Mr. Bolton) having done so without any further assistance than that afforded by classes in connection with the society.

The Botanical Class has been held at the University under Professor Blake, the following being the result of the examination:—College Prize, Mr. C. Clutterbuck; Certificates, J. Stanley, F. Hemmings, H. Roberts, W. Hurd and R. Briggs.

The class on pharmacy has been conducted by Mr. W. Gill, at the rooms of the Society in Shakespeare Street, and at the examination the successful students were A. Ball, A. Eberlin, W. Hurd, H. C. Ayris and C. Clutterbuck. A donation was announced from Mr. J. H. Haywood for the Prize Fund. Arrangements have been made with Dr. Haydon White and Mr. Sargent for classes next winter on materia medica and dispensing.

The *Pharmaceutical Journal* and *British and Colonial Druggist* have been regularly received, and the Calendar of the Society is also to hand. Various interesting specimens have been received from Messrs. Hodgkinson, Stead and Treacher.

The report was adopted.

The Treasurer (Mr. W. H. Parker) presented his annual statement, which showed a balance for the year of £5 12*s.* 10*d.* After being audited it was approved.

A vote of thanks was passed to Mr. Gill for his kindness in conducting the pharmacy class.

The President proposed a vote of thanks to the retiring Secretary, which was seconded by Mr. Robert Jackson and carried.

A vote of thanks was passed to the Society and the Proprietors of the *British and Colonial Druggist* for their respective journals.

The election of officers next took place, and resulted as follows:—President, Mr. Councillor Fitzhugh, J.P.; Vice-President, Mr. W. J. Rogerson; Treasurer, Mr. W. H. Parker; Hon. Secretary, Mr. W. Widdowson.

The ballot for the Council resulted as follows:—Messrs. C. A. Bolton, J. E. Dennis, T. B. Fletcher, W. Gill, A. Middleton, A. Smith, Savage and J. Wilford.

A vote of thanks to Mr. Fitzhugh for his untiring zeal on behalf of the Society was carried with applause.

Proceedings of Societies in London.

ROYAL INSTITUTION.

The Etiology of Scarlet Fever.

A lecture was delivered on "The Etiology of Scarlet Fever" at the Royal Institution on Friday, the 27th ult., by Dr. Klein. It has been proved beyond doubt from observations reported from various sources, that epidemics of scarlet fever may either arise from the contagion spreading from person to person by actual contact or else by the inhaling of air in which germs of the disease exist. But Dr. Klein in his lecture drew attention to the character which articles of food possess as carriers of disease, and made especial reference to infection of milk both in regard to the manner in which it becomes infected, and the possible prevention of evil results arising from the sale and drinking of it and its use as food. Evidently milk may become infected in various ways, which the lecturer grouped into three divisions, citing instances of epidemics caused by the milk so infected in each case. The first division included milk contaminated directly from a human source, though not necessarily implying that the milk had been in actual contact with an infected person. Thus in April

1881, Dr. Robertson reported that in Keswick members of some thirty or forty families supplied with milk from a certain dairy had been attacked by scarlet fever, and as the cattle were completely free from disease, the milk was supposed to have been infected in its carriage from the dairy across a yard in which some children lately recovered from an attack of scarlet fever were playing. The second division included the indirect contamination of milk from a human source, an instance of which occurred recently at Oxford. On March 3 a person connected with a dairy was attacked with scarlet fever, and on that date removed to the hospital. No case of infection was observed in any family supplied with milk from the dairy until March 10, when fresh cases occurred every day until the 18th. Since the period of incubation of scarlet fever germs is always less than seven days, it follows that the persons attacked could not have had the disease communicated to them direct from the first patient. In the third division were included all those cases in which the milk had clearly not been infected by human contact, but arose from the diseased state of the cow from which it was supplied. In 1885 and 1886 considerable attention was aroused as to the cause of an epidemic in the parishes of St. Giles and St. Pancras, and other districts in the north of London. After a prolonged investigation the outbreak was associated with the delivery of milk from a certain farm at Hendon, and as, moreover, some portions only of the milk appeared to have been contaminated, the disease was traced to individual cows. Dr. Klein then gave the results of a microscopical research on the bacteria found in infected milk. The microbes in the milk were studied from various points, especially in regard to their shape, size, mode of growth in different media, and their chemical and physiological characters. In the case of the infected milk obtained from Hendon, the micrococci were of a small spherical shape, about one-twenty-thousandth of an inch in diameter, and existed either singly or budding into a double form, or, when still further advanced, in long chains. The media in which the microbes were cultivated exercised some modifying influence on the appearance of their growth, as when cultivated in broth the chains did not appear so long or pronounced, whilst when the cultivation was effected in gelatine, the chains were still further modified and the microbes seemed to aggregate more in clusters. These modes of growth were made very apparent by the lecturer in a series of microscopical slides projected upon a screen. Further observations as to the growth of the microbes were made in tubes containing a quantity of "nutrient gelatine" composed of broth and gelatine. This mixture was inoculated by drawing over the surface of the gelatine the point of a needle previously dipped in the infected milk. On either side of its track small colonies of the microbes sprang up, and it was remarked of their growth that there was always an appreciable centre to each colony, whilst the colonies never became confluent, but their divisions always remained very distinct. Even when the microbes were spread thickly on the surface of the gelatine, or the gelatine was stabbed with the needle, the colonies of microbes always retained their isolated appearance. Among a number of specimens, however, Dr. Klein called attention to one tube of gelatine which had been inoculated about fourteen or fifteen months, in which the original colonies appeared to have sprouted and produced small ramifications. Dr. Klein then explained that having thus established certain facts in regard to the character of the microbes in infected milk, he inoculated calves with a cultivated liquid containing these microbes, upon which the calves were attacked with the same disease apparent in the cows from which the original milk had been obtained, whilst microbes of the same character could be recovered from the blood and tissues of the calves. A connection was thus proved to exist between these particular microbes and this particular disease and in order to complete the chain of evidence it was now necessary to discover if the same microbes existed in the blood and tissues of human patients suffering from scarlet fever. This was found to be the case, the microbes obtained being alike in microscopical and cultural characters, and Dr. Klein exhibited a microscopical section of the liver of a victim from scarlet fever, and also a cultivation of microbes from the same, in both of which the organisms seen in the infected milk were observed, and for which Dr. Klein has proposed the name of *Micrococcus scarlatinæ*. The lecturer now referred to a point still more interesting, if not alarming in its nature. In October, 1886, he had occasion to examine several tins of a particular brand of condensed milk which had been suspected of communicating scarlet fever to persons partaking of it. In one of the three tins examined he found the presence of microbes in all respects identical with the *M. scarlatinæ*, and capable of communicating the disease to mice and calves inoculated with it. Dr. Klein considered that the milk, which was presumably cows' milk, sold as a cheap brand to the poorer classes, had been very slightly heated, as in all the tins examined he detected the presence of various organisms, and in one case a species of bacillus was observed. With regard to the question as to whether the milk coming from a diseased cow was infected *per se*, or whether the infection arose from contamination with matter from ulcers in the udders, the lecturer considered both explanations as probable. The means taken for the prevention of this and other contagious diseases was also referred to by the lecturer. He remarked that mere infection of the milk by human contact could be avoided by attendance to the sanitary laws maintained in all good dairies, but when the disease existed amongst the cows, the case was much more difficult. The suspected cows, however, should be isolated, and Dr. Klein here mentioned that, in his opinion, veterinary practitioners had not kept abreast of medical men in this research, and did not attach sufficient importance to the matter, because milk of cows infected with cutaneous diseases had not given rise to scarlet fever in certain cases. Dr. Klein thought it rather remained with them to find out under what conditions contagion is effected. In conclusion the lecturer mentioned that if milk be heated to 185° F. for five minutes all the *M. scarlatinæ* are destroyed and gelatine inoculated with milk so heated remains sterile. As an instance of the efficacy of this treatment, Dr. Klein referred to the Keswick epidemic previously mentioned, in which a lodger drinking raw milk was attacked with scarlet fever, whilst the landlady, who had previously heated the milk drunk by herself, was not attacked. Indeed, Dr. Klein considers that if the treatment were applied in every case, seventy per cent. of the cases of scarlet fever would not be incurred, the remaining cases being due to personal infection and the consumption of cream from infected milk.

The Application of Photography to Astronomy.

On Friday, the 3rd inst., Mr. David Gill, Her Majesty's Astronomer at the Cape, delivered a lecture at the Royal Institution on "The Application of Photography to Astronomy," in which was incorporated a *résumé* of the decisions arrived at by the recent International Astronomical Congress held in Paris. The lecturer commenced by throwing upon a screen a photograph of the comet of 1882, as observed by himself at the Cape. The comet had a tail of about twenty degrees in length, and projecting in an opposition direction to the tail a small ray of light was observable in the photograph, though this was stated not to have been visible to the naked eye. The object of the lecturer in showing the photograph was, however, to exhibit the result obtainable without any of the modern appliances in astronomical photography, which had not then been at his disposal. In this case an ordinary photographic apparatus was used, to which was attached a telescope of

2-inch lens and 11 inches focal length as a guide to follow the nucleus of the comet, and the plate was submitted to two hours' exposure. Whilst Mr. Gill did not claim any novelty in the experiment or *modus operandi*, yet his photograph was a creditable one as compared with those now obtained with rapid drying plates with large field and properly adjusted guiding telescopes, the sole drawback consisting in the oval appearance of the stars, owing to the movement of the photographic plate. Some photographs of the modern telescopes and photographic apparatus used in observatories at the present time were then projected on the screen, and Mr. Gill pointed out the automatic clockwork arrangements for causing the photographing apparatus to revolve with the star or planet under observation, whilst in order to correct any slight error, an observer was stationed behind the guiding telescope to keep the two fine wires in the field of the telescope bisecting a particular star. Mr. Gill then drew attention to the work commenced by the brothers Henry, of Paris, in 1871, of charting all the stars as far as the ecliptic, and the difficulty of procedure when they reached the milky way, which was largely overcome by the opportune introduction of dry photographic plates. Then followed a glowing eulogy of these two astronomers, during which the lecturer described a recent visit he had paid to their observatory, in which every lens and instrument had been made by themselves without assistance. Mr. Gill next reverted to the objects proposed to be accomplished by the recent Congress, and he stated that he was induced to bring this subject forward because there was a popular idea that the only project to be attempted was to take a number of photographs of all parts of the stellar world in order to be able to compare them with like photographs taken in fifty or one hundred years' time. In brief, however, it has been determined to make a photographic chart of stars for this epoch and to compute the position and magnitude of all stars to the fourteenth magnitude. It had been seriously proposed to include stars of even the sixteenth or seventeenth magnitude, but as the present project included some twenty millions of stars it was thought better not to attempt too much. Further, it has been resolved to prepare a catalogue of all stars up to the eleventh magnitude, which will include about one-and-a-half million. This will of course involve an immense amount of labour as, owing to certain difficulties, measurements on the photographic charts cannot be at present used to determine the absolute position of the stars, and resort will have to be made to the old-fashioned meridian observation. Not the least of the difficulties to be overcome with regard to the photographic plates is the contraction of the film in course of development. With regard to these works Mr. Gill considered that although the data furnished with regard to the distribution of stars of the higher orders of magnitude, yet by far the most useful work to the coming generation will be the catalogue. The taking of so many observations will involve an immense amount of skilled routine work of a very trying character, which it would be useless for an amateur or a single handed astronomer to attempt, so that the erection of Government establishments for the purpose in each country is almost absolutely required. The French Government has already sanctioned expenditure for the erection of four telescopes. The lecturer then referred to the attempts of modern astronomers to heighten the precision in celestial photography, as on this will depend an advance in the method of measuring distance in inter-stellar space. This was followed by an exhibition of a series of photographs of planets and their satellites, double stars, clusters, sun spots, etc., among which were several showing the varying position of the black spot on Jupiter, by means of which its rate of rotation can be measured. The lecturer closed with a brief sketch of the work done by Professor Pickering in connection with the Henry Draper Memorial Fund.

SOCIETY OF CHEMICAL INDUSTRY.

A meeting of the Society of Chemical Industry was held in the rooms of the Chemical Society on Monday, the 6th inst., Mr. David Howard being in the chair.

A paper was read by Dr. H. E. Armstrong on

The Alkaloids—the Present State of Knowledge concerning them, and the Method employed in their Investigation.

BY H. E. ARMSTRONG, PH.D., F.R.S.

The author in his opening remarks called attention to the fact that although nitrogen is commonly regarded as one of the most inert of the elements, yet generally the presence of nitrogen in a body is associated with great activity; further, he remarked that in formulating nitrogen compounds, he did not agree with the practice of regarding nitrogen as always existing either as a triad or pentad. Referring to the researches of M. Pasteur on the presence of micro-organisms in zymotic diseases, and the subsequent proofs that the effects of such diseases are due not to the presence of organisms themselves, but to the toxic properties of the alkaloids produced by them, Dr. Armstrong pointed out that this study had drifted very largely into the hands of morphologists, and that a large field was open to chemists for research in this direction, and also in the preparation of antidotes to the effects of these alkaloids. The alkaloids which first received attention in the paper, are a group of four which Dr. Armstrong termed the "trimethylamine alkaloids," owing to their composition. They consist of neurine, choline, muscarine and betaine, and their composition in each case includes the trimethyl group, associated respectively with amylic alcohol, glycol, hydrate of hydroxyaldehyde, and hydroxyacetic acid. Of these both neurine and choline, which only differ by the molecule H_2O, exist ready formed in the animal organism, whilst both muscarine and betaine can be formed from choline by oxidation. Muscarine, neurine and choline have the same physiological characters, muscarine, as might be expected from its composition as an aldehyde, being the most active and decidedly poisonous, whilst the other two partake in their respective order of the same characteristics in a modified form. From the alkaloids found to occur naturally in the animal system and those nearly allied in composition, Dr. Armstrong passed on to the series of alkaloids found to be present in putrid flesh, and which Selmi has designated "ptomaines." Associated with researches on these bodies the names of several Italian chemists appear. Selmi was one of the first to attack the subject, and succeeded in bringing forward several qualitative tests for their presence, but Dr. Armstrong especially designated Brieger as affording valuable information concerning the separation and characteristics of these bodies. It is noticeable that ptomaines are only formed during the early stages of putrefaction of albuminoids, and that if the putrefaction be allowed to proceed for eight or ten days these bodies disappear and are replaced by other bodies of a benzinoid nature. Horseflesh has been found to give the largest proportion of these ptomaines, the method of preparation being the digestion of finely-chopped meat in water. Brieger thus obtained a non-poisonous body called neuridine, with the formula $C_5H_{14}N_2$, the hydrochlorate of which is easily crystallizable, and resembles urea in appearance. Together with this he also obtained a poisonous base of the composition $C_5H_{11}N$. From the putrefaction of fish ethylenediamine has been obtained, together with a base of the formula $C_7H_{16}NO_2$ and trimethylamine. From cheese putrefaction neuridine and trimethylamine were obtained, whilst in the products from the putrefaction of yeast only trimethylamine has been separated. In the putrefaction of human flesh, choline and neuridine first appear, but on a longer exposure they both disappear, and this disappearance is followed by the formation of three new bases, all of which are non-poisonous diamines, cadaverine ($C_5H_{14}N_2$) which is a pentamethylene diamine, pu-

trescine ($C_4H_{12}N_2$), and saprine ($C_5H_{16}N_2$); together with these two other bases possessing toxic properties have been observed. In all the experiments previously mentioned, a free access of air was allowed, but in another experiment by Brieger a large quantity of flesh was allowed to putrefy in a stable-loft from October to January with little or no access of air. A few ptomaines were formed, but of a less poisonous character. Among the latest researches of the same chemist Dr. Armstrong alluded to the isolation of tetanine, $C_{13}H_{30}N_2O_4$, the product of the micro-organism observed in tetanus. A hypodermic injection of tetanine produces all the symptoms observed in cases of tetanus, thus affording another proof that bacteria cause the suffering in their peculiar diseases by their products. Dr. Armstrong now referred to the "pyridine alkaloids," and gave a short *résumé* of the subject from the discovery of chinoline in 1842 until the period of Skraup's researches. By means of graphic formulas he also showed that the relation between pyridine and benzene was the same as the relation between chinoline and and naphthalene, one of the CH groups being replaced in each case by an atom of nitrogen. After describing the composition of allyl-aniline and the work of Prud'homme, Brüning and Graebe in the production of dye stuffs, Dr. Armstrong passed on to the consideration of some of the pyridine bases existing in plants. Pepper contains a base, piperine, which on boiling with caustic potash is resolved into piperidine and piperic acid. Piperidine $C_5H_{11}N$ can be obtained from pyridine C_5H_5N by the reducing action of tin and hydrochloric acid, whilst it is also obtained together with pentamethylene-diamine by the action of nascent hydrogen on trimethylene cyanide. Coniine, the alkaloid contained in hemlock, was discovered in 1827, and up till 1851 was considered to have the formula $C_8H_{15}N$, but now this has been shown by Hofmann to be $C_8H_{17}N$. By the oxidation of conyrine, $C_8H_{11}N$, of which coniine is a hexhydride, a product of pyridine was obtained, pyridine-carboxylic acid, from which it was deduced that conyrine is a propyl or isopropyl pyridine, and since isopropyl pyridine was obtained from propyl-iodide of pyridine, and the hexhydride of this gave a body with some slight differences from coniine, coniine was therefore assumed to contain the propyl radicle. Ladenburg, however, in a research on coal-tar picoline, obtained a product, α-picoline, from which allyl-pyridine was obtained. On heating this with nascent hydrogen the product answered to all the characteristics of coniine with the exception that it was optically inactive. By treating it with dextro-tartaric acid and crystallizing, a first crop of crystals was obtained that were dextro-rotatory, the rotation being practically the same as that of coniine. In the mother liquors a base was found that was slightly lævo-rotatory, which corresponded with the product afterwards obtained by the treatment of coniine with cadmium iodide. The cinchona alkaloids have also afforded a large field for research owing to their complicated composition. In the oxidation of cinchonine, cinchonic acid ($C_{10}H_7NO_3$) is obtained, having the composition of chinoline-carboxylic acid; on further oxidation with permanganate of potash, pyridine-tricarboxylic acid results, from which pyridine can be separated. Quininic acid ($C_{11}H_9NO_3$) results as the oxidation of quinine and xantho-quininic acid can be split up into hydroxychinoline and carbon dioxide. Besides cinchonic and quininic acids other acids are produced by the oxidation of the respective alkaloids, but their composition has not yet been determined, although Skraup recently stated that he has succeeded in isolating them. The results of such researches prove, however, the presence of the pyridine or chinoline groups in cinchona and other alkaloids. In the opium alkaloids pyridine is associated with a non-nitrogenous group, as may be seen from the oxidation products of narcotine ($C_{12}H_{13}NO_3$), which consist of opianic acid ($C_{10}H_{10}O_5$), hemipinic acid, meconin and cotarnine. A relation also exists between morphine and codeine, the latter of which is a methyl derivative of the former. In conclusion Dr. Armstrong called attention to the vast amount of work accomplished in the synthetical formation of antipyretics, and remarked more especially on the methylated products, which do not have disagreeable secondary effects, as is the case with many of the non-methylated ones. He expressed his regret that up to the present time English chemists had generally confined themselves to analytical problems, whilst continental chemists had acquired great superiority from attacking problems from the synthetical side.

In a short discussion which followed the reading of the paper Mr. David Howard remarked that he thought the position of the English chemists in regard to synthetical work was considerably due to English legislation with regard to vivisection, which precluded them from studying the physiological activity of any new bodies they might isolate. At the same time he expressed his surprise at the prevailing ignorance among English chemists respecting synthetical work, even in the case of one who recently claimed to have effected the synthesis of quinine. His remarks on the restraint laid upon physiological study were endorsed by several speakers; one suggested that there was also a moral side to the question, but was overruled by the remark of the Chairman, that he thought such researches having for their object the diminution of human suffering fully justified.

Dr. Alder Wright drew attention to the wide differences exerted in the physiological effects of many bases even by such a slight alteration in their composition, as the extraction of a molecule of H_2O, a fact which he should never lose sight of owing to his sufferings caused by the unsuspected production of apomorphine whilst at work.

Dr. Stevenson appeared to throw some doubt on the formula assigned by Brieger to the ptomaines first isolated by him, as the last discovered and most active body, tetanine, had a more complex structure.

Owing to the lateness of the hour a paper by Mr. B. Redwood, on "A Visit to the Petroleum-Producing Territories of the United States and Canada" was accepted as read, and will be published in the Journal of the Society in due course. The next annual meeting of the Society was announced to be held on July 13, 14 and 15 at Manchester.

CHEMISTS' ASSISTANTS' ASSOCIATION.

The first meeting of the new Council was held on June 2, at which the following principal officers were elected to serve for the coming session:—President, Mr. T. S. Dymond; Vice-Presidents, Messrs. J. E. Saul and A. J. Phillips; Honorary Treasurer, Mr. W. R. Dodd, F.C.S.; Honorary Secretaries, Messrs. E. J. Millard and E. S. Taylor. The President, Vice-Presidents, Treasurer, and Messrs. Bird and Millhouse were appointed on the Publication of the Proceedings Committee.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting was held on Thursday, June 2, Mr. J. J. Thomas being in the chair.

Mr. E. Young read a paper on "Turpentine and other Terpenes," in which he first described the methods employed for collecting the oleo-resin and distilling off the oil from it, briefly alluding to gum thus and other matters connected with this part of the subject. The sources of the different varieties were then given, and their principal differences explained; their specific gravities, boiling points, and specific rotations of polarized light being tabulated. The preparation and properties of terebene were described, and the composition of its constituents explained; other derivatives of terpenes, such as the hydrochlorates, bromides, cymene, terpin hydrate, etc., were discussed, and the probable composition of terpene inferred from these; its relation to camphors, resins, etc.,

also received notice. The various other terpenes and citrenes were also compared with oil of turpentine.

The paper gave rise to a discussion in which the Chairman, Secretary, Miss Munro, Messrs. Eastes and Tingle took part.

The second report of the session on Analytical Chemistry was then made by Mr. J. G. Tingle. This dealt with (1) the detection of alkaline carbonates in the presence of bicarbonates by rosolic acid, and preferably by phenolphthalein; (2) an improvement in the glucose test consisting in the facilitation of the precipitation of the Cu_2O by the addition of 3 to 5 drops of a 15 per cent. solution of $CaCl_2$; (3) a method of estimating KI by titrating it with an acid normal solution of $NaIO_3$, and dependent upon the well-known reaction of iodides and iodates in the presence of an acid, iodine being liberated; (4) a modification of the copper electrolytic test for Hg, adapted for detecting the salts of that metal in urine; (5) two new methods for the detection of cotton-seed oil in olive oil; (6) two modifications of the thalleioquin reaction for quinine, designed with a view of dispensing with the use of chlorine water, by substituting a solution of the gases produced by the action of HCl and H_2SO_4 on $KClO_3$; (7) reactions for kairin, antipyrin, and antifebrin, with solution of Fe_2Cl_6; and (8) a new test for thymol, dependent on the formation of a violet residue, when a chloroformic extraction of a KHO solution of the stearoptene is evaporated in a porcelain capsule. The report was illustrated in parts with experimental demonstrations of the tests mentioned, and was followed by considerable discussion, chiefly concerning that portion of the paper which referred to the olive oil tests. The customary vote of thanks having been tendered, a little miscellaneous business was discussed, and the proceedings terminated.

CHEMICAL SOCIETY.

A meeting of the Chemical Society was held on Thursday, June 2. Mr. William Crookes, F.R.S., President, in the chair.

The President announced that the Council had resolved to present an Address of Congratulation to the Queen.

The following papers were read :—

The Equivalent of Zinc. By Lieut.-Colonel Reynolds, late R.E., and Professor W. Ramsay.—The determination has been made by measuring the hydrogen evolved on dissolving zinc in acid, every precaution being taken to ensure accuracy; the weight of the hydrogen obtained was deduced from Regnault's determination of the density of hydrogen. The zinc used was separated by electrolysis from zinc sulphate, purified to the utmost possible extent; the last sample prepared was so nearly pure that dilute acid would scarcely act on it. In all, 29 experiments were made. Four experiments had to be rejected; nine were not fully corrected and therefore were also rejected; the next 11 were considered preliminary, the mean atomic weight deduced from them being 65·2430; finally, five experiments were completed, and the following results obtained from these are free from all known sources of error :—

	65·5060
	65·4766
	65·4450
	65·5522
	65·4141
Mean	65·4787 ± 0·016135

The Magnetic Rotation produced by Chloral, Chloral Hydrate and Hydrated Aldehyde. By W. H. Perkin, Ph.D., F.R.S.—The author has shown in a previous paper (*Chem. Soc. Trans.*, 1886, 777) that when water unites with another substance so as to produce an atomic and not a molecular compound the magnetic rotatory power of the product is less than the sum of the magnetic rotatory powers of the compounds used in its formation. He has now applied the same method of examination to aldehyde and chloral and their hydrates. Chloral hydrate was examined (*a*) in the fused state at 55·5°; and at the ordinary temperature (*b*) dissolved in water in the proportion of 1 mol. to 3 mols. of water, and (*c*) dissolved in a new neutral liquid isoamyl oxide. Deducting from the values found that deduced for liquid chloral, the results are as follows :—

	Fused at 55·5°	In water.	In amyl oxide.
Chloral hydrate . .	7·173	7·016	7·028
Chloral	6·590	6·590	6·590
	0·583	0·426	0·438

From these numbers it is evident that chloral hydrate does not contain water as a constituent, as in that case the difference should be 1 00. As ethylidene glycol, $CH_3{\cdot}CH(OH)_2$, is not known, at any rate in a pure state, its magnetic rotatory power was deduced from that of some of its derivatives (*Chem. Soc. Trans.*, 1884, 571). Deducting from the most probable value (2·817) that of aldehyde (2·385), a difference results (0·432) which is practically identical with those found in the case of chloral hydrate at low temperatures. The result obtained with fused chloral hydrate at 55·5° is a little higher, but there is no doubt that the hydrate is slightly dissociated when heated to this temperature: that this is the case is further indicated by a series of determinations of the density of a solution of chloral hydrate in amyl oxide between 4° and 60°, a change in the curve obtained on plotting the results being seen to occur at a point corresponding to a temperature a good deal below 55·5°. Experiments were also made with mixtures of aldehyde and water, that generally used consisting of equimolecular proportions. On making this mixture of aldehyde and water, some interesting peculiarities were noticed. If the temperature of the air and of the liquids be about 8° or 9°, at the moment of mixing the temperature drops about 1·5°; it then commences to rise somewhat quickly, and continues to rise, but more and more slowly, for a long time; in one experiment, made in a large test-tube covered with cotton-wool, commencing at 9° the temperature rose to 18·7° but only in the course of twenty-five minutes. If the temperature of the substances before admixture be about 16° and the quantities not too small, the rise of temperature is more rapid, and the mixture enters into ebullition. On attempting to determine the density of the mixture of aldehyde and water the results obtained were at first very perplexing from the fact that concordant numbers could not be obtained. It was then found that when any change of temperature took place the volume did not become constant in less than two and a half to three hours, so that in determining the density it was necessary to keep the tube containing the mixture at the desired temperature for two and a half hours before adjusting. Part of the product evidently undergoes dissociation as the temperature rises, recombination taking place as the temperature falls, but only very gradually, a small variation of temperature sufficing to produce a disturbance. Comparing the magnetic rotatory power of aldehyde with that of the mixture with water at 16°, the difference $0{\cdot}929 = 3{\cdot}324 - 2{\cdot}385$ is less than 1·00, and it may therefore be concluded that combination takes place; at a lower temperature no doubt this combination would have been found to be more perfect. There can, however, be no doubt that ethylidene glycol is present in the mixture. Glycols are viscid fluids, and it is interesting to notice that when the hydrated aldehyde is shaken up, a froth forms which does not break at once, the mixture differing in this respect from aldehyde and also from water. The effect of mixing aldehyde and absolute alcohol in molecular proportions is also very interesting. If the temperature of the liquids be not too low, the temperature rapidly rises and the mixture boils; if however the temperature be low, say 8° or 10°, the temperature im-

mediately falls seven or more degrees: the rise then sets in, and before long the mixture reaches its boiling point. In the first instance the fall is due to what may be called molecular arrangement setting in between the two fluids, which is a physical change, and occurs before chemical action has had time to take place to any appreciable extent; then chemical action takes place more and more rapidly, and in consequence the temperature rises. On mixing pure dry ether with aldehyde a fall of temperature occurs; subsequently the temperature rises gradually, but only to that of the surrounding air.

Note on a New Class of Voltaic Combinations in which Oxidizable Metals are replaced by Alterable Solutions. By C. R. Alder Wright and C. Thompson.—It appeared to the authors probable that just as a liquid capable of parting with oxygen, chlorine, etc., can be used in conjunction with an electrode of unchangeable material at one side of a voltaic cell (as in Grove's nitric acid battery and analogous combinations), or may be replaced by a solid conducting electrode, itself capable of losing oxygen (*e.g.*, a plate of strongly compressed peroxide of lead), so conversely might a conducting plate of oxidizable material (*e.g.*, zinc) at the other side be replaced by an unchangeable electrode in conjunction with a liquid capable of taking up oxygen, chlorine, etc., without producing any fundamental change in the character of the actions taking place in the cell whilst generating a current. The electrode immersed in this oxidizable substance, like the zinc of an ordinary cell, would acquire the lower potential, and the opposed plate the higher potential; *i.e.*, the wire connected with the latter would be the "positive pole" of the construction in reference to the external circuit. On trial, it has been found that such is the case, and that in consequence a large variety of novel forms of cell becomes easy of construction. For example, sodium sulphite or potassium ferrocyanide solution opposed to chromic-sulphuric acid solution; preferably with an intermediate layer of some neutral salt solution, such as sodium sulphate, to prevent the direct action of the two fluids on one another. During the passage of a current sodium sulphate or potassium ferricyanide is formed in quantity proportionate to the electricity passing, *i.e.*, to the amount of silver thrown down in a silver voltameter included in the circuit; whilst chromium sulphate is produced at the other side. Various analogous cells are described, in particular one where lead oxide dissolved in caustic soda is opposed to alkaline hypobromite: in this case lead dioxide is produced and separates out in the solid form; and one where chromium sesquioxide dissolved in caustic soda is opposed to chromium trioxide dissolved in sulphuric acid; here sodium chromate and chromium sulphate are formed, an E.M.F. about equal to that of a Daniel cell being set up.

Mr. Page said that after listening to Dr. Wright he was able for the first time to understand how electric currents might arise in the animal body.

Dr. Alder Wright said, in reply to Mr. Page, that the experiment suggested of opposing venous and arterial blood had not been actually tried by him as yet, but he thought it quite probable that a weak current might be produced (the President subsequently said that he had been told—he believed by Mr. Peter Squire—that a current was produced on opposing venous and arterial blood). By opposing alkaline pyrogallol solution to oxidizing agents, notable currents could be developed; and various other organic compounds might be used instead of pyrogallol. With certain organic bodies, however (*e.g.*, chloral hydrate), attempts to produce oxidation in cells had hitherto failed. The opposition of acid and alkaline fluids alone would not necessarily produce more than infinitesimal currents; Becquerel's "*pile à oxygène*" (nitric acid opposed to caustic potash solution) gave rise to decomposition of nitric acid and evolution of oxygen from the electrode immersed in the alkali; other authors have found that analogous cells with chromic-sulphuric acid instead of nitric acid would behave in the same way and develop a continuous current capable of doing external electrolytic work, such as deposition of silver in a voltameter; on the other hand, a cell in which caustic soda and sulphuric acid only were opposed (so that chemical action other than neutralization could not take place) would only develop an infinitesimal current through a silver voltameter, capable of depositing traces of silver even after some days, although its E.M.F. measured by an electrometer was considerable. With regard to the observations of Dr. Armstrong, he would say that whilst without doubt Grove's gas battery was the prototype of the class of cells discussed, inasmuch as that combination was virtually an oxidizable solution of hydrogen opposed to an oxidizing solution of free oxygen, still the examination of cells in which other oxidizable fluids were used instead of hydrogen solution, and other oxidizing substances besides solution of oxygen, was a branch of experiment in which hardly anything had hitherto been done, and which seemed to merit some little attention. The authors desired to study in detail the general behaviour of certain typical classes of cells in which actions of the kind take place, especially from the point of view of elucidating the precise chemical changes going on, and their relations to the amounts of electrical (or current) energy developed. Whilst there was not exactly a probability of any very startling discovery being made, there were still a number of points of interest connected with the subject worth examining; and although the hope of an improved primary battery based on actions of this kind for commercial use, as suggested by the President, was perhaps not yet within measurable distance, yet the problem of economically obtaining current energy by direct chemical action (and especially by oxidation) was one now attracting considerable attention, and it was impossible to predict what might or might not be the result of systematic experiments tending in that direction. The importance of obtaining practically usable currents from coal direct without the use of the steam engine and dynamo could hardly be over-rated should it hereafter be found practicable so to do; and in view of the compactness of the animal machinery, whereby the oxidation of fuel in the form of food gave rise by muscular action to mechanical energy, it did not seem to be of necessity hopeless to attempt to solve such a problem.

The Composition of Prussian Blue and Turnbull's Blue. By Edgar F. Reynolds.—According to Williamson, these compounds are respectively represented by the formulæ Fe_7Cy_{18} and Fe_5Cy_{12}, but Reindel and others have conjectured that they are identical in composition. The author has carefully prepared Prussian blue from hydrogen ferrocyanide and ferric chloride, and Turnbull's blue from hydrogen ferricyanide and ferrous sulphate; his analyses of the products show that Williamson's formulæ are correct expressions of their composition.

Phlorizin. By Professor E. H. Rennie, D.Sc.—The author has endeavoured by a re-examination of phlorizin to decide as to the correctness or otherwise of the usual formula, and also to ascertain whether the sugar yielded by it on hydrolysis is really dextrose or not. He shows by analyses and by a quantitative examination of the decomposition by dilute sulphuric acid that the usually accepted formula and equation correctly describe the composition and hydroliysis of phlorizin. The sugar obtained from it melted at 85—86°; its molecular rotatory power was $[\alpha]_D = 57{\cdot}9°$; and it gave with phenylhydrazine hydrochloride a yellow crystalline precipitate melting at 204—205°; there can be little doubt, therefore, that it is ordinary dextrose.

Further Notes on the Chemical Action of Bacterium Aceti. By Adrian J. Brown.—The author has continued his studies on the oxidizing actions of *B. Aceti*, and states that although mannitol has been shown to be easily converted into lævulose by the organism, its isomeride, dulcitol, is not acted upon. The dihydric alcohol, glycol,

is oxidized into glycollic acid, no other product being formed. The action is carried on much further when calcic carbonate is present to neutralize the acid as it is formed. The trihydric alcohol, glycerol, is found to be completely decomposed into carbon dioxide and water, the only other product formed being a very small amount of an acid, the identity of which could not be determined. Glycerol appears to encourage the growth of *B. Aceti* more than any other substance with which the author has experimented. The tetrahydric alcohol, erythrol, resists the action of the organism. Attention is called to the fact that erythrol and methylic alcohol are both acted on by oxygen in presence of platinum-black, but escape oxidation when placed under the influence of *B. Aceti*; it is also shown that when the same substance is submitted to oxidation in the two ways, the products are generally dissimilar, as in the cases of mannitol and dextrose. It is therefore considered that although the products of the actions which occur in presence of both platinum-black and *B. Aceti* are similar in the case of ethylic alcohol, the manner in which the oxidation is effected, contrary to the usual idea, is probably quite different. Mannitol has been prepared by the author from pure dextrose by the action of sodium amalgam. On submitting this to the action of *B. Aceti* it was converted into lævulose, thus completing the conversion of dextrose in into lævulose. As the melting point and crystalline form of mannitol from dextrose are similar to those of mannitol from manna, there can be little doubt that the two mannitols are identical.

Note on the Cellulose formed by Bacterium xylinum. By ADRIAN J. BROWN.—The author showed in a previous paper (*Chem. Soc. Trans.*, 1886, 432), that an acetic ferment, *B. xylinum*, is able to convert lævulose into cellulose. On treating this cellulose with strong sulphuric acid, it is found to be converted into a dextrorotary sugar and in this respect to resemble ordinary cellulose.

The Oxidation of Ethyl Alcohol in the Presence of Turpentine. By C. E. STEEDMAN, Williamsburn, Victoria.—The author finds that dilute ethyl alcohol in the presence of air and turpentine becomes oxidized to acetic acid. The experiment was made by placing in a clear glass 16-oz. bottle a mixture of 2 drachms of alcohol, 1 drachm of turpentine, and 1 oz. of water; the bottle was securely corked and left exposed to a varying temperature averaging about 80° F. for three months; at the end of that time the liquid was strongly acid from the presence of acetic acid. One curious fact appears to have light thrown upon it by this observation. Mr. McAlpine, Professor of Biology at Ormond College, Melbourne University, has a method of preserving biological specimens by abstracting their moisture with alcohol after hardening in chromic acid, and then placing the specimen in turpentine for some time, great discrepancies arise, however, according as the alcohol is allowed or not to evaporate from the specimen before dipping it into turpentine.

Obituary.

GEORGE CHRISTOPH WITTSTEIN.

The death is announced of Professor Wittstein, which took place at Munich on the 2nd inst. The deceased was born in 1810, in Hanover, where he studied pharmacy. After passing his qualifying examinations he became a teacher of chemistry and natural science, and laboured in this field for many years at Munich. A work on Practical Pharmaceutical Chemistry, by Professor Wittstein, was translated into English by Mr. S. Darby in 1853, and another on the Organic Constituents of Plants, more recently, by Baron v. Müller. The 'Vierteljahrschrift für praktische Pharmacie' was established by Professor Wittstein in 1852 and edited by him during the twenty-one years of its existence, and he was also the author of numerous articles on food analysis.

Notice has also been received of the death of the following:—

On the 28th of May, Mr. Thomas Ruston, Chemist and Druggist, late of Aspatria, near Carlisle. Aged 77

On the 1st of June, Mr. Henry Vaughan Telfer, Chemist and Druggist, Bruton, Somersetshire. Aged 45.

On the 2nd of June, Mr. John Borwell Johnson, Pharmaceutical Chemist, Uttoxeter. Mr. Johnson had been a Member of the Pharmaceutical Society since 1853, and for many years had filled the office of Local Secretary.

On the 5th of June, Mr. Frederick William W. Lloyd, Chemist and Druggist, Eastbourne. Aged 37 years.

Correspondence.

**** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

UNFAIR COMPETITION.

Sir,—Under this title one more would-be monopolist adds his feeble wail to the already great outcry for protection in trade. Surely your precepts, clearly and carefully explained though they ever are, fail woefully to carry conviction to many doubting minds. Perhaps it is a case of repetition of the old story "a man convinced against his will," etc. Be that as it may, the idea that the sale of some few poundsworth of poisons by legally unqualified persons is at the root of all or most of the present evils druggists suffer under, seems to hold its ground most tenaciously. Such idea, at all events, appears to influence your correspondent when he urges that the example set by the Brighton pharmacists should be "promptly and enthusiastically followed." But is this "idea" of sufficient importance to call for "protective" legislation? Is there any real ground for attempting to limit the choice of the public as to where it will purchase its drugs?

Has the average druggist fitted himself intellectually to such a degree as to entitle him to look for the exclusive right to retail or dispense any articles used in medicine? I ween not. A scrambling apprenticeship and a three months' course of "cram" are not conducive to high culture, and a certificate obtained more or less by mere luck is certainly no evidence of the same. Yet how much more training do many receive? Is it not notorious that much that should be taught during pupilage is left to be picked up anyhow and, often, after taking a position as assistant, if perchance it be not ground up under the practised tuition of an "irregular" teacher during the aforesaid three months? How, then, can we look for increased confidence by the public in our abilities, or for freedom from competition? Should we not rather try to perceive that this same "competition" is necessary under the circumstances, and really healthful, inasmuch as it raises the standard of excellence of our commodities, compelling all who would be of the "fittest" who survive to pay attention to the quality of all they sell, and to aim at dealing fairly and honestly with their customers?

Do let us endeavour to deserve all we would receive, and not pose as mendicants whining for favours.

Let apprentices be thoroughly taught, that they may attain skill in their art; give them opportunities of studying the necessary sciences; then, fully equipped, send them to meet the examiners and receive the official stamp of proficiency. So by degrees, slowly may be, yet surely, our status will be elevated, public opinion will turn in our favour, and we shall find the reward of our labours. But the idea of "protection in trade" must yield place to the advancement of the profession. Else we may expect to stick in the old grooves, and rightly so.

Sheffield. JOHN HUMPHREY.

Chloral Hydrate and Fehling's Solution.

Sir,—In the last paragraph of Mr. J. J. Thomas's very creditable paper on butyl-chloral, printed on p. 986, I notice a statement which calls for some comment. The writer observes that the "reduction of Fehling's solution by chloral hydrate is no doubt due to the formate produced by the alkali," and upon this assumption founds an opinion and an equation. From the tone of the remainder of the paragraph referred to, it would appear that Mr. Thomas had not confirmed his opinion by experiment.

Recently I had occasion to call attention to the action of Fehling's solution on chloral hydrate (see before, p. 856), and I then ascribed the decomposition to the chloroform produced. The matter at the time had only incidental interest, but before hazarding this statement I had taken the precaution to examine the behaviour of an alkali formate with Fehling's solution. I found that there was absolutely no reduction of the copper, even after boiling for some time, nor did the use of Trommer's, Pavy's, Schmiedeberg's, Cresswell's or Holland's modifications of the cupric test result in a different experience. I therefore unhesitatingly ascribed the decomposition only to the chloroform produced, the fact being well known that this body readily reduces an alkaline cupric solution. The non-reduction of copper by butyl-chloral tends to confirm my statement, as no chloroform is formed on treating with caustic alkali. Curiously enough, Hoffman and Power, in their standard work on the examination of medicinal chemicals, ascribe the rapid reduction of copper by chloroform to the formation of a minute trace of sodic formate. This opinion they probably base on the fact that chloroform when superheated with aqueous or alcoholic potash is split up, forming potassic formate and chloride. On the other hand, chloroform can be distilled unchanged from aqueous potash. If, therefore, any formate is produced at the temperature employed, the rapidity and amount of the copper reduction would tend to negative the idea of its exercising any function whatsoever in the reaction, even intermediate or catalytic.

An interesting point in connection with the medicinal exhibition of butyl-chloral may be noticed. Ethyl-chloral hydrate during its passage through the system appears to combine with some product of the organism forming the conjugate body, *urochloralic acid*. This, like its progenitor, reduces Fehling's solution. Butyl-chloral hydrate, as we know, does not react with Fehling, and yet, if Mering and Musculus, the discoverers of urochloralic acid, are to be credited, the urine of persons under treatment with butyl-chloral reduces the cupric solution. I have not had the opportunity of examining such a urine; but it would be manifestly interesting physiologically if the statement of these chemists could be confirmed.

143, *New Bond Street.* J. E. Saul.

Huechys Sanguinea.

Sir,—Mr. Moss has kindly sent me a sample of *H. sanguinea*, and I have no doubt from the appearance of the insects, and the results of his careful experiments, that they are not the same as my specimens brought home in 1871, and described by me, at the suggestion of Dr. Gray, as *H. vesicatoria*. Unfortunately I have mislaid my specimens, but the insects were much larger, heavier and more brilliantly coloured than those sent me by Mr. Moss. Mine were collected by myself from the Ailanthus trees of Han-Kow, and were, I think, females. In my early notes I described them as Cicadas. They were distinctly vesicant when prepared as ointment.

I learn from Mr. Butler, assistant keeper at the British Museum Natural History Department, that Messrs. Amyot and Servill founded the genus *Huechys* in 1843. They make three species of the genus, namely, *H. sanguinea*, *H. incarnata* and *H. philœmata*. They describe the genus thus:—Thin body, head rather small, triangular, as large as the prothorax; forehead angular, lightly compressed on each side, presenting underneath a kind of keel, or hollow edge of a longitudinal straight groove (or furrow) to the full length. Eyes large, not very prominent. Prothorax without lateral expansion. Elytra entirely opaque. Abdomen elongated.

The eyes in my Han-Kow specimens were very prominent, and the ocelli very distinct. I feel sure that if the insects were carefully collected and promptly exported, they would be found sufficiently vesicant for medical purposes. Chinese drugs are badly secured, slowly conveyed to certain drug emporia in Hunan, Hupeh (Han-Kau), Chekiang (Ningpo), etc., and then irregularly distributed all over the empire. The odd lots which occasionally reach Europe would be probably of very ancient date.

I do not know much of entomology, but I feel sorry that the Homopterous insects in question should have ever been separated from the genus Cicada, to which they seem to me to more properly belong.

Shepton Mallet. F. Porter Smith.

The Teaching of Botany.

Sir,—The Pharmaceutical Society is to be congratulated on the proposal for a completer specialization in the teaching of Botany, as foreshadowed in the report of the recent Council Meeting, and the intention of the Council that this subject shall be taught more in accordance with the requirements of modern science is to be commended. But surely the Council do not wish to ignore or to depreciate so important a part of pharmaceutical education as the recognition of drugs, their sources and active principles, together with a knowledge of common adulterants and methods for detecting them?

Has not the time arrived when the term Materia Medica may very well be discarded and that of Pharmacognosy be adopted in its stead?

In a complete pharmaceutical curriculum the subject demands especial attention and is well worthy of endowment as a separate branch of study.

If the multiplication of chairs be undesirable, why not attach it to the kindred subject, Pharmacy, and endow a chair of Pharmacognosy and Pharmacy?

Halford Street, Leicester. S. F. Burford.

A Successful Examinee.

Sir,—We, countrymen, compared with shrewd City men, are not supposed to have much wit, but occasionally we develop a faculty of making a little go a long way, which is akin to genius, whereof the following is an instance, culled from the provincial press:—

"Mr. ———, A.P.S., M.S.A., of ———, has recently been successful in passing the final examination of the Pharmaceutical Society; the Examination of the Apothecaries' Hall; the highest examination in the compounding and dispensing of medicines; and the highest examination in *materia medica*; and having acquitted himself so well as to stand highest in proficiency was awarded the medal of the college;" which, being interpreted, means that a certain cram-shop has passed another man through the "Minor."

Senex.

K. K.—The report contains a statement of all that took place in Court; the actual facts of the case and the conditions of settlement were not disclosed.

S.—Oxalic, citric and malic acids.

Indignans.—Any evidence you may be able to collect as to the supposed infraction of the law should be communicated to the Secretary, 17, Bloomsbury Square.

Inquirer.—The Bill is set down for consideration in committee on Tuesday next.

E. E. Rowland asks to be supplied with a good formula for preparing Aq. Menth. Pip. conc., 1×40, similar to that supplied by wholesale chemists.

F. C. F.—Your operation appears to have been conducted correctly; probably there was something wrong in one or other of the ingredients.

Communications, Letters, etc., have been received from Messrs. Cullinan, Rideal, Grierson, Walker, Warden, Flückiger, Wyley, Towcester, Civitas, Stellata.

CONTRIBUTIONS TO THE HISTORY OF WARS.

BY PROFESSOR FLÜCKIGER.

In the *Pharmaceutical Journal*, xiv. (1884), p. 898, Mr. Kirkby figured a new variety of wurrus (or wars), and described it carefully. My friend, Edward Schär, Professor of Pharmacy in the Swiss Polytechnic School, Zürich, taking a great deal of interest in the matter, repeatedly obtained wars from a correspondent of his at Aden, which we found agreeing with those glands of *Flemingia* which I had first described in the *Pharmaceutical Journal*, ix. (1868), p. 279, under the incorrect name of "New Kamala." For they are by no means due to some *Mallotus*, like true kamala, but to the pods of *Flemingia*, as shown in the *Pharmaceutical Journal*, xiv. (1884), p. 917, by Professor W. T. Thiselton Dyer, F.R.S., now Director of the Royal Gardens, Kew.

Professor Schär recently received a new supply of wars from Aden, which I find to agree with Mr. Kirkby's curious variety. This variety indeed is totally different from both the glands of *Flemingia* ("new kamala"), and those of *Mallotus philippinensis*, the true kamala. Kirkby's drug has a dull brown rather than a reddish hue, which I find is not altered by a temperature of 100° (212° F.), whereas the dark violet of the *Flemingia* glands, if heated to that degree, turns decidedly blackish, as first ascertained by my late friend Daniel Hanbury (see 'Pharmacographia,' 1st edition, 1875, p. 518). This is the more striking, as the same glands, by boiling them with water, yield a turbid yellow decoction of much the same colour as an emulsion of gamboge. This decoction, after cooling at 15° C., remains turbid and is not altered by addition of a solution of iodine (iodine 3, iodide of potassium 8, water 1180). If we treat true kamala in the same way a slightly opaque yellowish decoction is obtained; in the cold it is not altered at all on mixing it with solution of iodine.

We may therefore distinguish three different drugs, viz.:—

I. Kamala, the well-known glands of *Mallotus philippinensis*.

II. Wars, the glands of *Flemingia rhodocarpa*, Baker, a species not specifically distinguishable from *Flemingia Grahamiana*, W. and A., growing in Southern India, as pointed out by Professor Oliver (*Pharm. Journ.*, xiv., 969). As to *Flemingia congesta*, Roxb., its glands agree with those of *F. rhodocarpa*. But at Kew they have no evidence that this plant grows in Arabia, so at least I was informed by a kind note of Professor Thiselton Dyer's, September 4, 1883.

Wars from *Arabia* is therefore to be attributed to *Flemingia congesta*, and the source of the drug of the *Somali coast* is *F. Grahamiana* (*F. rhodocarpa*). This species also occurs in the Mozambique district.*

III. *Kirkby's Wars*, as we may term it until further information be afforded. The specimen with which I was presented by Professor Schär had been imported into Aden from Harrar.

As to the latter, it may be separated into three different constituents. Firstly, by shaking the drug No. III. with water and pouring it off, very minute grains or fragments are deposited from the water which are not altered by iodine. I can only state that they mainly consist of inorganic matter mixed with a few simple hairs; suffice it to class those fragments as dust. Secondly, if the drug is again shaken with a little water, pouring off the turbid liquid in a watch glass it soon deposits the very glands of "Kirkby's wars" (fig. A.). And thirdly, at the bottom of the flask there collects a large amount of heavy brown matter, which, in all probability, has nothing to do with wars; it consists of something like ferruginous sand, which I thought not worthy of any further investigation. The sample of the drug before me, in fact, afforded by calcination no less than 45·15 per cent. of a blackish-brown residue, rich in, or mainly consisting of, ferric oxide, not displaying any effervescence when moistened with nitric acid.* The drug yields but very little to alcohol; even on addition of a few drops of ammonia water a faintly, but purely yellowish filtrate is obtained, which, on addition of ferric chloride assumes a dingy brownish hue. If the drug under notice is boiled with water, it yields a clear, extremely slightly yellowish, or a little reddish filtrate, which after cooling and mixing it with aqueous solution of iodine, displays a *rich blue coloration*. This behaviour at once allows of the identification of "Kirkby's wars" with certainty, provided starch granules be absent.

Its true character may be shown by the above-mentioned second portion of my drug. Mr. Kirkby terms, I think correctly, his wars "glands," and figures them *l.c.* I would only remark, that their appearance, in my opinion, is not exactly granular as shown in Kirkby's fig. A. (*Pharm. Journ.*, May 10, 1884, p. 898), but rather cloudy, or somewhat, as it were, stratified, or shrivelled. The glands, on an average, are not larger than those of true wars ("new kamala"), but of a totally different outline. They are either nearly globular, or ovoid, or slightly tapering, many of them reminding, as to their shape, the starch grains of potato; sometimes also there are tapering, or nearly kidney-shaped or crescent-shaped forms, or glands approaching to a cylinder (see fig. A.). In fact, as Mr. Kirkby already stated, there is scarcely any prevailing form. The following sketches, under A., may, at least, afford an idea of the great variety exhibited by those curious glands.

If they are moistened with an aqueous solution of iodine, their very faintly reddish hue is at first but very little affected, by and by it turns more distinctly red or somewhat violet. After a few minutes blue spots make their appearance in the glands, resembling to some extent granular matter enclosed within some membrane. Are these blue spots due to starch? I do not believe so, having in no way succeeded in isolating starch granules from those glands. No starch is to be observed, if the glands are, for instance, submitted to a strong pressure between two glass slides, the

* Sir Joseph Hooker, 'Report on the Progress and Condition of the Royal Gardens at Kew during the year 1881 (1882), p. 50. An abstract will be found in the *Pharmaceutical Journal*, xiii. (1882), p. 533.

* Mr. Holmes obligingly sent me a sample of the drug which had been examined and described by Mr. Kirkby. Of this, 0·448 gram, dried at 100° (212° F.), gave 0·249 gram of the same residue as afforded by my sample, *i.e.*, 55·58 per cent. of blackish-brown matter which yielded but very little to chlorhydric or nitric acid. I need scarcely say that the drug as received from Mr. Holmes agreed also under the microscope with that described here.

blue coloration produced by iodine is not at all to be observed without the glands, but only in their interior part.

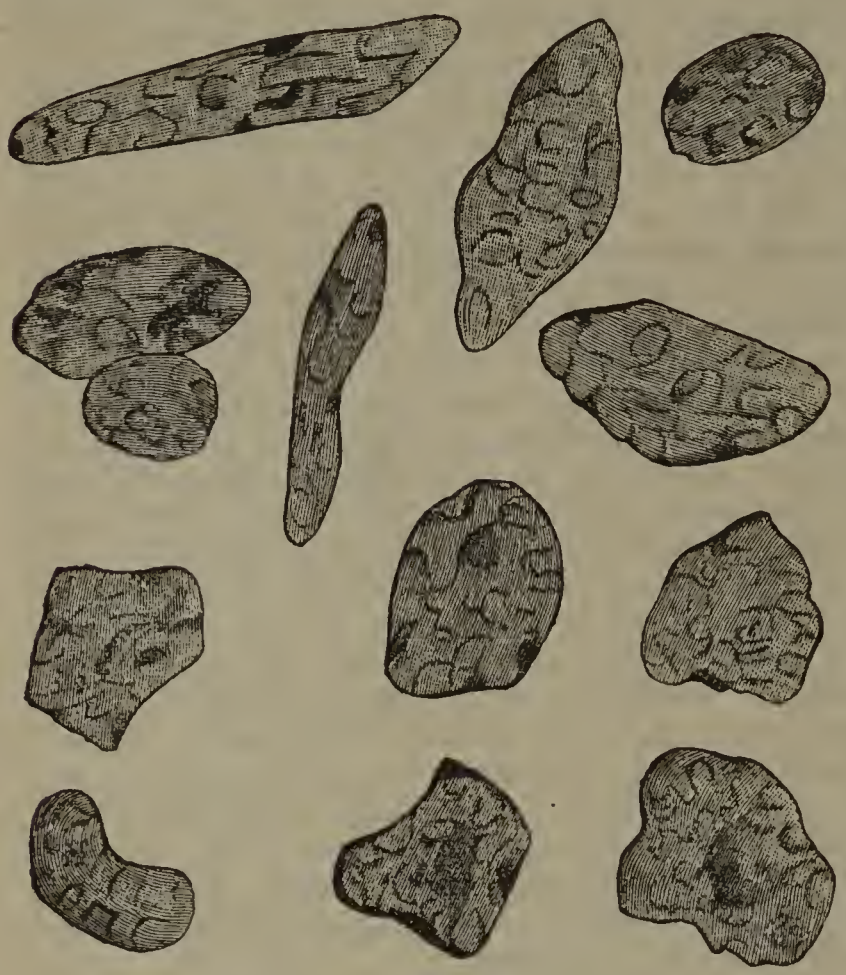

Fig. A.—Glands as seen under glycerin.

If a more concentrated solution of iodine be applied, the whole glands at last become uniformly and thoroughly blue. Their substance is not obviously altered by boiling water, although the filtrate, as already stated, contains a little of the matter to which a blue coloration is imparted by iodine. If the glands are boiled with concentrated caustic lye, they are not much altered, nor has ammonia water any marked action on them.

The above experiments show that they are certainly not starch granules. Sulphuric acid (1·830 specific gravity) affords the best information about the structure of the glands under notice. They are immediately altered by the acid, their outer portion becoming perfectly hyaline, whereas the central portion continues to display the original cloudy or stratified appearance. Yet this nucleus also is soon penetrated by the acid, and then the gland is manifestly shown to be made up of a large number of small cells. Their delicate walls are not dissolved by the sulphuric acid, or at least disappear only after a day; in this respect they would remind of cork or suberin, which is so remarkable on account of its not being dissolved by concentrated sulphuric acid. It is a well-known fact, that the walls of many glands or ducts are made up of corky substance, as, for instance, the oil ducts in the rhizome of the Zingiberaceæ.

As to the cells which are made apparent by sulphuric acid, they are not arranged in any regular order and are strongly coherent, so as to form one mass, *i.e.*, the whole gland is nothing else than an agglomeration of minute cells, which as above mentioned cannot be separated by means of pressure. At last the whole contents of the glands are dissolved by sulphuric acid, and the solution turns blue if it is mixed with an aqueous solution of iodine.

Now, the glands being a coherent agglomeration of cells, the question arises whether they are really included in a surrounding membrane or cuticle. If they are kept for a day in a saturated solution of chloral hydrate, the little cells become much more evident and quickly take up iodine from the solution already mentioned. Many of the glands then distinctly show a very thin colourless outer coat or layer. At the same time it may be observed that the contents of the cells do not swell; they would do so if they consisted of starch granules, for starch is quickly disintegrated and gradually dissolved by chloral hydrate;* no such tumefaction is produced by the action of chloral hydrate on the glands under notice nor on the cells they are containing.

Concentrated sulphuric acid, as already alluded to, also makes evident the existence of a delicate membrane covering all the little cells, but the acid carries a portion of the contents of the cells out of them; the acid solution around the cells turns blue on addition of iodine. The action of chloral hydrate is safer for that purpose, or also that of chromic acid (1 in 200 water).

Yet to clear up the constitution of the glands I at last found best quite another method. I heated the glands with a little water in a sealed tube to about 130° (266° F.) when I obtained a pasty mass. On diluting it with water and filtering a clear liquid was obtained, which turned blue by iodine and became turbid on addition of alcohol. The solid portion remaining on the filtrum examined microscopically showed a great variety of changes undergone by the glands. Some of them were but little or not at all affected, many of them distinctly showed nearly the same structure as after the treatment with chloral hydrate.

Many of the glands however were now seen empty, *i.e.*, reduced to the very membrane, which can thus be demonstrated most convincingly; it does not absorb iodine which is readily taken up by the disintegrated cells. Even after that treatment many of those glands which are least altered by heating are not thoroughly blue, but only display blue spots answering to the little cells they contain.

These experiments performed by me afford in my opinion sufficient information about the structure of the glands. They are loaded with an agglomeration of numerous delicate empty cells, the walls of which are coloured blue by iodine, and partly dissolve in boiling water. It is very remarkable to observe how obstinately the cells stick together.

I thought it well worth to insist on the glands under notice, inasmuch as I am not aware of another instance of any analogous formation. The cells included in the glands would appear to agree with dextrolichenin,† or with a substance occurring in the seeds of tamarinds,‡ or in the buku leaves.§

As to the mother-plant of the glands of "Kirkby's wars," nothing is known to me. They are widely differing, both in their structure and their chemical behaviour, from the glands of the two *Flemingias* constituting true wars. There can be no doubt as to the vegetable origin of the former; heated in a glass tube they evolve acid vapours.

* As shown by me in the *Archiv der Pharmacie*, cxcvi. (1871), p. 7; also 'Pharmacographia,' second edition, 1879, p. 632.

† 'Pharmacographia.' 2nd edition, p. 739.

‡ Flückiger, 'Pharmakognosie,' Berlin, 1883, p. 802.

§ Dr. Shimoyama, not yet published investigation.

In the 'Pharmacographia,' 2nd edition, p. 573, mention is made of Masudi, who informs us (10th century of our era) that Ginbil consisted of *sandy* fruits of red hue. In my 'Pharmakognosie des Pflanzenreiches,' Berlin, 1883, p. 237, I have more explicitly shown, that *Kanbil*, *Kambil* or *Quinbil* are old Arabic synonyms of wars. The old Arabic authors would appear to have known not only the Indian kamala, but also two varieties of wars; the red variety, perhaps, was that more exactly termed kanbil.

In the Pharmacopœia Persica (see 'Pharmacographia,' second edit., p. 753), in a medicine against "latos lumbricos," mention is made of *qambel, seu arena ad vermes* (p. 85), and *quambel, arenula Arabica contra vermes* (p. 86). This no doubt also agrees with the drug under notice. In the first place wormseed is associated with qambel together with semen convolvuli coerulei, or, at p. 86, with grana campanulae coeruleae. I scarcely need to point out that those seeds or grains mean the semen kaladanae, described in 'Pharmacographia,' p. 448. As qambel is expressly termed a sandy matter it would appear that there cannot be question of a sophistication with sand.

Avicenna* gives some very curious information about wars and khanbil, far from clear, yet interesting. He tells us: "*Warts*, Croci indici pollen. Est res rubra, crocum probe attritum aemulans atque e felice Arabia advehitur, dicitur illic e plantis desumi . . . Ad scabiem pruritum, achores et impetiginem est utilis." Scholium Plempii: "Hanc plantam scribit Golius in suo lexico esse Sesamo similem, flavescentem, quae in sola Arabia felice provenit; ex qua paratur gomraton, hoc est linimenti genus, quo facies mulieres tingunt conciliandi nitoris ergo . . . Illud ipsum vocabulum Warts apud celebres botanicos significat enronmam et crocum."

"*Khanbil*, Sementina seu semen lumbricorum, Semen est *arenaceum*, rubro colore suffusum, dilutione tamen seu minus rubro quam præditus est Crocus indicus . . . Lumbricos ascaridesque necat et expellit." Scholium Plempii: "In Arabico est Warts, Porro video etiam Arabibus incertum esse quid vere sit Khanbil. Scribit enim Elkharasjius . . . esse *terram rubram* minutam."

The repeated allusion to red sand or earth is worth noticing with regard to the large amount of inorganic matter which I found in Kirkby's wars.

Paulus Aegineta also speaks of yellow and red "Vertz," or "Vars," as mentioned by Rhazes, both kinds brought from Yemen. In Adams's edition of 'The Seven Books' of Paulus, III. (London, 1847), p. 457, the drug is, I think wrongly, attributed to *Memecylon tinctorium*, Willdenow, a plant abounding in yellow colouring matter, but not occurring at all, as far as I know, in countries which afford wars.

Possibly the glands to which these lines are devoted are the khanbil of olden times.

In looking again at the very specimen of true wars which I had described, nearly twenty years ago, under the name of new kamala, I am struck now to find an extremely small number of Kirkby's glands accompanying those of *Flemingia*.

In publishing my note I hope it will contribute to clear up definitely the history of the drugs under notice, which have been, in the East, in use for so many centuries.

* 'Canon ed. Plempius,' Lovani, 1658, fol. 116 and 255.

NOTES ON EXHIBITS OF PHARMACEUTICAL INTEREST IN THE LIVERPOOL JUBILEE EXHIBITION.

The fine Exhibition building which contained the Liverpool International and Maritime Exhibition of 1886, has again been filled with an interesting and splendid loan collection, illustrating peace and war.

The various classes of exhibits comprise War Trophies, Exploration, Colonial and Indian Courts, Life Saving and Ambulance Divisions. The vast building (the largest of its kind) is tastefully decorated with banners, palms and ferns, which, together with the magnificent collection of armour, present a most attractive appearance. Other attractions have not been neglected, in the reproduction of an old Lancashire village, and several of the ancient and historic buildings of Liverpool, amongst which the old Castle, the Tower and Exchange have been resuscitated in a realistic manner.

There are many exhibits of interest to the pharmacist, including the fine collection of medicinal plants, oils, gums and drugs illustrating the economic products of India.

This collection is lent by the Committee of the Imperial Institute, and shows the enormous resources of our Colonial possessions.

Foremost among the drugs are samples of Indian opium, showing its preparation from the incised poppy capsule to the crude opium, the juice derived from the unripe capsule, and finished in the provision opium cake, as prepared for the China market.

There are also specimens of the alkaloids morphine, codeia, and narcotine, in the crude and pure state manufactured at the Ghuzipur opium factory. Some fine samples of the *Aconitum ferox*, *Napellus*, and *heterophyllum* are shown. The latter variety does not possess any poisonous properties, and is used as a tonic in India. The various cinchona barks are largely represented, including some splendid specimens of the official red bark. In addition there are seeds of the *Gynocardia odorata*, the chaulmugra, the expressed oil from which has been introduced to this country, its active principle being gynocardic acid, and *Cannabis Sativa*, Indian hemp, which is so largly used in India both for smoking and its narcotic properties, the young leaves and twigs collected from the semi-wild plant being used in the manufacture of the intoxicant liquor known as hashish. Specimens of *Hyoscyamus niger*, *Datura stramonium*, and *Atropa belladonna*, which are now cultivated in the temperate districts of the Himalayas, are also shown. The seeds of *Eugenia Jumbolana*, or *Taman*, are not much known in England, although used in America, and are said to be useful in the treatment of diabetes.

Some fine samples are shown of catechu, which is largely exported from India and Burmah. The cutch produced by the North West provinces is very different in appearance to that exported from Pegu, it being paler in colour than the Burmah cutch, and made into larger cubes. It is said to be purer and more carefully prepared. Several fine varieties of turmeric are represented, it being largely cultivated for home use, also some good specimens of Bael fruit, almost every part of this tree being utilized in India.

The *Semecarpus anacardium*, or marking nut tree, from the nuts of which an acrid juice is extracted that is used medicinally and as a natural marking

ink for linen. Among the oils are samples of the essential oils of cloves, caraway and cinnamon, also an oil extracted from the small cardamom fruits by distillation. There is also a clear oil obtained from the seeds of the sunflower, a plant which grows to great perfection and size in India. The seeds are stated to yield 22 per cent. of this oil.

A rose oil, or common otto of rose, prepared in the North West Provinces and the Punjaub, is also exhibited in the West Indian Court; kola nuts and some excellent samples of arrowroot are represented.

The Ceylon section exhibits several varieties of cardamom seeds, cinnamon, and a collection of cinchona barks grown by the Ceylon Planters' Association.

In the Australian Court are specimens from the numerous eucalypti, both the gum and leaves. Messrs. Cullerne and Co. exhibit some beautiful samples of isinglass, from the finest Russian to the coarse Astrachan leaf; also samples of Balaga and Sargin leaf and Brazilian isinglass of excellent quality.

In the Ambulance Court may be seen some admirably fitted up field medicine chests, from the size of a knapsack to the field hospital ambulance waggon, sent by the Woolwich Government Stores. The Netley Hospital authorities also exhibit a compact and complete ship's hospital, showing the latest improvements.

From this glance round, in which only a few of the many interesting exhibits have been enumerated, it will be seen that the Liverpool Exhibition will well repay a visit.

NOTES ON THE SAFFRON PLANT (CROCUS SATIVUS, L.), AND IN CONNECTION WITH THE NAME OF THE TOWN OF SAFFRON WALDEN.*

BY JOSEPH CLARKE, F.S.A.

"The rosy morn in saffron drest."

Taking into consideration the short space of time that, during a day's excursion, can be allotted to the reading of papers, it would be a work of supererogation to inflict an elaborate botanical description of the plant saffron, which may be obtained from any herbal. It was successfully cultivated in the neighbourhood of Walden for somewhat over two centuries, but has disappeared for nearly half that period, and though it has no pretension to be called indigenous, it finds a place in every British flora and treatise on medical botany, and even in the Pharmacopœia, so unwilling are we to give up so interesting a plant and so charming a flower. The time of its introduction into this country is not precisely known. As with many other things, from a glimmering through the mist of ages past, it is believed that the Romans brought it with them.† The earliest accounts make mention of it growing near a Roman road, running through Essex. This might be Saffron Walden. As the modes of cultivation have gone completely out of the memory of living man, a brief description may not be uninteresting to even the most scientific of the pilgrims of the gatherings of to-day. That the flower and its accredited virtues had great attraction for the ancients is certain. It is conjectured to be the *Nepenthe* of Homer, and the Greek name is *Krokos*, signifying a thread, from the thread-like appearance of the pistils, when dried for use. The name in Hebrew is *Chorukim*. Loudon derives the word from Chaldee, *Krokice*. The common name of the plant, with slight modifications, in English German, French, Dutch and Spanish, is the same as the Arabic *Zahafran*, which, with the Z softened into S, and pronounced quickly, would be exactly similar to our word.* That the plant was held in high repute at an early date by the people of the East, is to be learned from the "Song of Solomon" (iv. c., 14 v.)—"Thy plants are an orchard of pomegranates with pleasant fruits, camphor with spikenard and saffron." The bulb or "corm" is about the size of a nutmeg, compressed at the bottom; the young leaves and flower are contained in a thin sheath, from which they emerge simultaneously. The flower, though not quite so robust, is similar in shape to the well-known spring crocus (*Crocus verna*, L.), but is of a lilac or light violet colour, in the centre of which, about half the length of the petal, is a slightly formed style supporting three stigmas of slender shape and orange golden-yellow colour. Part of this style or "string," with the stigmas or "chives," is the saffron of commerce. The foliage of the plant, like that of all the crocus tribe, increases in length long after its bloom has faded, and may be readily known by its extreme attenuation. With the exception of some of the finer grasses, the leaves of the crocus are more slender in comparison to their length than those of any other British plant.

Dr. Douglass, between the years 1723 and 1728, employed proper persons to make observations on the culture of saffron then growing on a large tract of ground extending from Saffron Walden towards Cambridge. The land accredited to be most conducive to its production was a temperate dry clay, not too stiff, on a substratum of chalk. Early in April the ground was ploughed more deeply than for corn; in May twenty, thirty, and even forty loads of short rotten manure on an acre were ploughed in, and at Midsummer the land was ploughed a third time. The roots were planted in July in rows six inches apart, and three inches from each other. Only the round roots or "corms" were planted; the flat and spiked roots being rejected; and about 128 bushels per acre was the allowance of "seed." In September the ground was well hoed, and the weeds destroyed. At the latter end of September, early in the morning, Sundays not excepted, the flowers were gathered, when the "chives," that is the style and stigmas, were retained, and the rest of flower discarded. These parts of the flower were dried upon a kiln, covered with a wire netting or a hair clath, over which were laid several sheets of paper, and weighted. This process required great care and watchfulness. After an hour the coverings were taken off, the saffron turned upside down, and then covered and weighted as before for another hour. If this operation was successful there was nothing more to do, but simply to turn the cake over a gentle fire every half hour for twenty-four hours. Inferior chives were sprinkled with small beer to make them sweat. About five pounds of wet saffron made about one pound when dried, but in the latter part of the season six pounds were needed. The average portion of dried saffron obtained from an acre the first year was rarely over two pounds, twelve for the second year, and rather more for the third. After this third crop, the midsummer following, the roots were taken up and transplanted to new ground.†

Dr. Douglass's estimate for an acre under crocus cultivation in 1728, was :—

	£	s.	d.
Rent for three years.	3	0	0
Ploughing three times.	0	18	0
Dunging	3	12	0

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* Reprinted from the *Essex Naturalist*, January. This paper was kindly written specially for the Meeting of the Club at Saffron Walden, on April 14th, 1884, by the venerable author, who is so well known as a local archæologist and naturalist. We are indebted to Professor Boulger for several notes and memoranda used in passing this paper through the Press.—*Ed. Essex Nat.*

† Cole, 'Adam in Eden 1657.

* "Crocus is named in greeke Crokos, in englishe saffron or safforne, in dutche saffran, in frenche safrone, it is hote in the second degree and dry in the fyrst." Turner, 'Names of Herbes' (1548).

† See *Philosophical Transactions*, Nos. 138, 380, and 404.—*Ed. Ess. Nat.*

	£	s.	d.
Hedging	1	16	0
Splitting and setting the heads.	1	12	0
Weeding and paring the ground	1	4	0
Gathering and picking the flowers	6	10	0
Drying the flowers	1	6	0
Instruments of labour for three years	0	10	0
Ploughing once, harrowing twice	0	12	0
Gathering the roots	1	0	0
Raising or cleaning roots.	1	12	0
Total charge	£23	12	0

It has been stated that saffron was introduced into England directly from Asia.* Hackluyt (1582) says that the root was first brought here in the reign of Edward III., by a pilgrim from Tripoli, who concealed it in his staff ; had it been discovered, he would have been liable to the penalty of death. This story may be mythical, but Edward III. was renowned for his encouragement of industry of all kinds. To Sir Thomas Smith, a native of Walden, Secretary of State to Edward VI., is attributed the introduction of it to the town of Walden, but though it was grown to a large extent, and its cultivation certainly facilitated by him, he could scarcely have been the means of originating the industry, as the Charity Commissions' report speaks of two saffron gardens belonging to Gepy Simmonds, in 1481, and in the Churchwarden's accounts for Walden, 2nd Richard III., is this entry :—Itm. Payd to John Rede for pyking of V unc safron xii^{d}."—and Flemming, a clergyman who resided in the neighbourhood, relates that in 1584 it was extensively grown here ; and that in 1565 its abundance was so great that the pickers were offered half the produce for their labour. In many of the wills of the time mention is made of saffron gardens, from half an acre to three acres. This is attested by quotations from the ancient records of the town, 1st Henry VIII., "Q^{d} diversi tenentos huj^{d} manerii trent porcos suos in gardinis croc^{d}." 10th Henry VIII. "It^{m}. 9^{d}. Johes Geyner & Robertus Rosale, trent porcos suos, vagantes ad largū in gardinis crocor'teñ & in blade & graine." Hackluyt in 1582, alludes to Walden as the principal seat of the saffron culture, and Camden† and Gerard‡ describe it as being in the highest perfection at the period of their writings. From the former writer they copy what is certainly to be received with reservation, that barley will grow after saffron for eighteen years in succession without any additional manure, and that saffron will grow after it again. A skilful farmer understands the rotation of crops, and what plants will follow each to advantage ; and a practical agriculturist, here on the spot alluded to, says that four crops of barley may follow each other, but not without extra manure. Hackluyt, Camden, Gerard and Ray all mention Walden as the chief place of saffron cultivation, for whence it gradually extended in nearly a northern direction through the villages of Cambridgeshire to Cambridge. In 1531 the town accounts of Cambridge show that saffron was grown in Cambridge and Barnwell to a great extent. In Barnwell-field there were twelve acres ; the prior of Barnwell had ten acres ; and in Cambridge fields there were eight acres and three roods planted. At this time the price varied from 60*s.* to 20*s.* according to good or bad seasons. In John Norden's account of Essex, 1594, is written "About the town of Walden groweth great store of saffron, whose nature, in yelding her fruite, is verie straunge, and bindeth the laborer to greate trauaile and dilligence ; and yet at length yealdeth no small advantage to recomforte him agayne."

Camden says, "Tne fieldes here (Walden) on every side smell sweetly, and smile pleasantly with saffron." About half a century ago, in trenching the triangular piece of ground, now the lawn on the western side of the Museum, a small plant of saffron came up, possibly from a latent imported seed, but otherwise not to be accounted for. That the plant has been confounded with *Colchicum autumnale* (the "meadow saffron") is evident by the description of it given by various authors, ancient and modern. Dioscorides, a physician in the earliest century of our era, describes it as an acrid poison, and Gerard ascribes to saffron potent qualities which it does not possess.* In many of the British Floras it is said to be indigenous, and even so eminent a botanist as Sir J. E. Smith has fallen into the error. Loudon makes no distinction between the two species, but our accomplished botanist Ray knew better ; he says, "Nothing is known concerning its place of spontaneous growth, and no wild plant is to be seen where it had been cultivated two hundred years."

Saffron is said to be a mild aperient, but its medicinal uses are now confined to the measles and a few other complaints. The old-fashioned people of the last generation used it in mild cases, and rhubarb in more virulent ones. I well remember their medicine boxes containing both these drugs. A list of the prices as recorded in the 'Liber Fraternitatis Sanctæ Trinitatis de Walden' may be interesting, but it must be remembered that money was then of far more value than now.

	£	s.	d.
1540. For a pound of saffron to give my Ladye Pagett	0	12	0
1561. A pound of saffron given to the Queen's attorney	1	5	0
1614. Bought 4 oz. of saffron, 15*s.* 4*d.*, bought a pound of saffron	3	3	4
1629. Paid for v ounces and a half of saffron at 18*d.* per ounce	0	8	3
1653. 1 lb. of saffron presented to my Ladye	1	17	0
1661. For a pound of saffron, paid Pratte for gathering the heads 4*d.*	3	10	0
1665. Paid for a 1 lb. 4 oz. of saffron	4	1	10
1689. Presented to King William III., when he came to Audley End, 14 ounces of saffron, which cost.	3	3	8
1717. Paid for a silver salver to present some saffron to King George, £4 11*s.* Paid for the saffron	1	6	6

Saffron varied much in price in abundant or unproductive years, but from this time, from foreign introduction and from its disuse as a medicine, it rapidly declined both in cultivation and value. Probably I am almost the only man who has ever seen a field of saffron in bloom—that is, in this vicinity. The last of the saffron growers, with whom I was well acquainted when a child, was named Knot. He lived at Duxford, in Cambridge, about six miles N.W. of this town. He grew about half an acre, and made a journey once a year to dispose of his produce. In later years the journey was too much for him, and his friend, William Thurnal, acted for him. Up to 1816 he continued to grow saffron, and in 1818 the only remains of the crocus were to be found in his garden. I well remember the clay ovens and the sheets of white-brown paper used in drying the chives. In a conversation with his grandson some years after, he laughed at the notion recorded by Camden that the flowers should be gathered early in the morning, before sunrise. The only other saffron that I have ever seen was a bed in the garden of a celebrated amateur

* It was cultivated by the Arabs in Spain, about A.D. 960, and is mentioned in English leech books of the 10th century. See Ellacombe's 'Plant-lore of Shakespeare.' —*Ed. Ess. Nat.*

† 'Britannia,' vol. i., p. 426. The passage is quoted at length in Gibson's 'Flora of Essex,' p. 312.—*Ed. Ess. Nat.*

‡ 'Herball,' Ed. 1597, p. 123 ; Ed. 1633, p. 152. So also William Bulleyn in his 'Government of Health' (1588)—"Our English hony and safron is better than any . . . ."—*Ed. Ess. Nat.*

* Ray does the same. 'Synopsis' (Ed. 1724), p. 374.—*Ed. Ess. Nat.*

florist, Mr. Charles Baron. At his demise his garden passed into other hands, and the saffron failed. The saffron farmers were called, by way of distinction from other farmers, "crocurs," and from the uncertainty of the crop from disease in the bulbs, and the changes of this variable climate in September and October, the profits were very precarious, occasionally ruinous; which gave rise to habits of habitual discontent, and it may be inferred that the word "croaker," now a common appellation for a grumbler, was so derived! Saffron, in some shape or another, is still used in confectionery, probably only as a colouring matter, and for colouring butter and cheese.* In the county of Durham it is largely employed in the manufacture of biscuits, buns and cakes. Such things bought in the confectioner's and bakers' shops around Bodmin, Penzance, and Land's End are coloured with saffron. Nothing of the kind is heard of here. In Ireland these cakes are well known and used. The late Lord Talbot de Malahide, as an inducement for me to visit him in Ireland, said he would treat me with saffron cakes; and Mr. Maynard informs me that in the Museum here lately an Irish lady said that saffron cakes were now extensively used in her country, especially in the neighbourhood of Dublin. The commercial value of saffron is chiefly for the dye which it affords.† There are many imitations of it, some of great beauty, but they lack the charm of the floral tincture. There is nothing analogous in nature to the delicately rich and beautiful tint which is supplied by the stigmas of the saffron blossoms, excepting the hue of early morn, to which the poet has referred—

"How, when the rosy morn begins to rise,
And wave her saffron streamer through the skies."

I think it is a flower which might with advantage, as a late autumn beauty, with its light violet or lilac blossoms, be introduced into our gardens.

I will now devote a few lines to the name of the town in connection with the saffron plant, and the time when it assumed its present prenomen. It never was a large town, but was an important one from its Castle and Monastery, and from being the only market for many miles round. In Doomesday it is called Waledana; on the earlier seals of the monastery it is Waledeni; in a later and better executed seal on a deed of 1534 (the seal may be earlier) it is still Waledeni, without a prefix. At different times the town has had other additions to its name, as Walden-burg, Brook Walden, Chipping Walden, (Cheaping), which latter probably has much to do with the present name. A gentleman from the British Museum, on looking over some old deed, said: "I think I can help you; here is 'Seffing Walden'"; but I was doomed to disappointment; the parchment was stained and crumbled, and on closer inspection the word turned out to be "Chepping." Yet this raised the surmise, the town being the chief mart for the commodity, that this name, aided by the misspellings of the time, had gradually merged into saffron.

On a seal attached to the charter of Edward VI., 1549, is depicted three *brooms*, intended for saffron flowers, surrounded by a wall, forming the miserable pun of "Saffron Wall'd in"; this is the earliest record I can find of the prefix, nor does it appear to have been used before the year 1530. The Corporation were very unwilling to adopt it; their election book makes no use of the prefix until 1729.‡

When the present seal of the Corporation was fabricated the saffron blossoms were depicted more naturally than in the 16th century. A late lord asked whether the heraldry had not been spoiled, but his lordship was reminded that his family were going to replace the griffin supporters of his arms by lions, and he was asked if he intended to have the long cat-lizardlike lions of Edward III., or natural animals? The only response was a shrug of the shoulders. An old heraldic painter who had been accustomed to depict the ancient form of lion, was anxious to see a living beast, and when the Zoological Gardens were first opened went there. On being shown one he disputed rudely with the keeper, and left in great anger, believing he had been hoaxed. On entering what may be said to be almost a public room in the town (connected, I may say, with a most accomplished British botanist, now, alas! no more), the visitor is confronted with a frieze running round it of what may be surmised to be plants of the genus *Orchis*, but he is surprised to be informed that they are intended for our celebrated plant saffron. Again, the fabricator of the effigy on the east wall of the new town hall has strictly obeyed the injunction "Thou shalt not make to thyself the likeness of anything in heaven above or in earth beneath." Eight saffron heads will be seen in the spandrels of the arches in Walden church, exactly opposite the north porch.

Another incident connected with the name of the town may amuse; there is a phrase "Saffron Walden, God help me," heard all over the kingdom, in the wilds of America, and even in Australia. When the almshouses were re-established in the reign of Edward VI. the recipients of the charity had but a miserable pittance, and had a licence from the King to beg. As this was soon after the Reformation, when so many priests were reduced to mendicity, and were wandering about holding out their hands, "A poor priest, God help me!" so the licensed recipients of the Walden charity, when asked where they came from, exhibited their licences with "Saffron Walden, God help me!" and seeing that this freed them from prison, other beggars adopted the cant words. In a manuscript that I have on the dissolution of Tiltey Abbey, near Thaxted, Father Thomas, a favourite priest, was allowed 4*s.* 6*d.* a week from the parish of Thaxted, the others were reduced to beg their subsistence. *Deo adjuvante floremus* appears to be a Latin parody of the beggar's phrase.*

* Shakespeare's reference to it ("Winter's Tale," iv., sc. 2)—"I must have saffron to colour the warden pies," indicates its common use for this purpose in his time.—*Ed. Ess. Nat.*

† "The chiues, steeped in water, serue to illumine, or, as we say, limne pictures and imagerie, as also to colour sundry meats and confections."—*Gerard.*—*Ed. Ess. Nat.*

‡ The plant has also given its name to Saffron Hill, formerly part of Ely Gardens, Holborn; to Zaffarano in Sicily; and to Zafaranboly in Anatolia.—*Ed. Ess. Nat.*

* I also can recall the proverbial use of this phrase. My mother would sometimes quote a saying of my grandfather's, who was a Norfolk man, descriptive of any importunate person:—"He's only a Saffron Walden God-help-us."—*W. Cole.*

PHARMACY IN JAPAN, PAST AND PRESENT.†

BY M. T. KAWAMURA.

The recent publication of a Japanese Pharmacopœia turns attention to the general question of pharmacy and medicine in Japan. We are not to suppose, because the Japanese have not heretofore had a Pharmacopœia like those of European nations, that they were without medicines. Even the most ignorant people know something about the use of remedies. It is an instinct with four-footed animals to seek relief from pain in the use of medicines, as we see dogs eating grass for a heartburn.

In oriental countries, medical science was taught a thousand years before the Christian era, and many of the medicines they used are still prescribed in civilized countries. So late as the fourteenth to the sixteenth centuries, the oriental people surpassed Europeans in their knowledge of medicine as they did in their general civilization. Chinese medicine was introduced into Japan by the Coreans about two centuries before the Christian era, and from that time our people generally adopted the medicines and the medical science of China. Most of the Chinese medicines are from the vegetable and animal kingdoms. Few inorganic substances were used. Antimony, however, has been employed in China two

† From the *Pharmaceutical Era*, May.

thousand years. The vegetable drugs were, many of them, those now universally adopted, such as cinnamon, peppermint, rhubarb, jasmine, licorice root, and gentian. The following is a specimen of an old Chinese prescription, recommended for a patient who had taken cold, and complained of headache, dryness of the mouth, and inability to sleep :—

℞	Gentian.	℥iij. (by weight)
	Scullcap	℥ij.
	Evodia glauca	℥ij.
	Jasmine, pieces	No. xiv.
	Water	℥viij.

Boil about half-an-hour, until the liquids measure 6 fluid ounces, then strain through muslin or silk. To be taken in warm liquid three times a day, between meals. (The drugs were to be used in such cases generally in the form of a coarse powder, No. 12 to No. 20.)

Most of the medicines used internally were prepared in the above method, by decoction. Medicines were also employed in the form of extracts, syrups, pills, ointments, plasters, and liniments.

It was formerly the custom for physicians to prepare their own prescriptions, and they had, therefore, generally a dispensary connected with their office. The principal business in the drug stores was in crude drugs, and in ready-made pills and other articles, such as are kept in the drug stores of this country. They did not do a prescription business.

About the year 1437, Japan was first visited by the Spanish and Portuguese, and from that time there has been more or less commerce with foreign countries. European drugs were thus introduced, among other things, but our people were comparatively ignorant about their use. In 1590, if I remember rightly the date, our government interdicted commerce with foreigners, except the Hollanders, and for them only one port, Nagasaki, was opened. Here they were permitted to reside, and they brought with them whatever was used in their own country. Through them our people were instructed in European medicine, and became acquainted with foreign drugs and chemicals. From the Portuguese and Spanish we had not gained European ideas to any great extent, since their relations had never been so intimate with our people.

In 1834 Commodore Perry visited Japan, and secured a treaty by which Japanese ports were opened to Americans, and from that time our people have been more and more inclined to adopt the ideas of foreigners. Schools have been established for instruction in foreign learning. About twenty-two years ago, a medical school was established in which medicine was taught according to English ideas. Previous to this there had been many private medical schools taught by Japanese who had been instructed by the Hollanders.

In later years, our people have learned that the Germans are more advanced in medical learning than the English, and we have sent to Germany for our teachers of medicine. A preparatory school was therefore established by the government, in which students were taught the German language so that they might be able to understand the lectures in German, and use German text-books. After a four years' course in this school, the students were admitted into the medical school. It thus required seven years to acquire a knowledge of medicine. Some of the students were supported by government, others studied at private expense. According to the German professors, these students showed as much ability as those of the German schools, in Berlin and other places.

Students are also taught in their own language, the course occupying five years. Many thousands of students have been graduated thus. In 1884, there were 168 students pursuing the German medical course, and 627 studying in Japanese ; in pharmacy there were 67 students. The pharmaceutical department was established twenty years ago, but there have been comparatively few students, for the reason that physicians have been in the habit of dispensing their own medicines. The number of students is, however, increasing, as the utility of a separation of the practice of pharmacy from that of medicine begins to be understood.

Instruction in pharmacy is given also in German as well as in Japanese. The German course requires six years, the Japanese three for graduation.

According to the government report there were in 1884 in Japan 632 hospitals, of which ten were government hospitals, 357 public and 265 private hospitals. These include seven hospitals for the insane, three for lepers, eight for eye troubles, four for beri beri, 125 for syphilitics, two for surgical cases. There are now thirty-five medical schools in Japan ; of these I cannot give any exact statistics.*

The number of practising physicians in the country is 39,708. Of these 32,374 have passed the examinations required before local boards, or were practising prior to the enactment of the law requiring such examination ; 584 are graduates of the Medical Department of Tokio University, or of medical schools in Germany, England or the United States ; 2974 have passed examinations of the Bureau of Health of the Home Department, while 3776 belong to the old school of Chinese practice, and have passed no examinations.

Of specialists, there are 288 surgeons, 510 obstetricians, 131 who practise oral surgery, and 644 oculists. Besides these there are 19,249 female midwives, and 4405 veterinary surgeons.

The number of apothecaries in Japan in 1884 was 8428. Of these 333 have passed the examination of the Board of Health of the Home Department, which includes arithmetic, natural philosophy, chemistry, elements of botany, pharmacy, and prescription writing.

The New Japanese Pharmacopœia.

In the year 1880, the Japanese Government gave an order to the Sanitary Bureau of the Home Department to have prepared a Japanese Pharmacopœia, and appointed a committee to carry out the publication of the work. This committee numbered seventeen members selected from the Medical Department of the University, the Military and Naval Hospitals, the Sanitary Laboratory of the Bureau of the Home Department, from physicians practising in Tokio, and from foreigners in the employ of the Japanese Government.

At the first meeting of the committee, held at the rooms of the Sanitary Bureau, the following subjects were discussed :—

1. General principles to be adopted in carrying out the work. 2. The remedies which should be included in the new Pharmacopœia. These points being decided, the work was placed in the hands of a sub-committee. It was thought best to compile the Pharmacopœia in the first instance in the German language, with which they were especially familiar. The work was afterwards translated into Japanese. In selecting the official Japanese names—a task of no little difficulty—the entire original committee took a share.

After the translation was completed, the work was revised by sub-committees appointed for that purpose, and finally submitted to the general committee for their approval. It underwent a further critical revision, in which the three government laboratories were invited to assist, in order that the analytical reactions, tests, and volumetric solutions might be verified. The work in its completed condition was finally published in June, 1886.

In compiling the Japanese Pharmacopœia, the German, British and United States Pharmacopœias were all consulted. The German was perhaps more closely followed than any other.

* In the military hospitals the surgeons are instructed in the German system, and nearly all speak German. In the naval hospitals, the English system is followed, and most of the surgeons speak English.

The new Pharmacopœia contains 475 articles, nearly all of which are official in the Pharmacopœias of Germany, the United States, and Great Britain. The Japanese version is to be considered the official text. The articles are arranged in alphabetical order, however, in accordance with the Latin name, as in the Pharmacepœias just mentioned. Under the title of each article is given a description of its physical properties, with the mode of preparation, and tests for purity. The metric system is adopted for absolute weights, and all formulæ are constructed in parts by weight. The work has also an appendix, giving lists of dangerous and powerful remedies, doses, solubilities, etc.

Among the foreigners who took prominent part in the work were A. S. C. Geerts (Dutch), Director in the Yokohama Laboratory of the Sanitary Bureau, who died in 1883, having been more than ten years a resident in Japan; Dr. Eykman (English), Professor in the Pharmaceutical Department of Tokio University, who left Japan in 1885; Dr. Eldridge (American), Director in Yokohama Hospital, and still a resident at Yokohama, Dr. Langgard and Dr. Van der Hayden.

The new Pharmacopœia will give our physicians an authoritative standard. Heretofore those who have studied the German system have used the German Pharmacopœia, while those who have studied the English system have, naturally, used the British Pharmacopœia, and much confusion has resulted, since these Pharmacopœias differ in many particulars.

How generally the new Pharmacopœia is now used, I cannot say from observation, for I left Japan before it was published, but since it is our only authoritative standard, I infer that it is as generally used as is the U.S. Pharmacopœia in this country.

As I have already explained, the compounding prescriptions is not as yet done to any great extent in the drug stores of Japan. Physicians have always assistants and private students who are expected to put up their prescriptions. The assistants are graduates in medicine. They aid the physicians in examining patients, and in giving instruction to the private students, and generally superintend the preparation of the medicines prescribed. The private students are generally those too poor to take a regular course of medical study in the schools. The physician furnishes them room and board, and engages to instruct them in medicine. In return they do the work connected with compounding medicines, such as washing bottles, making pills, ointments, writing labels, etc. They learn also to write prescriptions. In the evening they have their time generally for study. These private students become physicians after they have finished their studies in the doctor's home, and passed the examinations of the Sanitary Bureau of the Home Department.

Of course it is only the more advanced students who are allowed to put up the physician's prescriptions. The more celebrated physicians keep two to five assistants, and ten to twenty private students. The doctors generally have one assistant and three or four students. Even in the country this is still the prevailing custom. It is probable, however, that it will be abandoned before very long. Laws will probably be made requiring that those who compound prescriptions shall have a special education, and the work of the pharmacist will be separated from that of the physician, as is the European and American practice.

SOME CONSTITUENTS OF YERBA SANTA.*

BY R. ROTHER.

A syrup prepared from Eriodictyon leaves is extensively used for the administration of quinine in a bitterless form. It also affords the further advantage of extinguishing the bitter taste of quinine when taken immediately after the use of mixtures in which it would otherwise be chemically incompatible. In order to disguise the bitterness of quinine when given in a fluid state, it has been variously exhibited in the condition of insoluble salts. The great objection to this mode of procedure is that these quinium compounds remain partially insoluble, and hence inoperative, in both alkaline and acidine contacts. Some of these combinations, although remarkably insoluble in the main, are by no means destitute of the nauseous bitter taint.

The important advantage possessed by *Yerba Santa* consists not only in the phenomenal suppression of the bitterness of quinine, but also in its presentation in a readily assimilable state.

A certain resinous component of Eriodictyon leaves is characterized by the property of forming in contact with some bases very soluble seemingly saline compacts. These, when merged with quinium salts, generate by double decomposition an ordinarily insoluble quinium-resin salt. This compound is promptly decomposed by the stronger acids, and is peculiarly soluble in ammonia.

When coarsely ground Eriodictyon leaves are percolated with water, a moderately dark brown coloured and somewhat bitter percolate is obtained. On evaporating this to a syrupy consistence and treating this residue with alcohol, a light brown liquor and dark brown pasty residue results. The alcoholic solution has acquired all of the peculiar bitterness of the percolate whilst the pasty mass is practically tasteless. On treating this residue, or the original one resulting from the percolate, with potassium carbonate, an ammoniacal odour becomes quite pronounced. The addition of an acid to the dark brown mass, separated by alcohol, yields a profuse precipitate which is wholly, but slowly, dissolved to a dark brown solution by a large volume of water.

When the residuary leaves in the percolator are treated with water rendered strongly alkaline with ammonia, the first portion of the new percolate is very turbid, but becomes clear as the free ammonia descends into the precipitate. A considerable proportion of alkaline menstruum is needed to extract the colour-giving substance wholly. Evaporation of the percolate to a syrupy residue and treatment of this with alcohol, yields a brown-red bitter solution, and a profuse dark brown precipitate. The solution and precipitate are in all respects identical to those obtained in the first percolation.

The alcoholic solution contains the quinine precipitant in union with ammonia as an acidic salt. The addition of water causes a dense milkiness, and acidulation with a strong acid precipitates the acidic resin in curdy flakes. Excess of ammonia added to the alcoholic solution causes no precipitate, but the colour is very perceptibly deepened. On exposure of this mixture the excess of ammonia and much of the alcohol is dissipated, whilst a red-brown tarry acidic ammonium salt deposits.

The precipitate given by alcohol appears to be an acidic ammonium salt of the tasteless and non-quinine precipitating acidic component of the leaves. When treated with water an inconsiderable proportion dissolves, leaving a large residue. Addition of ammonia or potassium carbonate and much water dissolves this wholly to a deep red-brown solution. The tinctorial power of this body is its most remarkable property. In its natural condition it is very probably in great part an acidic anhydrate, which is dissolved by aqueous solutions of alkalies and their carbonates. Under these circumstances no perceptible effervescence occurs when carbonates are employed.

With the use of monocarbonates the solution contains bicarbonate, showing that the reaction is like to that resulting in similar cases with analogous matter from other plants. On adding ferric chloride to such a solution, no precipitate at first appears. The continued addition of it, however, causes an abundant

* From the *American Journal of Pharmacy*, May.

brown-black precipitate soluble to a great extent in an excess of the reagent. It is also partially soluble in ammonia with a deep red-brown colour. The addition of ammonia to a mixture containing excess of ferric chloride gives a precipitate utterly insoluble in ammonia. These results show that the various proportions of the tinctorial body appended to basic radicles determine the degree of solubility and insolubility of the compound. As already stated, strong acids occasion a precipitate when added to alkaline solutions of this substance. Boiling of the mixture with dilute sulphuric acid appears to generate a new insoluble substance readily soluble in alcohol and in ammonia, with intense red-brown colour. The solutions are characteristically tasteless.

The tarry acidic ammonium salt of the quinine precipitant is readily and perfectly soluble in a sufficiency of alcohol. It is also readily and completely soluble in excess of ammonia. When treated with ether, a portion of the acidic component is dissolved. A correspondingly less acidic salt, however, remains undissolved. The action of chloroform is precisely similar in this. The acidic resin thus separated has an all-proportional solubility in these menstrua. It remains as a green-yellow transparent mass after the spontaneous volatilization of the respective solvents. It reacts with monad monocarbonates, converting them into bicarbonates. It is readily soluble in bicarbonates, evolving no carbonic anhydrate except on heating. When the solution obtained with sodium bicarbonate, for instance, is evaporated, a portion of the resin separates and is readily taken up by ether or chloroform. Alcohol however, dissolves an acidic sodium salt of the resin.

Treatment of Eriodictyon leaves with alcohol, dilute or strong, wholly removes the quinine precipitant. But this method of isolating it is neither economical nor practical.

A fluid extract of *Yerba santa* limpidly miscible with simple syrup is a desideratum. The writer has heretofore employed ammonia as a part menstruum in preparing syrup of *Yerba santa*. In order to secure an effective extraction an excess of ammonia is essential. It is difficult, however, to adjust a proper proportion, and hence the ammonia may preponderate in the finished syrup.

The writer would suggest a fluid extract of *Yerba santa* for preparing the syrup to be used in the proportion of 1 fluid ounce for 1 pint of the syrup. This fluid extract is merely an alcoholic solution of normal potassium eriodictyonate uncontaminated by the dark coloured non-quinine precipitant. The following is the process recommended :—

	Troy ounces.
Yerba santa leaves, coarsely ground . . .	16
Potassium carbonate	3
Ammonia water.	
Alcohol.	
Water. Of each sufficient to make one pint.	

Mix ammonia water and water in the proportion of one measure of the first and seven measures of the second. Mix the *Yerba santa* with 8 fluid ounces of this mixture and pack it firmly into a cylindrical glass percolator. After due maceration pour on menstruum until 3 pints of percolate has slowly passed. To this add the potassium carbonate and evaporate it until a pasty residue is left. Stir this well with 8 fluid ounces of alcohol, gradually added; let the pasty precipitate subside and decant the supernatant liquor. To the residue gradually add 8 fluid ounces of alcohol, as before, pour this mixture upon a strainer and force the liquid out. Should this second extraction measure more than is needed to complete the intended volume of fluid extract, dissipate the excess of alcohol by appropriate means; unite the residue with the first extraction, set the mixture aside for twenty-four hours, and decant the clear fluid extract from the scant crystalline deposit meanwhile formed.

LOBELIA INFLATA.*

BY J. U. AND C. G. LLOYD.

Description of the Drug.—In commerce two products of the plant are found, the entire dried herb and the dried seed. The former only is officinal, but the seed is a distinct article of trade, and very largely used.†

Lobelia Herb.—As found in commerce this drug consists of the stems, leaves and inflated capsules of *Lobelia inflata*. Usually the plant is gathered after the lower leaves have changed to brown, and after the seeds have fallen from the lower capsules, which are then also brown. The plant is cut off just above the ground, and the lower portion of the stem is generally devoid of leaves even in the carefully selected recent drug. Sometimes the plant has been known to appear so abundantly over an old field as to permit of its being mown with a scythe,‡ then the drug consists of straight, few branched stalks, from 6 to 24 inches long. If culled from moist situations along the banks of streams, the plants are more robust, branched and bushy.

Farmers often gather little lots of lobelia, and then the entire plant is sold. Root and herb collectors, on the contrary, understand that the seed commands a better price than the herb, and they thresh out the seed, break or chop up the stalk, and sell the seed separately. Thus it happens that the larger part of the lobelia herb of commerce is devoid of seeds, and is in a broken condition. As a rule, the leaves and capsules are of a green colour, the upper capsules being especially verdant.

No substitution for *Lobelia inflata* herb or adulterant is gathered, of which we are aware, nor is any probable. *Lobelia cardinalis* and *Lobelia syphilitica* are such different appearing plants they would be easily detected, and the other native and more closely allied species are so small and mostly rare that it would not be profitable to collect them.

According to the 'Pharmacographia' the drug used in England is mostly imported packed in ounces.§

Some writers assert that the root of *Lobelia inflata* is employed. This is a mistake, and first made by confusing *Lobelia syphilitica* with this plant. The root of *Lobelia syphilitica* was employed before *Lobelia inflata* was known to medicine, but the root of *Lobelia inflata* has never been used.

All parts of *Lobelia inflata* contain an acrid alkaloid which produces a painful irritation upon inhaling the dust of any portion of the plant. All parts of the herb, and the seed, produce an acrid biting sensation on the tongue, and a sharp tobacco-like impression in the throat and fauces. The milky juice of the green plant is intensely acrid, owing perhaps to the more soluble condition of the alkaloid. This juice is so violent that an amount so small as to refuse to affect a balance sensible to the one-thousandth part of a grain, produces a sharp tingling sensation upon the tip of the tongue. Upon drying, this juice becomes very much modified, but not by the escape of a volatile alkaloid.

The first published description of *Lobelia inflata*‖ states that the leaves if chewed "produce giddiness and pain of the head, with a trembling agitation of the whole body," and this sentence, with little variation, has passed

* Extract from the article on *Lobelia inflata* in the 'Drugs and Medicines of North America.'

† The powdered herb was known to Thomsonians as *green* lobelia. The powdered seed as *brown* lobelia.

‡ Professor A. J. Howe relates to us an instance in which several tons were cut at one time from an old wheat field about a mile from Worcester, Mass., on the road to New Worcester.

§ "The herb found in commerce is in the form of rectangular cakes, 1 to 1¼ inches thick, consisting of the yellowish-green chopped herb, compressed, as it would seem, while still moist, and afterwards neatly trimmed. The cakes arrive wrapped in paper, sealed up and bearing the label of some American druggist or herb-grower."—'Pharmacographia,' 1879, p. 399.

‖ 'Account of Indigenous Vegetables.'—Cutler, 1785.

through a multitude of works on materia medica.* It has not been our experience to note a giddiness of the head, the sensation with us is simply a tobacco-like irritation until nausea, headache and vomiting occur, and this is the report of others, who we know to be familiar with the drug.

Lobelia Seed.—This drug presents a deep brown colour in mass. It consists of minute, almost microscopic seed. Their actual size is about $\frac{1}{60}$ of an inch in length by $\frac{1}{240}$ of an inch in diameter. The typical seed is oblong, rounding at the ends, and cylindrical. Sometimes they are nearly round, however. The average number of seeds in a capsule is between 450 and 500. It requires 2500 seed to make 1 grain in weight.† Upon microscopic examination, each seed is shown to be a beautiful object, bright and glistening, the surface being a corrugated ridge-like network.

Lobelia seeds are odourless, but upon handling them a fine dust rises that is very irritating when inhaled. They possess the acridity of the plant in an intensified degree, and were considered by the Thomsonians to possess one-half more strength (emetic) than the powdered leaves.

Lobelia seed have never been officinal, but are in good demand in the American drug market, and extensively employed by Eclectic physicians who consider that the preparations of the seed are more uniform and reliable than those of the herb. Our experience is to the same effect.

No adulterations or sophistications are known to us, although often fragments of the leaves and capsules are present, not being separated by sifting through fine enough sieves. The commercial term for the drug free from this chaff is "clean lobelia seed."

The corrugated surface of the seed is a characteristic of the species of lobelia, and would serve to individualize them. It would be possible to substitute the seed of other species, *Lobelia syphilitica*, and perhaps *Lobelia cardinalis*. We made a careful comparison under a microscope of the seed of *Lobelia syphilitica* and *Lobelia inflata* and were unable to note any difference either of size or marking.

We are not aware that the substitution is ever made by collectors, but it could be done with profit to them as the *Lobelia syphilitica* produces seed in abundance and is a common plant and easily collected.

Fortunately, however, the plants are so different in all appearances that ignorant collectors have no idea that they are at all similar and the substitution is not suggested to them.

CONSTITUENTS.—*Lobeline.*—The characteristic principle of *Lobelia inflata* is an acrid, irritating alkaloid, that pervades all parts of the plant; most easily obtained from the seed. It is known as lobeline.

It exists in combination with an unimportant vegetable acid. If freed while in contact with other constituents of the plant the alkaloid decomposes in a short time. If heat is applied to an aqueous solution of the natural constituents, this decomposition occurs rapidly and the alkaloid soon disappears.‡ Heat applied even to an alcoholic tincture accomplishes the rapid destruction of the alkaloid.

In a recent experiment whereby we evaporated in a close still the alcoholic tincture of fifty pounds of lobelia seed, and extracted the residue with acidulated water, having neglected to add the acid to the alcohol, most of the lobeline perished. In another experiment, by an oversight, heat was applied to an aqueous solution of the alkaloid, while it was associated with other constituents of the plant, and the alkaloid entirely disappeared.*

Although much time and attention have been given to the lobelia constituents, the result is far from satisfactory. In our opinion, the chemistry of the subject is yet obscure. We have followed the various processes and obtained the acrid alkaloid, amorphous, colourless, intensely active, one drop of its solution immediately vomiting a strong man, but we have not crystallized either the pure alkaloid or a salt of it. We obtained crystals from the impure alkaloid *lobeline*, as others had and for some time accepted that they were the corresponding salts, but further (recent) examinations enabled us to eliminate the crystalline material entirely, leaving the alkaloid as an amorphous product.† That we were for a while deceived is evident, that others may also have been misled is possible. For the present we shall simply call this crystalline substance *inflatin*,‡ and are led to make this introduction before referring to the preparation of lobeline.

(*To be continued.*)

* The original description of a drug seems to be authority with many writers who neglect to give proper credit to the real author, and, who seem not to display much personal knowledge of the subject.

† Thus, a pound will contain 17,500,000 seed. The business firm with which the writers are connected purchased recently, in one lot, 2000 pounds of lobelia seed. By our calculation this amount contains the enormous number of 35,000,000,000 individual seed.

‡ This fact was well known to the Thomsonians. They used but little heat, and throughout their literature we find constant reference to the loss of strength by boiling. Indeed, they wisely preferred to give both the herb and seed *in substance*. Empiricism demonstrated what chemistry supports.

* Here again the Thomsonians learned from experience. They used *acetic acid* to make their most stable preparations.

† We simply state that *we* were misled. The crystals that we obtained were not of lobeline, but an impurity that intimately accompanies it and crystallizes more easily under the influence of acid liquids. Our crystals compare, too, with Procter's description.

‡ We dislike to affix a name to a body that is so obscure in its classification as this now is. We find also that the various forms of the word *lobelia* are entirely monopolized. Hence, we reluctantly select *inflatin* for want of a better name.

CHEMISTRY OF GERMINATION.

In a work on this subject (*Les phénomènes chimiques de la germination*, Brussels, 1886), M. A. Jorissen states that the greater part of the nitrogenous substances formed in germination are derivatives of the albuminoids. The result of germination is not always a reducing process. The chief constituents of ash are phosphoric acid, potassa, magnesia, and lime. During germination a transport takes place of these substances from the cotyledons or endosperm to the embryo, the substances thus transported being chiefly phosphoric acid, potassa, and magnesia; the proportion of dissolved mineral substances is inverse to the advance of growth.

The author regards the transformation of starch into sugar as a purely chemical change independent of any micro-organisms, it is brought about by diastase even in the presence of the most powerful antiseptics. Seeds can, therefore, germinate without the assistance of these organisms. Ammonia salts are, he states, formed on germination. Experiments were tried on the formation of solanine and solanidine in the potato, to determine whether they are produced in germination. He finds that they are not reserve-substances, but a diffusible form of compounds of nitrogen. Amygdalin is also a plastic substance, and not a simple product of metastasis. It disappears only slowly on germination.

According to the author's observations, starch-grains may resist for months the action of diastase alone; in the rapid formation and transformation of the carbohydrates during germination, he believes the albuminoids to play an important part; and that they are derivatives of a simpler substance, formic aldehyde. Calcium is found universally in the cell-wall, and is probably essential to the formation of cellulose. The fatty acids are formed at the expense of the albuminoids independently of glycerin; on germination the fatty oils are split up into glycerin and a fatty acid. Sugar is not the invariable form assumed by carbohydrates during transport; it is not present in seedling hemp, nor in the epithelium of the scutellum of grasses.

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"AMORPHOUS COCAINE."

THE increasing use of cocaine, not only as a local anæsthetic, but also for other purposes, and the very marked dissimilarity of many of the preparations of this alkaloid, as met with in commerce, appear to require a somewhat more precise definition of its characters than has yet been given with any degree of authority. It is still an open question whether the amorphous substance frequently associated with crystallizable cocaine and its salts really possesses the anæsthetic property of the pure alkaloid, or if it does so, whether it does not at the same time produce other objectionable effects. Certainly, the difference between these substances is in many respects very considerable, and sufficient to call for careful inquiry into their physiological actions. In the paper recently contributed to this Journal by Dr. STOCKMAN, the peculiarity of what is termed amorphous cocaine was attributed to the solubility of the crystallizable alkaloid in hygrine, another basic substance said to be naturally associated with cocaine in coca leaves. This opinion has been arrived at by Dr. STOCKMAN from a study of the physiological action and chemical relations of what is termed amorphous cocaine, but he gives no account of the experimental grounds upon which the opinion is based. So far as anything is known of the basic substance said to be associated with cocaine in coca leaves there appears to be strong reason for doubting whether Dr. STOCKMAN's opinion can be accepted as furnishing a satisfactory explanation of the amorphous and uncrystallizable character of a great part of the cocaine and cocaine salts met with in commerce. Taking the accounts given of hygrine by WÖHLER and by LOSSEN it must not be overlooked that both these authorities speak of it as being volatilizable. In this respect there is a marked difference from the substance known as amorphous cocaine, which is not volatile, but remains as a syrupy mass when its solution is evaporated. If this substance were really a solution of cocaine in hygrine the probability is that the hygrine might be evaporated off, leaving the cocaine in a crystallizable state. But this is not the case, and it appears more reasonable to infer that amorphous cocaine is a substance quite distinct from the crystallizable base.

In reference to this subject we have recently received a letter from Dr. W. MERCK, in which he states that his experience in working with cocaine does not agree with the opinion put forward by Dr. STOCKMAN, and so far as hygrine is concerned he regards it as being a purely imaginary substance. When investigating the subject he considered it to be of especial importance to repeat LOSSEN'S experiments, with the view of obtaining hygrine and ascertaining its properties and composition; but, as he states in his letter, all attempts to do so proved fruitless, and he could never obtain from cocoa leaves by distillation any product that could be regarded as an alkaloid. We are in a position to add that this has also been the experience of other operators, and it seems clear that before Dr. STOCKMAN'S suggested explanation of the nature of amorphous cocaine can be accepted the existence of hygrine must be established, and its capability of dissolving crystallizable cocaine demonstrated. Meanwhile it is necessary to regard the amorphous substance as being distinct from cocaine, and there appears also to be sufficient reason for excluding it from use for many of the purposes to which cocaine is applied. The irritation produced when the amorphous substance is applied to the eye, and sometimes resulting in ulceration of the cornea, is in itself strong evidence of the desirability of using only pure preparations of cocaine for such purposes, whether these effects be due to the presence of hygrine or not.

From what has been said it will be evident that there is a need of some ready means of testing the purity of cocaine salts capable of giving an indication more conclusive than that afforded by their mere appearance. For this purpose there is probably no more simple test than that proposed by Mr. MACLAGAN, and described in the "Month" of last February. It consists in dissolving one grain of the hydrochlorate in two ounces of water, adding two drops of ammonia solution and stirring the liquid with a glass rod so as to rub the sides and bottom of the glass. With a good sample of the salt well marked striæ will be at once formed where the rod has touched the sides of the glass, and very soon afterwards a copious crystalline precipitate will be deposited, leaving the liquid quite clear and bright. In applying this test to a sample of hydrochlorate containing the amorphous substance the solution becomes slightly milky, but no striæ are formed, and frequently no precipitate is separated, or if there be it is less copious than in the case of a pure sample, also less distinctly crystalline, and either ropy or at most of a flocculent character. In some instances no precipitate separates, but the liquid merely becomes milky, although the quantity of water used is only sufficient for retaining in solution four-tenths of a grain of true cocaine, or about half the quantity contained in one grain of the hydrochlorate.

"DRUMINE."

In "The Month" of December last, mention was made of the reported discovery of an alkaloid possessing anæsthetic properties analogous to those of cocaine. It was described as having been obtained from an Australian euphorbiaceous plant (*Euphorbia Drummondii*) by Dr. John Reid, of Melbourne, who stated that a 4 per cent. solution applied to the tongue or hand produced very marked local anæsthesia, and that when injected subcutaneously it acted as a pure sensory paralyser without preliminary excitement. The name of "drumine" was given to this substance by Dr. Reid. Subsequent it was tried physiologically by Dr. Ogston, of Aberdeen, who found that the material he had received from Dr. Reid in the form of a semi-crystalline waxy mass of a greyish-white colour had little if any effect as a local anæsthetic, and certainly could not be compared with cocaine in that respect. We learn that a similar result has been obtained with a sample of a solution supplied to Messrs. Savory and Moore by Dr. Reid last January. This was placed in the hand of Mr. W. H. H. Jessop, of the Royal Hospital for Diseases of the Chest, for trial of its effects when injected subcutaneously and when applied to the eye. In all instances the results were absolutely negative. Chemical examination also showed that the solution gave no indication of the presence of an alkaloid. In the present number of the Journal will be found a letter from Mr. Tanner, in which he gives the result of his examination of a substance supplied under the name of "drumine," but consisting mainly of calcium oxalate. It would appear, therefore, that whatever alkaloidal substance may exist in the plant operated upon by Dr. Reid, the method of extraction adopted by him has not been successful in obtaining it. The account he gives of that method, viz., maceration of the entire plant in hydrochloric acid and precipitation of the liquid with sodium bicarbonate shows that it might well furnish nothing more than calcium oxalate, and that as drumine is said to be soluble in water the whole of this might be lost in the mother liquors.

We are informed that it has been resolved unanimously by the Executive of the North British Branch to hold another election of the Executive at the earliest convenient date, for which purpose nomination papers will be sent out to the Members and Associates of the Society resident in Scotland immediately. It has also been resolved that in future the election shall take place annually in the month of June.

* * *

On Tuesday last, in the House of Commons, the adjourned debate on the motion to go into committee on the Pharmacy Acts Amendment Bill was further adjourned until Friday, the 24th inst.

* * *

Some little excitement seems to have been caused among the pharmacists of Italy by a recent decree of the Government. According to the present law a candidate for the pharmaceutical qualification in Italy must study three years at a university, in which, besides the ordinary chairs for natural sciences, there are two others for pharmacy and materia medica. During this time the examinations in the several sciences may be passed, and then, after one year's practical experience in a pharmacy, the candidate may go on to the final examination, which includes the carrying out of a qualitative analysis, the making of one chemical and one pharmaceutical preparation and discussion thereupon, pharmacognosy, pharmaceutical botany and dispensing. Between 1860 and 1867, during which years the Italian kingdom was being gradually constituted, many young men were interfered with in the progress of their studies, who at the close of the war were too old to go through the regular course, and moreover the pharmacists of the now united provinces had not been previous to the new law all under similar conditions. Accordingly, after the annexation of Venetia and the final unification, in 1867, a number of pharmacists were afforded an opportunity of acquiring a regular position at an extraordinary examination session. Considerable astonishment was excited, however, when ten years later, in 1877, a second extraordinary examination was held, though the passing of this did not legally qualify a person to become a proprietor of a pharmacy or dispense poisons. Dr. Hugo Schiff, who was on the Commission for Piedmont, says that many of the candidates were almost entirely without scientific knowledge, but that in some parts of the country an undesirable leniency was exercised, leading to the address to the Government of a protest against the repetition of these opportunities for avoiding the usual course. The issue of a decree fixing the date for a third special examination session for 1888 has, therefore, given rise to much dissatisfaction, and the executives of the pharmaceutical associations and schools throughout the country are exercising their influence to secure its withdrawal.

* * *

A correspondent to the *Lancet* states that within the last few days a number of children have been taken to the Royal Southern Hospital, Liverpool, suffering from symptoms of poisoning consequent upon eating some "nuts" which they found in a heap of rubbish. The supposed "nuts" are said to have been croton seeds.

* * *

In discussing, in an annual report just published, the position of the rival processes of alkali manufacture, the Chief Inspector of Alkali Works says that in Lancashire the Leblanc process holds its own, and has even advanced, in spite of the continued development of the ammonia soda process. In the Newcastle district, however, the amount of alkali manufactured according to the Leblanc process has diminished, and taking the whole country the amount of salt decomposed last year in Great Britain in the older way is estimated to have been 649,248 tons, against 664,551 tons in 1885. The amount of alkali made by the ammonia process has steadily increased, and now reaches 95,000 tons of carbonate of soda annually. The 137,220 tons of salt thus used added to the quantity decomposed by the Leblanc process gives a total of 786,468 tons, the highest amount that has yet been reached.

* * *

Is is also stated on the authority of the Inspector of Alkali Works that out of the 100,000 tons or more of sulphate of ammonia produced annually in this

country, chiefly from the ammoniacal liquor of gas works, only one-fifth is retained for home use for all agricultural and chemical purposes, the remainder being exported, chiefly to Germany. A hope is expressed that British farmers may soon learn the manurial value of this compound, which, being produced at the gasworks scattered throughout the country, could as a rule be obtained by them practically free from the heavy charge for carriage involved before it can reach the German or Belgian farmer.

* * *

Some experiments carried out on a large scale at Messrs. Walker, Palmer and Co.'s lead works, in Flintshire, with a view to utilizing electric currents in causing the deposition of the particles suspended in the lead fume, in accordance with the suggestion of Professor Lodge (see vol. xvi., p. 1041), have not been attended with the hoped-for success. A large Wimshurst induction machine, with four glass discs of 5 feet diameter, was erected, and the currents of electricity were carried from it to two wire gratings inserted a few feet apart in the main flue, which were of the size of the sectional area of the flue. It was hoped that the electricity in traversing the space between the gratings would, in accordance with the results obtained by Professor Lodge in his preliminary experiments, cause the deposition of the dust or fume; but this deposition did not take place, although the cause of the failure remains at present unexplained.

* * *

We learn from the *Pharmaceutische Zeitung* that Dr. Theodor Peckolt, whose name will be familiar to our readers as the author of numerous valuable communications on Brazilian drugs, intended celebrating last week, in Rio, his fiftieth anniversary as an *apotheker*. Dr. Peckolt was born in 1822 at Christianstadt-am-Bober, in Prussian Silesia, and emigrated to Brazil in 1847.

* * *

The fifty-fifth annual meeting of the British Medical Association is to be held in Dublin on the 2nd, 3rd, 4th and 5th of August, the President-Elect being Dr. J. T. Banks, the Regius Professor of Physic in the University of Dublin. The Address in Medicine will be delivered by Dr. W. T. Gairdner, Professor of Medicine in the University of Glasgow; the Address in Surgery by Dr. E. Hamilton, Professor of Surgery in the Royal College of Surgeons in Ireland; and the Address in Public Medicine by the Rev. Dr. S. Haughton. The Section of Pharmacology and Therapeutics will be presided over by Dr. William Whitla. There will also be the "Annual Museum," which is to be held in the Anatomical Department of the Medical School of Trinity College, the Honorary Secretary to the Food and Drugs Section of which is Dr. F. J. B. Quinlan, 29, Lower Fitzwilliam Street, Dublin. The Committee charged with the arrangements of the Museum is anxious to allot the space at its disposal, and requests immediate application from intending exhibitors to the Local Honorary Secretary, Dr. George F. Duffey, 30, Fitzwilliam Place, Dublin.

* * *

The next meeting of the School of Pharmacy Students' Association will be held on Thursday, June 23, when the proceedings will include a note on a Specimen of Green Olive Oil by Mr. J. O. Braithwaite, and a Report on Pharmacology by Mr. R. A. Cripps.

Transactions of the Pharmaceutical Society.

ADDRESS TO THE QUEEN.

The following is a copy of the loyal and dutiful Address to Her Majesty the Queen on the completion of the fiftieth year of her reign, which has been drawn up and duly forwarded in compliance with the resolution passed by the Council of the Pharmaceutical Society at its last meeting:—

"*The Humble Address of the President, Vice-President, and Council of the Pharmaceutical Society of Great Britain.*

"To the Queen's most Excellent Majesty.

"May it please your Majesty,

"We, the President, Vice-President, and Council of the Pharmaceutical Society of Great Britain, approach your Majesty with feelings of loyal devotion to your august person and to your throne, to tender our sincere congratulations on the happy completion of the fiftieth year of your Majesty's reign.

"During that period Pharmacy and the kindred sciences promoted by your Majesty and his Royal Highness the late Prince Consort have made enormous strides. It is a source of peculiar gratification to us that our Society was one of the first founded during your Majesty's reign, its Charter having been granted in the year 1843, and the Acts of Parliament which confirmed the Charter and placed pharmacy on a definite legal basis having been passed also during your Majesty's reign.

"We humbly pray that your Majesty may long be spared to reign over a happy, loyal, prosperous and united empire, beloved by all your subjects.

The Common Seal of the Pharmaceutical Society of Great Britain.

Seal.

"MICHAEL CARTEIGHE, *President.*
"THOMAS PRESTON GOSTLING, *Vice-President.*
"JOHN ROBBINS, *Treasurer.*
"RICHARD BREMRIDGE, *Secretary and Registrar.*"

Provincial Transactions.

BRIGHTON ASSOCIATION OF PHARMACY.

The first annual dinner of the Brighton Association of Pharmacy took place on Thursday, June 9, and was well attended by members and friends. The chair was taken by Mr. W. D. Savage, J.P., and after letters had been read from Mr. Carteighe, Dr. Paul, Dr. Hodson and others, regretting their inability to attend, the Chairman proposed the usual loyal toasts, which were heartily received.

Mr. Cornish (in the absence of Mr. T. Billing) proposed the toast of "The Medical Profession," and paid a warm tribute to the high character, both scientifically and morally, of the members of the medical profession. He expressed his belief that the medical profession in England stood as high as in any part of the world, and that chemists being prepared by their education and aptness in their calling to be a helpmeet to medical men in the beneficent work of ameliorating the condition of suffering humanity, were daily rendering essential service to the medical profession. As a body, chemists always felt a warm attachment to the medical profession.

Dr. Ewart, in responding, said that the medical pro-

fession was world-wide in its diffusion. It had been said "You will find a crow, a sparrow and a Scotchman wherever you go," and according to his experience, it might be added, "an Anglo-Saxon doctor;" for whether in Afghanistan, in India or China, or wherever you go, an English, Scotch or Irish doctor has always gained a very substantial footing. There was a self-sustaining power in the profession—a power to make itself felt. It filled a very important sphere in civilization. It was a humanizing profession, and perhaps no other profession did so much eleemosynary work. The medical profession regarded chemists as really and virtually a complementary part of the profession, for it was to them that medical men looked to have their prescriptions honoured, not in the breach but in the observance, and that they were honoured was proved by the fewness of the complaints made. Sir W. Gull had recently said that medicine was not much good, but he thought that Sir W. Gull had not reflected that the English people were the most healthy, energetic and robust people in the world, and at the same time the largest medicine takers. The medical profession was a humanizing profession, and more than that it was liberal to a degree, the republic of medicine was less contracted and restricted than other professions. It was liberal in promoting one great department which was calculated to diminish its profits, the department of sanitation. In consequence of sanitary improvements the nation would become healthy, wealthy and wise. He felt honoured by the invitation to the dinner; medical men liked to meet those with whom they were in professional contact, and next to patients there was no class they were in more frequent contact with than chemists, for whom personally he had the very highest esteem. Chemists were a real assistance to medical men in modifying the pains and pangs of suffering humanity.

Mr. Alderman Cox, J.P., next proposed the toast, "The Pharmaceutical Society," and said it would be acceptable to all, as all were indebted to that body The Pharmaceutical Society had been established to give a better education to those who entered the calling, and to raise chemists from being mere tradesmen to something like a professional status, and this had been accomplished. Commenting on the Benevolent Fund, Mr. Alderman Cox said he thought that nothing could be more kind and generous than for chemists to provide out of their meagre profits for the unfortunate ones in their calling, and that it was very creditable that over £17,000 should have been distributed to deserving persons during the past ten years. He thought there was no better way of commemorating the Jubilee than that proposed by the Pharmaceutical Council, to give an additional £5 to all annuitants.

Mr. Cortis (Local Secretary at Worthing) responded, and endorsed all that had been said on behalf of the Society, and as one who had received his professional education in the School of the Society he had every reason to speak well of it; it had been of very great service to him and to a great many others.

Dr. E. G. Whittle next proposed "The Brighton Association of Pharmacy," and expressed his pleasure at being present and his best wishes for the Association. Dr. Whittle then proceeded to indicate questions which might be discussed at meetings of the Association. He believed that medical men would find it to their best interests not to dispense even for minor ailments, and chemists would be well advised not to prescribe. He suggested that dispensing should be done on special terms for clubs, and for family practice; a prescription from a consulting physician should be charged at a higher rate than one from a family medical man. He believed that chemists' charges were very fair and in some cases very low, considering that the payment was made for skill and education, and not based on the mere commercial value of the drugs.

Mr. W. D. Savage, J.P., responded, and after thanking those present for their reception of the toast, gave a history of the Association from the year 1861, when the first Brighton Chemists' Association was founded, and told of various lectures and classes which had been started for apprentices and assistants, and which had not been valued as they deserved. He hoped the Bill now before Parliament for enforcing attendance at a series of lectures would become law.

Mr. T. H. Long proposed "The Visitors;" he hoped that the dinner would become an annual affair, and that more visitors would attend in future.

Dr. Ewart responded. Other toasts to Messrs Caton and Salmon, and to the Secretary (Mr. Marshall Leigh), followed, and a vote of thanks to the Chairman brought the meeting to a close. The meeting was enlivened by songs, recitations, etc., by Messrs. Long, Costerton and Leigh.

Proceedings of Scientific Societies.

SOCIETY OF CHEMICAL INDUSTRY.

Manufacture of Arrowroot Starch in St. Vincent.*

BY J. W. MACDONALD.

As we have lately been treated to a very interesting paper on starch manufacture from Indian corn, it was suggested to me that we might with advantage continue our discussions on this subject by learning something of its manufacture from another raw material, arrowroot, or, as it is known in botany, *Maranta Arundinacea*. This plant is essentially a starch-producing plant, the starch existing in it in almost absolute purity, and no other use having been found for it, as far as I am aware, excepting for feeding cattle. I have long felt, and this was also dwelt upon by our Chairman in his discussion on Dr. Archbold's paper, that it was a great waste of valuable nitrogenous matter to manufacture starch from such materials as maize, wheat, rice and potatoes, which in themselves form a large proportion of the food of man. We have around us large masses of half-fed human beings, nevertheless we daily destroy hundreds of tons of valuable food in the manufacture of starch, etc. I feel sure that as the world advances and becomes more populated, a more conserving spirit must pervade our manufactories, and only such raw materials be used as will cause the least waste of matter; countries, too, that are best suited by natural forces for the production of certain commodities, will have to carry out the intentions of nature. We shall not then have such anomalies as Europe trying, by the aid of Governments, to supply the world with sugar; for nature's sugar plant is the sugar cane, and its home, the tropics.

Arrowroot is also a native of the tropics. The island of St. Vincent in the West Indies has taken the foremost part in its growth and production; a fair quantity is also made in Natal, and smaller quantities in India, Fiji, Queensland and other countries. Formerly, the Bermuda Islands produced a good deal, but, as there is very little arable land and a scarcity of water, and the inhabitants having turned their attention to growing early vegetables for the New York markets, arrowroot is gradually being given up.

In St. Vincent the plant grows 2 to 3 feet high. It is a weak fibrous stalk with six to eight arrow-shaped leaves resembling the leaves of the lily. When the root is ripe, these leaves fall and wither. The plant flowers but does not bear seed, and is therefore propagated by the root. This can be done in two ways, either by pulling the green stalks, trimming off the long hairy roots, and setting them 6 inches apart in fields previously prepared for their reception, or, as is most generally done, by returning to the soil the upper end of the root, which

* Read before the Liverpool Section of the Society of Chemical Industry. From the Society's Journal.

is hard and fibrous, and contains very little starch. As the fields are dug up, the labourers pick out the roots and break off these top pieces 4 to 6 inches long, and bury them in holes 6 inches apart and a few inches deep. In this way reaping and planting go on simultaneously. Care must be taken, however, to avoid returning to the soil small thin weak roots. The roots commence to grow in about a fortnight, but, to avoid choking, the fields have to be weeded two or three times. In about ten to twelve months the roots are ripe, and are then 12 to 18 inches below the surface. If they are reaped before being properly ripe, the next crop suffers, and frequently takes fifteen months to mature, and the fields require to be frequently weeded. With careful attention and manuring fields will produce crops for over twenty years. The arrowroot is a very hardy plant, and will continue to grow up and die down for years after its cultivation has ceased in a field. The roots are long and tap-shaped, and are jointed at intervals of three-quarters to one inch. In the soil they are protected by a fibrous covering which grows from each joint, the folds overlapping each other to the end of the root. Full-grown roots are from 10 to 18 inches long, the most starch being found in the lower or youngest end.

The first part of the manufacturing process is to soak the roots in water to soften the covering and the adhering earth. They are then stripped of the covering and washed, and thrown into a second or rinsing tank. When thoroughly clean they are taken to the pulping machine. The skin is said to contain a resinous matter which gives a yellow tinge and unpleasant flavour to the starch, if the latter is not well washed. In former times the roots were very carefully skinned with German silver knives, before being pulped. This is said to have produced whiter starch, but as it was so laborious and expensive, it was discontinued. The skinned roots were pulped by subjecting them to great pressure by passing them through an upper, and then a lower and much closer, pair of polished brass rollers, to break the starch cells. The method of pulping now generally adopted is to feed the clean unskinned roots against a fine saw-grater very similar to a potato-grater. It is a solid cylinder of hard wood about 23 inches diameter and 7 inches wide. Slits are made by a saw from end to end of the wood at half-inch intervals. Saw blades having six to ten teeth to the inch are then fitted into the slits, and the whole immersed in water to swell the wood and fix the saws. The grater is now fitted into its place very close to a wooden feeding bed. As it revolves several hundred times per minute it tears the roots into shreds. A great deal, however, depends on the fineness of the teeth and the velocity of the drum.

On account of the very fibrous nature of the pulp there is considerable difficulty in the sieving or separating of the starch from it. The fibres readily gather into lumps and enclose the starch, so that hand sieving, although very tedious, has to be resorted to. The pulp is first run into a box or sieve, the bottom of which is a sheet of copper or tin punched with holes about one-fifth inch diameter. While water flows on, the contents are kept thoroughly agitated by hand, until all the starch has been washed out. While one strainer full is being washed, another is being filled so that there should be no delay. However careful one is there is a loss of starch in the fibre owing to the presence of small bits of the roots which have escaped pulping.

In one factory, instead of the above strainer a tin-lined copper cylinder has been tried. The cylinder was stationary, its under side being pierced with holes, and, inside, paddles or beaters revolved at great speed amongst the pulp and water, until the latter flowed away free from starch. The washed fibre was then removed and a fresh charge of pulp put in. This, however, has been discontinued. In another factory, a half cylinder, also stationary, is in course of erection. Its under side is also pierced with small holes, but there is a slide under this to open or close at will. Inside there are rakes attached to two shafts, which move in opposite directions and cause the rakes to oscillate very rapidly between each other, thereby keeping the fibre always open. The starch water is let out, more water run in, and the operation repeated until the starch has ceased; then the fibre is taken out. The great objection to any mechanical washer is the tendency of the fibre to accumulate on the agitators and break them. I do not know at present of a single mechanical washer being in use. To get over this difficulty it has been proposed to chop up or slice the roots into small short pieces, and either rasp them or pass them through metal rollers or mill-stones, so that the thin disintegrated pulp may flow over mechanical sieves. I do not know if this plan has yet been tried. Although causing a loss of starch, the present method of rasping avoids an undue pulverizing of the soft yellow fibre, and so gives a very white starch without much further trouble.

From the fibre strainers the starch water flows consecutively through a series of brass wire sieves of forty, eighty, and one hundred meshes; each of these retain small fleshy bits of unpulped root. From the last sieve the water runs into the settling cisterns, which are preferably lined with white glazed tiles to avoid accumulation of slime.

A portion of the fibre collected on the finer sieves is used for feeding the animals on the estate, the remainder and all the coarse fibre are used as manure. For this purpose it is left in heaps until it decomposes, after which it is distributed on the fields along with pen manure. Sometimes also ashes and guano are used. The waste water from washing the starch contains a considerable amount of vegetable matter, and gives good results where it is run on the fields, but the extensive application of this is not practicable. After the starch has settled in the cisterns the water is run off and more added, the whole is stirred up and again allowed to settle. This generally suffices to dissolve out soluble matters. At night all the cisterns are drained, and the starch is dug out and taken to a mixing box, where it is mixed with a small amount of water, then run through another fine sieve into the separating pans. These are small round galvanized cisterns with smooth perpendicular sides. When filled, the starch milk is stirred round with a small oar until it is in violent circulation. The oar is withdrawn and the cisterns left until morning. The stirring has the effect of separating the starch from any remaining impurities. These, being of less specific gravity, settle last and therefore on top of the starch. Next morning the water is drained off, and the light impure starch scraped off the surface. If the earlier parts of the process are carelessly done, this separation may have to be repeated before the starch is quite pure. The impure surface starch contains a large proportion of starch entangled in very fine particles of fibre and broken cell walls. Although this can be dried and exported as an inferior starch, it is generally given to the labourers as a perquisite. It is used in various forms as flour. Poultry and pigs are also fed with it. Weak caustic soda extracts a colouring matter from it, but also precipitates a yellow substance, making it very difficult to separate the starch from it in a pure state.

The pure starch in the separators is now taken out in blocks, and placed on trays for about twelve hours to drain and harden. It is then broken into smaller pieces, and taken to the drying house, where it is air-dried. This building is open on all sides for free circulation of air. It is surrounded, however, with galvanized wire to keep out the small birds which hover about. Inside there are a series of wire shelves over large shallow wooden trays. The top shelf is made of very open wire, the next is closer, and so on, the lowest being the closest. The wet lumps of starch are placed side by side on the top shelf, where they remain until by the action of the air they crack up and fall through on to the next shelf. In

time the whole falls through the lowest shelf, and is in a fine granular state, ready for packing. It contains from 14 to 17 per cent. of water. In cold wet weather the starch dries very slowly, taking sometimes as long as two weeks. During this time, if the starch has been imperfectly purified, the lumps get sour and become yellowish. Indeed, the whole process must be as rapid as possible. In the settling cisterns especially, if the starch is left in contact with the impure water too long, its whiteness is affected. The crop lasts from October to May. The name "arrowroot" is, I think, derived from the Indian word, Ara-ruta, or "mealy-root;" but some say that this root has been confounded with the *Maranta galanga*, which was called the arrowroot on account of its bruised roots being used as an antidote to the poison of the *Jatropha Manihot*, which was used for poisoning their arrows. I may say that tapioca starch is obtained from this poisonous root. The poison, however, is contained in the juice only, and is destroyed by heat.

Regarding the yield of arrowroot, an acre will produce 13,000 to 15,000 lb. of roots, according to the season ; in wet seasons the roots are heavy and moist, and give less starch. A fair average yield is 22 cwt. air-dried starch, with 14 per cent. water, per acre, or about 19 per cent. on good roots. I have no doubt that this will be considerably increased by the use of much-needed improved pulping and sieving machinery. The roots that I have analysed got slightly dried in transit, so that they show a rather high amount of starch. The analysis, however, will give an idea of the constituents of the roots. In some respects it differs from an analysis by Benzon, stated in Ure's Dictionary, and which I append:—

	J. W. M.	Benzon.
Starch	27·07	26·00
Fibre	2·82	6·00
Fat	0·26	0·07
Albumin.	1·56	1·58
Sugar, Gum, etc. . . .	4·10	0·60 (Gum)
Ash	1·23	0·25 ($CaCl_2$)
Water.	62·96	65·50
	100·00	100·00

The ash consisted of phosphate of lime and alkaline sulphates, and chlorides.

I have made an attempt to introduce the residual coarse fibre as a raw material for paper manufacture, but consumers say that it is too weak and lacking in tenacity. For paper making the starch still remaining could be recovered by steeping in boiling water, and used for sizing the finished paper.

Owing to the fall in the value of sugar, the production of arrowroot in the West Indies has been extended rather beyond the demand. The wholesale price has consequently fallen to an almost unremunerative point. This low price, however, will permit it to be used for whatever purposes the commoner kinds of starch are now employed. In some respects it is superior to common starch, and one of my chief objects in writing this paper is to draw the attention of large users of starch to this comparatively new source of very fine starch. Arrowroot swells much more readily, and with less heat than maize, rice or wheat starch, and forms a stiffer jelly. It is, therefore, highly adaptable for sizing and laundry purposes. I think this property is attributable to the larger size of the granules of arrowroot starch which are among the largest of the starch granules, whereas the granules of wheat, maize and rice starch are very small and will contain a greater proportion of starch cellulose and less granulose, the latter being the substance which swells when dissolved in hot water. Another use for which arrowroot starch is very suitable on account of its great purity and freedom from chemicals, is for the preparation of powder for the skin. Many of the powders sold are composed of very questionable ingredients: arrowroot well crushed and dried on a plate before the fire is both simple and safe.

It is as an article of food, however, that it has hitherto been mostly used, but the exorbitant retail price put on it (from 8*d.* to 2*s.* per lb.) has kept it out of general use. Of course, being starch it cannot have the flesh-forming power of flour and other nitrogenous meals, but it is the purest, most digestible and palatable of the starches, and is devoid of the unpleasant taste or flavour observed in potato starch and in the so-called cornflour and other starches extracted from the cereals by the caustic soda and fermentation processes.

Regarding adulteration, this is only done when the arrowroot is for sale at a high retail price for food. This is chiefly effected by such cheap starches as those from potato, sago and tapioca. I have also found chalk and plaster of Paris in arrowroot, but this is very rare. The microscope affords the only reliable means of detecting admixtures of starch, and as this is only within the reach of very few, admixtures often go on with impunity. I need not here enter into a description of the characteristics of various starch granules, for they are described in many well-known books. I find, however, that many of the prints given and the descriptions are very erroneous, so that one should resort more to personal observations, using samples of the various starches for comparisons, the origins of which have been carefully ascertained and noted. When examining a sample of unknown starch, a small portion from the standards should be mounted and compared in order to make sure of the origin of the unknown sample. If a thin well-washed section of the root be examined by the microscope, the arrangement of the cells is seen to be very perfect and beautiful, resembling somewhat a section of the honeycomb. The cells are hexagonal and very transparent, and are filled with very uniform starch granules. The pith of the root contains very small and somewhat irregular cells, which are filled with exceedingly small starch granules; this is probably the source of the smaller granules seen in a sample of arrowroot starch. The fibres are arranged in concentric rings round the pith. They are somewhat strong in the fleshy part of the root, but weak at the joints, which break very easily.

Regarding the annual production of arrowroot, I have not been able to obtain many statistics. Bermuda raises only 500 to 700 kegs, so that very little of what is sold as Bermuda really comes from there. Natal produces 2000 to 3000 cases, and St. Vincent about 22,000 brls., 20,000 of which come to England, and most of the remainder is sent to America. The production of other countries is, I believe, very small.

Analysis of Arrowroot Starch.

	Per cent.	Per cent.
Starch	83·70	99·5 when dry
Fibre.	0·04	0·05 ,,
Fat	0·07	0·08 ,,
Sugar, Gum, etc. . .	0·18	0·21 ,,
Ash and Sand. . .	0·14	0·16 ,,
Water	15·87	—
	100·00	100·00 ,,

Parliamentary and Law Proceedings.

The Question of Recovery for the Services of Unqualified Assistants.

HOWARTH *v.* BREARLEY.

On Saturday, the 11th inst., in the Queen's Bench Division of the High Court of Justice, before Lord Coleridge and Mr. Justice Denman, a case was heard

which raised a question of great importance to medical practitioners and also to the public, the question being whether unqualified persons can be employed by medical practitioners to supply medical attendance and medicines. The action in the Salford Court was by the assignee of one Fitzmaurice, a qualified medical practitioner at Bury, to recover from a person living at a village near that town a sum of £18 12*s.* for medical attendances and medicines for a period from 1880 to January last. It appeared that the actual attendances had been by an unqualified assistant of Fitzmaurice, and that he prescribed and made up the medicines, Fitzmaurice himself taking no part in the business. At the trial it was objected that under the 21 and 22 Vict., c. 90, the plaintiff could not recover as the attendances were by an unqualified person. And the Judge so thought and directed a nonsuit. This was an application by way of appeal from that decision.

Mr. Willes Chitty appeared for the plaintiff in support of his application for a new trial, and contended that in law the medical attendances were by the principal, who was a qualified practitioner, and not by his assistant.

Lord Coleridge: Then your contention comes to this—that a qualified medical practitioner may employ any number of unauthorized persons to administer medicines; and (to use an expression of Lord Ellenborough's) to make our stomachs the arena for the struggles of opposing poisons.

Mr. Willes Chitty: The principal was qualified.

Lord Coleridge: But the unqualified person prescribed, and that was the ground on which the Judge decided, viz, that the qualified person who sued had not attended or prescribed.

Mr. Willes Chitty: He had by his agent.

Lord Coleridge: Who was unqualified.

Mr. Willes Chitty: The medical man had a branch house at which his assistant attended.

Lord Coleridge: And he was unqualified; so that the qualified man did not attend, and the man who attended was unqualified. It is a very serious question. Patients have been killed by mistakes of unqualified persons. In one instance a person was killed by an assistant giving him 6 grains of strychnine instead of 6 grains of salicin, a rather serious mistake. One does not like the idea of one's life being terminated by such a mistake.

Mr. Willes Chitty: If this view is to prevail a doctor cannot keep a boy.

Mr. Justice Denman: Oh, yes he can; but he must not send his boy to attend his patients, feel their pulses, and prescribe for them. If you are right he may send his boy or his butler to attend them.

Mr. Willes Chitty: Business is constantly done by servants or agents.

Lord Coleridge: But the Act says that an unqualified person shall not recover for attendances or medicines. And here the qualified person did not attend or prescribe.

Mr. Willes Chitty: Not personally, it is true.

Lord Coleridge: And the Act says that an unqualified person shall not recover for attendances or medicines.

Mr. Willes Chitty: Here he is not suing; it is his employer, the qualified person, who is suing.

Lord Coleridge: And he did not attend or prescribe.

Mr. Willes Chitty: Not personally.

Lord Coleridge: How can a medical man attend or prescribe for a patient unless personally.

Mr. Willes Chitty: If the assistant were qualified that could not be set up.

Lord Coleridge: But there the Act operates, and says that the unqualified person shall not attend or prescribe.

Mr. Willes Chitty: Not so; the Act does not say that; it merely says that an unqualified person cannot recover for attendances; nor is he seeking to do so in this case; indeed he could not do so, for if he sued he would be met by the objection that he had attended the patient only as the servant of his employer, so he could not recover. There is nothing illegal in an unqualified person attending patients with a qualified person, only the unqualified person cannot recover for the attendances. That is the only effect of the Act.

Lord Coleridge: That view would defeat the whole object of the Act, which is to prevent unqualified persons from acting. To hold that they may act, and that, though they cannot recover, their employer, if qualified, may do so, would certainly defeat the very object of the Act.

Mr. Willes Chitty: No doubt it has been held that in order to recover it is necessary that the practitioner should have been qualified and registered at the time of the services rendered (Leman *v.* Houseley, 10 "Law Reports," Q.B., 66); but that does not touch the present question, for there the unqualified person was suing.

Lord Coleridge: But Lord Blackburn there said, "the object of the Act was clearly to prevent unqualified persons from practising," and that is obviously good sense.

Mr. Willes Chitty: There are other cases at variance with that view.

Lord Coleridge: If so, then I adopt the principle of the case just cited. The question is, were the services here rendered by the qualified person?

Mr. Willes Chitty: No doubt that is the question. But a medical man may render medical services by his assistant.

Lord Coleridge: Not so, legally, if his assistant is unqualified.

Mr. Justice Denman: The question is whether a qualified practitioner can recover for services he has not rendered, but only by an unqualified assistant.

Mr. Willes Chitty: That, no doubt, is the question; and why should he not recover for such services, just as a solicitor can recover for services rendered by his clerk?

Lord Coleridge: For clerk's work and only clerk's work.

Mr. C. A. Russell appeared on the other side, and contended that the plaintiff could not recover for the attendances. No doubt a medical man might to some extent carry on his business by unqualified assistants, but here the medical services sued for were rendered by an unqualified assistant, and not by his employer. The learned counsel was stopped, and

The Court proceeded to pronounce judgment against the plaintiff.

Lord Coleridge said the unqualified person had actually rendered the services, and the action was brought by his employer, no part of the services having been personally rendered by him—that is, not physically, for the services of a medical man were rather intellectual; and if the qualified practitioner, being at hand, really directed the attendances and the medicines, he might possibly recover for services thus rendered. But here the attendances were really by the unqualified person, and the Act said that no person should recover for medical services unless he was qualified and registered. In the present case the medical man whose representative sued had not himself rendered any medical services—that is, had not attended nor prescribed, and a medical man could not recover for attendance not really rendered by him. The Judge, therefore, was right in directing a nonsuit. There was no case which had established the contrary. But it had been held that an unqualified person could not sue his employer or his patients for attendances or medicines ("Alvarez de la Rosa *v.* Prieto," 16 "Common Bench Reports," N.S., 578); and then there was the later case already cited, "Leman *v.* Houseley," to the same effect. There were two earlier cases, indeed, in the Irish Courts, apparently to the contrary effect, but these were overruled by the later cases, and to these later cases he adhered. The medical man whose representative sued had not rendered the services sued for, and he could not recover, and therefore the nonsuit was right.

Mr. Justice Denman concurred, observing that the medical man here did not show that he had rendered the services sued for, and so he could not recover. The services sued for were rendered by another person, who was unqualified, without any consultation with him. It was urged that this person acted as his servant; but a qualified practitioner could not thus authorize an unqualified person to act for him in medical attendance. It would be a mockery to apply the doctrine of master and servant to such a case, and it would entirely defeat the intention and object of the Act.

Appeal accordingly dismissed.—*Times.*

Reviews.

A Text-Book of Organic Materia Medica. By Robert Bentley, M.R.C.S. Eng., F.L.S.*

A good, reliable authoritative work on materia medica, apart from therapeutics, has now for some years been a desideratum. Statements are so often copied from one work into another, without being in every case verified, that a feeling of distrust is engendered thereby. The publication of 'Pharmacographia' marked a distinct era in the history of works of materia medica, since all the statements made in it were verified wherever possible; but in spite of its trustworthiness, that work has the drawback of not treating of all the ordinary drugs kept by chemists and druggists, while describing several not in use in this country. Pereira's 'Materia Medica,' even in its last edition, formed rather too bulky a book for constant use as a text-book, and the arrangement adopted in it was unsatisfactory. The size of the work now under notice is much more convenient, and it was with the hope that the desideratum had at last been obtained that its pages were eagerly scanned. A careful inspection, showed, however, that it is very elementary in character, and that although the author intends it for "the use of students during their apprenticeship, and as a text-book for them while attending a course of lectures, and as a preparation for their examination," it must be regarded only as giving a general outline of the subject, leaving many details to be subsequently filled in from a course of lectures on materia medica, as well as from those on botany and chemistry. This mode of treatment is perhaps the best for the student, as the long experience of the author has doubtless proved to him, and is probably necessary in order to condense the vast amount of available material into a convenient compass.

But the apparent disadvantage of the elementary character of the book is counterbalanced by the fact that references are constantly made to more extensive works on the subject, or to original papers in the *Pharmaceutical Journal* or elsewhere. Thus, under aconite, the reader is referred to Bentley and Trimen's 'Medicinal Plants,' vol. i., pl. 6., for a botanical description of the official species, and for the adulterations of the root to papers in the *Pharmaceutical Journal.*

The references to the most recent and important papers on the chemistry of the different articles of materia medica are, however, not so frequent or so numerous as could be wished. Thus a better idea of the chemistry of aconite, of rhubarb, of podophyllum rhizome and of Indian hemp would be obtainable by a reference to the papers which have been published on these subjects since the appearance of 'Pharmacographia.' The student will also find it necessary to supplement the work under notice by consulting the 'Extra Pharmacopœia,' or he may be misled by such statements as the one that "picrotoxin is not used internally."

The advantages which the pharmaceutical as well as the medical student will find in the 'Organic Materia Medica' are: a useful table of contents, so arranged as to show at a glance the drugs belonging to each of the natural orders, the part used, and the botanical classification adopted both in this work and in the author's 'Manual of Botany;' freedom from too great a mass of detail, so that the memory is not too much taxed at first and a clear idea of the general outlines of the subject can be got by a single perusal; an account of the animal materia medica, and of many non-official drugs that are sometimes omitted from works on materia medica, and a number of accurate woodcuts, which will be found very useful by the student.

The text is written in a very readable style, and is remarkably free from printers' errors, the only one that was noticed being that of Kabar*b*ine for Kabar*d*ine musk. Regarded as an elementary work it may be recommended as giving an excellent bird's-eye view of materia medica, and as serving as a good introduction to more exhaustive treatises on the subject. The student must, however, not forget that no work on materia medica can be absolutely complete or up to date, and that the study of the most advanced work on the subject should always be supplemented by a reference to the most recent papers in the various medical and pharmaceutical journals.

* London: Longmans, Green and Co. 1887. Small 8vo. Pp. i.-xxviii., 1-416. 7*s.* 6*d.*

A Manual of Botany. By Robert Bentley, F.L.S., M.R.C.S. Eng. Fifth Edition.*

Bentley's 'Manual of Botany' is now so well known and extensively used, both as a manual for students and as a work of reference on economic botany, and has in successive editions been so carefully revised, that only the alterations and improvements which have been made in the present edition require notice here.

Since the first edition was issued attention has been increasingly paid by teachers of botany to the microscopical details of plant structure, and to the study of vegetable physiology, while systematic botany has been comparatively neglected. This appears to have been in great measure due to the importance to medical students of a comparison between the processes of life and of diseased growth in plants and animals. In order to bring the work up to date concerning the researches that have been made of late years in this direction, Professor Bentley has availed himself of the assistance of Mr. J. W. Groves, Demonstrator of Practical Biology in King's College, in revising the portion relating to physiology. This forms an admirably condensed epitome of the immense mass of published material in which the varied and often contrary opinions of different botanists are clearly set before the student.

But, however useful this portion of the work may be to *medical* students or to students of organic chemistry, it is the structural, systematic and economic portions of the work that will prove of most value to the student of pharmacy. In the structural portion the student will be thankful for the clear and simple manner in which the modern terms such as thallome, caulome, meristem and many others are introduced and explained. Although the beginner may do well to master a primer on the subject before reading this portion of the work, the more advanced student will find it most valuable for reference. The economic sections have been brought well up to date, the additions to the new British Pharmacopœia being included, as well as a large amount of new matter taken from various journals.

In the systematic portion the author has wisely followed the 'Genera Plantarum' of Bentham and Hooker, except in the *Monochlamydeæ* and *Monocotyledones*, in which a modification of Le Maout and Decaisne's classification is introduced by the separation of the monocotyledons into *Petaloideæ* and *Glumaceæ*. The classification adopted by Professor Bentley in this respect undoubtedly is easier for students to remember, and is more in accordance with that of the other sub-classes in the 'Genera Plantarum.' It has, however, the disadvantage that it cannot serve as a preparation for the use of that important

* London: J. and A. Churchill. 1887. Crown 8vo. Pp. i.-xxxii., 1-902. 15*s.*

work, and that the series adopted by Professor Bentley run one into the other. Among the cryptogams the lichens are retained as a natural order, although the widely accepted theory of their consisting of fungi parasitic on algæ is carefully stated. In the present condition of our knowledge, this plan is by far the most convenient, since in systematic works on lichens the Schwendenerian theory is almost without exception ignored, and none of the leading lichenologists adopt it.

Covering, as the manual does, a more extended field than many other botanical text books, it is likely to continue, for many years, to be one of the most useful works of reference for botanical students of all classes. We trust that the author may find that the labour and time expended in bringing it to its present state of completeness and compactness, may be rewarded by the increasing sale that the work unquestionably deserves.

What to do in Cases of Poisoning. By William Murrell, M.D., F.R.C.P., etc. Fifth Edition.*

This little book having now reached its fifth edition, the author can well afford to feel independent of critics and take the jubilant tone affected in the Preface. He says that the attainment to a fifth edition is not his fault, and he disclaims responsibility for it. We can only say that the success has been well deserved, for the book is a model of compactness and, what is more important, it presents in a clear form just the information required in an emergency where the effects of poison have to be promptly combated. If we were to make one suggestion it would be in favour of an index, though this is perhaps hardly required. Although the author provides this little prompt-book, he evidently considers the medical man should be independent of it. He says to his reader: "It is possible that you may experience a difficulty in remembering the antidotes to the various poisons. If so, rest assured that your knowledge of pharmacology is defective. All rational treatment of cases of poisoning is founded on a correct appreciation of the physiological action of drugs." It may be added, that in anticipation of the occurrence of cases of poisoning from overdoses of "patent medicines," Dr. Murrell gives a list of the "supposed active ingredients" of some of the more popular preparations.

Obituary.

Notice has been received of the death of the following:—

On the 7th of June, Mr. Francis Edmund Bromley, Chemist and Druggist, Northumberland Place, Bath. Aged 72 years.

BOOKS RECEIVED.

Year-Book of Treatment for 1886. A Critical Review for Practitioners of Medicine and Surgery. London: Cassell and Co., Lim. 1887. From the Publishers.

Botany Notes. By Alexander Johnstone, F.G.S., Part I. Histology and Physiology. Part II. Systematic Morphology. Edinburgh: E. and S. Livingstone. 1887. From the Publishers.

Atlas Manuel de l'Histologie des Drogues Simples. By J. Godfrin and C. Noël. Paris: F. Savy. 1887. From the Authors.

The Commonhealth: A Series of Essays on Health and Felicity for Every-Day Readers. By Benjamin Ward Richardson, M.D., F.R.S. London: Longmans, Green and Co. 1887. From the Publishers.

The Mineral Water Maker's Manual for 1887. London: J. G. Smith. From the Publisher.

* London: H. K. Lewis. 1887. 32mo. Pp. 1-220.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Chloral Hydrate and Fehling's Solution.

Sir,—With respect to the reduction of Fehling's solution by chloral hydrate, I beg to say that I have reason to believe the explanation of Mr. J. E. Saul (page 1028) to be perfectly correct, namely, that it is the chloroform resulting from the decomposition of the chloral hydrate by the alkali that really causes the reduction, and not the formate simultaneously produced, as assumed by Mr. J. J. Thomas.

In connection with the point in question, I may perhaps be permitted to quote the following passage from my 'Commercial Organic Analysis,' vol. i., page 177:—"The reduction of Fehling's alkaline copper solution is also a good and delicate test for chloroform, with which it reacts thus:—

$$CHCl_3 + 5\,KHO + 2\,CuO = Cu_2O + K_2CO_3 + 3\,KCl + 3\,H_2O.$$

When the solution is heated, the formation of the yellow-red cuprous oxide occurs very promptly. The reaction might probably be used for the determination of chloroform in the absence of other reducing agents, especially if the test were applied to a liquid obtained by distillation. Chlor-ethylidene and alcohol do not interfere with the test." On page 173 of the same work the following passage occurs:—"Solutions of chloral reduce Fehling's solution on testing. The reaction may be employed to detect traces of chloral if other reducing substances be absent, and might probably be made quantitative."

The statements made of the qualitative reaction of chloral and chloroform with Fehling's solution are the results of my own experiments, but whether the equation representing the chloroform reaction was quoted from some other observer, or was simply my own expression of the probable decomposition I am unable to recollect.

Sheffield. Alfred H. Allen.

"Drumine."

Sir,—The announcement in the *British Medical Journal* for March 26 of the isolation from *Euphorbia Drummondii* of an alkaloid possessing anæsthetic properties likely to rival those of cocaine, without the disadvantages which this latter alkaloid is known to possess, naturally soon attracted the notice of some leading members of the medical profession, and recently a sample of the substance was placed in my hands for examination, with the view of determining a convenient mode of exhibiting it for therapeutic trial. It presented the appearance of an almost white, dry, odourless and tasteless powder, which under the microscope was seen to consist of octahedral crystals; it produced no reaction when applied to moistened litmus paper; treated with various solvents it was found to be insoluble in water, dilute acetic acid, alcohol, ether and chloroform, but soluble in dilute hydrochloric acid, from which it was reprecipitated on the addition of ammonia in excess.

The hydrochloric solution gave no precipitate with the usual alkaloidal reagents, potassio-mercuric iodide, phosphomolybdic acid, etc.; gently ignited on platinum foil, but little charring took place, and a considerable greyish residue soluble with effervescence in HCl, and answering in characters and tests to calcium carbonate, was obtained. It afforded no indication of the presence of nitrogen. On drying at 100° C. it lost 4·9 per cent.

0·397 gram of the dry substance carefully ignited in a platinum crucible gave a greyish residue weighing 0·232

gram =60 per cent. Sufficient evidence has, I think, been given that the substance in question consisted almost entirely of calcium oxalate. It is only fair to state, in this connection, that the accredited agents in this country of Dr. Reid's new alkaloid (?), having found it "unsatisfactory," have declined any further supply of the article at present.

Westminster Hospital, S.W. A. E. TANNER.

UNFAIR COMPETITION.

Sir,—Under the above heading Mr. Humphrey assumes that the certificates possessed by the average chemist, given by the Pharmaceutical Society as evidence of his having successfully passed the requisite examinations, and that he is well qualified to carry on the responsible business of a chemist, is not a sufficient guarantee for the public to have. He further remarks that the certificates are obtained more or less by luck, leaving one to infer that at times the examiners are more strict than at others, and that the certificates are not impartially, deliberately, and soberly awarded. Now this is a grave accusation against the examiners. Mr. Humphrey also speaks of a scrambling apprenticeship. I should like to know what the gentleman exactly means by the term "scrambling." Are the youths supposed to be scrambling for pharmaceutical facts during the time of their pupilage? If so it denotes a great desire to know on their part.

Mr. Humphrey also gives it as his opinion that competition is rather beneficial than otherwise, and I am inclined to agree with him, if the competitors compete on equal terms, but can it be said that chemists and grocers compete on equal terms?

The grocer is allowed to sell every drug in creation except the scheduled poisons without passing any examination at all, and when compiling his price list he has not to note money and time spent in acquiring a knowledge of the drugs he offers for sale.

Chemists do not want to whine and do not whine for favours; they only ask for, and should demand, justice.

My contention is, that if it is expedient for the safety of the public that chemists should be examined before they are allowed to exercise their calling as retailers of drugs, etc., grocers also ought to be examined before they are allowed to retail drugs.

If the Pharmacy Act were extended to all dealers in drugs, grocers would soon cease to be opponents of chemists.

157, *High Street, Borough.* FRANK J. EBBUTT.

Sir,—Referring to Mr. Humphrey's letter published in your issue of June 11, I think most of us will in the main agree, but the charge he makes that the certificates of our Society are "obtained more or less by mere luck" is contrary to my experience. Many a good man, well up in his subjects, gets plucked—possibly from excessive nervousness, impeded speech, or other cause (and therefore I think the proposed partly written examination will be an advantage to the candidate)— but I think a man ill prepared seldom, if ever, passes. I have confirmation for this statement in the fact that four candidates to my knowledge presented themselves for examination at the last meeting of the Board; three of these were what I call crammed (six months' study), the fourth had made his studies part of his daily work for a period of five years; the first three failed, but the fourth received his certificate.

I think the fault is this: a candidate having passed the necessary qualifying examination considers his education finished, and instead of making his knowledge the basis of further culture, permits his knowledge to gradually lapse, and ultimately forgets the greater portion of it. It is not my province to dictate to my confrères, but I certainly think it would be to our mutual advantage to make a kind of hobby of some especial branch, say of natural history, biology, zoology, etc.

I think all will agree with me that to place a book before a man who cannot read it would appear to that man as a senseless mass of black marks, and so it is with nature, the further a student advances the more interesting it becomes. Finally, I think, Sir, if we are to gain the confidence of the public and the elevated position to which we are entitled, the external world must be shown we are worthy of that position, and that the chemist of to-day—thanks to the Pharmaceutical Society—is not the chemist of fifty years ago, but a man of education, culture, and refinement. The only way to demonstrate this fact to the public is by showing them we are well informed upon subjects outside our business—the things of every-day life—because of the substance of our business they are incompetent to judge. FREDERICK DAVIS.

A PLEA FOR APPRENTICESHIP.

Sir,—May I offer a few scanty remarks concerning the letter which appears in a recent issue under the title of "A Plea for Apprenticeship?" I have not the opportunity of knowing whether your correspondent, Mr. Humphrey, is established in business, and is an employer of both apprentices and assistants, but I must say if he acts toward them as he very ably dictates to others it does him much credit.

Regarding the "curriculum" which has so prominently occupied your columns of late, I think from many standpoints it would be received with joy by those who are perhaps standing between two points, as to whether they shall enter on the career of a chemist or not, when I narrate my own case. I was apprenticed to a chemist within seven miles of London, and to a man who figured very prominently about the year 1870 in the annals of Bloomsbury Square and to whom was paid a heavy premium, which of course I expected, taking into consideration his very exceptional qualifications; but little did I expect that I was chaining my start in life to one who would blight my efforts to success.

During my whole apprenticeship I seldom if ever made a plaster, and I scarcely saw a prescription; my general routine from morning till night being to weigh and wrap up packets, etc. As for general treatment it was simply unbearable, and shop-cleaning, sweeping, beating mats, cleaning windows, running household errands, and distributing bills from door to door, was about the only instruction towards the "exams" at Bloomsbury Square that I received. Having no father to defend my cause I have no doubt advantage was taken on that score, but I may tell my fellow students, that notwithstanding all, I have still managed to stick to my colours, and my only hope now is that I may at a future date reap some benefit, although the "silver lining" has not yet shown itself to me at the "Square." I agree with your correspondent that "some" do act towards their apprentices "as they would be done by."

On the other hand I must say that the fault lies often on the apprentice's as well as the master's side; but still for all that, if the apprentice will not learn when he has the opportunity, why does the master keep him?

I am afraid "Money" is the key to this.

I will now conclude by saying, How much better if I had paid my money to a college for proper instruction instead of repenting the waste of a perhaps golden opportunity. TOWCESTER.

G. W. W.—(1) *Plantago major.* (2) *Brassica Napus.* (3 and 4). Send specimens in flower.

P. H. Marsden.—(1) *Ornithogalum umbellatum.* (2) *Cerastium glomeratum.* (3) *Plantago lanceolata.* (4) *Vaccinium Myrtillus.* The B.P., 1885, has already been reprinted.

G. A. Grierson.—*Andromeda polifolia.*

Nemo.—Chertier's copper is a compound used in pyrotechny, and is made by mixing equal parts of finely powdered sulphate of copper and chlorate of potash into a paste with strong solution of ammonia and drying at a moderate temperature.

R. H. R.—(1) See Roberts on the Pancreatic Digestion of Milk (*Pharm. Journ.*, June 12, 1880, p. 999). (2) Try a cochineal colouring.

W. F. Quick.—(1) *Veronica Chamædrys.* (2) *Stellaria Holostea.* (3) *Geranium Robertianum.* (4) *Nepeta Glechoma.* (5) *Cardamine pratensis.* (6) *Vinca minor.*

Assistant.—The chloroform ordered is about four times as much as the water is capable of dissolving, though the solution might be more or less affected by the tincture. The undissolved portion might be diffused by means of mucilage, or if this is not allowable use a "shake the bottle" label.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Burroughs and Wellcome, Trimen, Rickarby, Rowell, J. C. Lloyd, H. B.

"THE MONTH."

Amorphous Cocaine.

In the present number of the Journal will be found a letter from Dr. Stockman, in which he takes objection to the remarks made last week in reference to his opinion as to the nature of the substance known as "amorphous cocaine." He there states very fully his reasons for doing so, but he still fails to furnish any information that would suffice to establish the existence of "hygrine," and until that is done it is impossible to accept the solubility of cocaine in hygrine as being a *vera causa* that accounts for the difference between cocaine and the amorphous basic substance that is too frequently associated with it. The accounts given by Wöhler and Lossen of the substance to which they applied the name of "hygrine" are so vague and meagre that at most it only ranks among the apocrypha of chemistry, and chemists who have since endeavoured to obtain a substance answering to their description have failed to do so. Dr. Stockman has not given any description of "hygrine," and the experimental data he gave in his paper, though they may be in themselves correct, do not in any degree serve as evidence of its existence. The question as to the nature of amorphous cocaine must therefore still be regarded as an open one. As a matter of fact that substance differs from true cocaine in not being crystallizable, and the fact of its yielding benzoic acid on decomposition does not prove it to be cocaine. Even if it be a compound of true cocaine with "hygrine" or some other base it is not the less distinct from cocaine. In addition to this evidence of difference of a physical and chemical nature there is the physiological evidence furnished by Dr. Stockman himself that amorphous cocaine causes considerable irritation when applied to the eye. This fact is after all the most conclusive as regards the practical use of cocaine preparations containing this amorphous substance, and so far as that point is concerned the tendency of Dr. Stockman's paper appears to be in perfect accord with all that has been said on this subject in this Journal.

Cacao Husks.

The husks or shells of cacao seed are sometimes utilized for making a cheap beverage, and are also said to be employed in adulterating ground spices. Mr. P. S. Clarkson reports (*Amer. Journ. Pharm.*, June, p. 277) that he has found them to yield 9·07 per cent. of ash, which, besides the usual constituents, contained aluminium, also found by Wanklyn in the ash of cacao. In addition there were obtained 0·9 per cent. of an alkaloid that gave the usual reactions for theobromine; 5·32 per cent. of a fat corresponding with cacao butter; 0·93 per cent. of an odorous resin soluble in ether and alcohol, as well as albuminoids and colouring matter.

Duboisine.

About seven years ago, Professor Ladenburg, during his investigation of the mydriatic alkaloids, arrived at the conclusion that duboisine, the base obtained from the Australian *Duboisia myoporoides*, was identical with hyoscyamine (*Pharm. Journ.*, [3], xi., 351), though as generally met with probably contaminated with some impurity. This opinion was subsequently challenged by Herr Harnack, who affirmed that duboisine exercised a much stronger physiological action than hyoscyamine. Professor Ladenburg has therefore been induced to re-investigate the subject, working upon a sample of duboisine supplied by Herr Merck. The base as received was a yellow-brown syrupy mass, which was dissolved in hydrochloric acid and precipitated with gold chloride. The gold salt had at first a resinous appearance, but after four recrystallizations it became homogeneous, melting constantly at 197°–198°, and showing all the properties and having the same elementary composition as the gold salt of hyoscine. Neither hyoscyamine nor any other alkaloid could be detected in the first mother-liquor from the gold salt. Professor Ladenburg is of opinion that the explanation of this different result probably lies in some variation in the method of preparing the duboisine, but he confesses he cannot say in what respect. It will be remembered that the name "hyoscine" was appropriated for a base found in the mother-liquor after the removal of hyoscyamine in preparing that alkaloid from henbane; it is isomeric with atropine and hyoscyamine, but is split up by alkalies into tropic acid and pseudotropine.

Emetine.

Although emetine was one of the first of the vegetable bases discovered, having been separated by Pelletier and Magendie in 1817, its chemical history has for seventy years remained very incomplete, and several contradictory statements have been made as to its composition. This has been no doubt partly due to the failure to obtain the alkaloid in the crystalline condition. A careful investigation by Herr Kunz of what he believes to have been the pure alkaloid has led him to the conclusion that emetine is a biacid base, and a tertiary diamine like quinine (*Archiv*, June 15, p. 461). He considers that its elementary composition is represented by the formula $C_{30}H_{40}N_2O_5$, which differs by C_2 from that attributed to the alkaloid by Lefort and Wurtz. The introduction of a methyl group yielded a new base which was obtained as a hydrate,—"methylemetonium hydrate,"—to which the formula $C_{30}H_{40}(CH_3)N_2O_5$ is attributed. This compound was amorphous and very hygroscopic, and the sulphate was the only crystalline salt prepared from it. "Methylemetonium" differs sharply from emetine in its physiological action, in which it resembles curare, 0·0037 gram injected subcutaneously into a frog producing total paralysis of the motor system in two minutes. It is thought very probable that emetine, like quinine, is a chinoline derivative. Besides emetine, ipecacuanha root contains choline.

Choline in Indian Hemp.

The presence of a basic constituent in Indian hemp has been reported by several chemists, who have, however, shown considerable diversity of opinion as to its nature. At first it was stated to be identical with nicotine, but this was disproved by Siebold and Bradbury (*Pharm. Journ.*, [3], xii., 326), who, however, found a volatile base that they named provisionally "canabinine." Afterwards, Dr. Hay expressed an opinion (*Ph. Journ.*, [3], xiii., 998) that the drug contained several alkaloids, and reported that he had obtained one in crystals, which, on account of its tetanizing property, he called "tetano-cannabine." Messrs. Warden and Waddell, however, working upon a large quantity of Indian hemp failed to isolate Dr. Hay's compound (*Ph. Journ.*, [3], xv., 574). Herr Jahns now reports (*Archiv*, July 15, p. 479) that he has separated from Indian hemp a base which he has identified as choline, and points out that this result corresponds

fairly well with the statements of previous workers, except in respect to the crystallizability of Dr. Hay's alkaloid and its solubility in ether. The quantity of choline obtained by Herr Jahns from different samples of Indian hemp varied considerably, but amounted at the most to one-tenth per cent.; it was also found to be present to a less extent in commercial "cannabinum tannicum."

Aniline Camphorate.

Referring to the fact that the recent discovery of antipyretic properties in acetanilid ("antifebrin") has opened up a possible future in therapeutics for another group of compounds, aniline derivatives and salts, Herr Vulpius points out that a compound of aniline and camphoric acid had previously been credited by Tomaselli with antispasmodic properties (*Pharm. Centralh*, June 9, p. 283). This salt does not usually figure in trade lists, but Hager, in his *Handbuch der pharmaceutischen Praxis* (vol. i., p. 364), states that it can be prepared by dissolving 50 parts of camphoric acid ($C_{10}H_{16}O_4$) in 150 parts of absolute alcohol, and adding to the solution 56 parts of aniline, or sufficient to produce a neutral liquid, which is then left to evaporate spontaneously in a dark place. The product so obtained is described as occurring in small white or reddish odourless prisms, having a pungent acrid taste and easily soluble in water, alcohol and ether. This formula is objected to by Herr Vulpius on the ground that excess of aniline is ordered, and that it is difficult to ascertain the exact point of neutralization with the ordinary indicators, paper stained with the violet colouring matter of dahlia petals, which is coloured green by aniline, being the most convenient. Moreover, he considers the use of alcohol as unnecessary, and liable to lead to discoloration during the evaporation, even in the dark. He prefers to heat together in a closed vessel, at the temperature of a boiling water-bath, 100 parts of finely-powdered camphoric acid and 93 parts of aniline. The crystallization of the aniline camphorate is said to commence in a few minutes, but to take some time to complete, though its progress is accelerated by contact with a wide surface of the containing vessel. Aniline camphorate—$(C_6H_7N)_2.C_{10}H_{16}O_4$—thus prepared, is said to dissolve in alcohol and ether, but not freely in water, of which it requires about 30 parts, and in its solubilities generally it approximates to aniline rather than to camphoric acid. Chloroform and carbon bisulphide appear to break up the compound, taking up the aniline and leaving a residue of camphoric acid; heated fat oils and oil of turpentine behave more or less similarly. Apart from the alcoholic and ethereal solutions, which are not adapted for hypodermic use, the best solvent for aniline camphorate is glycerine, which takes up one-tenth of its weight, and can then be diluted with an equal weight of water. The maximum single dose of aniline camphorate given by Tomaselli as an antispasmodic was 0·2 gram, and the maximum quantity administered in one day 0·8 gram, which was usually given dissolved in four volumes of ether or ether-alcohol, and enclosed in a gelatine capsule.

Convolvulin from a New Source.

In a communication from the pharmaceutical laboratory of the University of Erlangen Dr. Schutze describes some interesting results obtained in an examination of the fruit of *Pharbitis triloba*, Meiq., a convolvulaceous plant indigenous to Japan, and used medicinally in that country (*Pharm. Centralh.*, June 2, p. 270). A preliminary treatment of the finely divided fruit with ether removed a quantity of greenish-brown extract consisting principally of fixed oil. The residue was then exhausted with alcohol, and from the alcoholic extract were obtained, by suitable treatment, a tannin giving a green precipitate with salts of iron, a crystalline acid, and a brown resin. This resin, after purification by precipitation from alcohol and treatment with animal charcoal, was obtained as a yellowish-white amorphous mass, yielding on trituration an almost odourless whitish powder that had acid properties, irritated the mucous membrane and provoked sneezing. The resin had a melting point about 140° C., but first became transparent at 148° to 150° C., and decomposed at a higher temperature. It was freely soluble in alcohol and acetic acid and almost insoluble in water, but in hot water it became softened without notable solution. It was dissolved by alkalies and with heat by alkaline carbonates, separating upon the addition of acids as a white precipitate. Further it was insoluble in ether, chloroform, light petroleum spirit, benzol and carbon bisulphide. The resin did not reduce Fehling's solution, but exhibited glucosidal properties upon boiling it with dilute hydrochloric acid; it was reddened by concentrated sulphuric acid and when treated with nitric acid it yielded sebacic acid as a decomposition product. In these and other characters, as well as in elementary composition, it corresponded with convolvulin from jalap root, with which body Dr. Schutze considers it to be identical. It may be added that a similar conclusion was arrived at by the authors of 'Pharmacographia' respecting the resin derived from "kaladana seeds" from the closely allied *Ipomœa Nil*, Roth. (*Pharbitis Nil*, Choisy).

Constituents of Red Sanders Wood.

Red sanders wood or red sandal wood (*Pterocarpus santalinus*) is a substance that has hitherto been only partially investigated as to its constituents. Pelletier and others separated from it a crystallizable colouring matter, that has been named "santalin" or "santalic acid," and Weidel isolated a crystalline body isomeric with piperonal ($C_8H_6O_3$), which he named "santal." In addition Cazeneuve obtained a magnificent crystalline substance, which he only partially studied, and named "pterocarpin." In again taking up the study, M. Cazeneuve has separated, with pterocarpin, a body that appears to be homologous to it, and which he has therefore called "homopterocarpin" (*Comptes Rend.*, civ., 1725). The compounds were obtained by digesting powdered sanders wood with milk of lime, drying, exhausting the cake with ether, distilling the yellow ethereal liquor to dryness, and treating the residue with boiling alcohol, which deposited on cooling a crystalline mixture of pterocarpin and homopterocarpin, separable by treatment with bisulphide of carbon, in which the latter is soluble and the former is not. Pterocarpin melts at 152° C., and has a composition agreeing with the formula $C_{10}H_8O_3$. Homopterocarpin melts at 82° C. and is represented by the formula $C_{12}H_{12}O_3$. Both compounds, when fused with potash, give off an odour resembling that of coumarin and probably belong to that group.

Parkia Biglobosa.

Messrs. Heckel and Schlagdenhauffen have published in the *Journal de Pharmacie et de Chimie* (p. 601) an analysis of the fruit of *Parkia biglobosa* (*Leguminosæ*), which they state is known, in common with cola

nuts, under the name of "café du Soudan." By the natives of different parts of Equatorial Africa, the tree passes under the names of "houlle," "néré," "nérétou," "doroa" and "rounuo." The pods appear to contain a large quantity of sugar, yielding to boiling alcohol as much as 59·6 of soluble matter, of which 39·25 is glucose, and 15·65 inverted sugar. Illustrations of the pod and of the microscopical structure of the seeds are given.

Betol.

Betol is the name that has been given to a recently introduced compound of β-naphthol with salicylic acid—the β-naphthol ether of salicylic acid—analogous to that to which the name "salol" has been applied (*Pharm. Centralh.*, June 2, p. 280). The preparation, which is the subject of a patent, is described as melting at 95° C.

Antifungin.

A white sweet-tasting powder, said to consist of a soluble borate of magnesia, prepared by a special process, has been introduced under the name of "antifungin," as possessing extraordinarily powerful disinfecting properties, and as being a specific against diphtheritis (*Pharm. Centralh.*, June 2, p. 281). It is said to be soluble in four parts of boiling water, and it is used as a 15 per cent. solution. From 5 to 20 drops, according to age, are administered every one or two hours, and about a teaspoonful is sprayed hourly in the sick-chamber. Further, the diphtheritic growth is painted with the solution every one or two hours until it disappears.

Photoxylin.

"Photoxylin," a substance used in Russia by photographers, has been recommended by Professor Wahl, of St. Petersburg, as a substitute for collodion in surgical practice (*Lancet*, June 18, p. 1253). He states that a 5 per cent. solution of photoxylin in equal parts of alcohol and ether, when applied to the skin, forms an impervious dressing that adheres firmly and is not easily rubbed off in washing. In small operations he has found that the application of this solution makes it possible to dispense entirely with more bulky antiseptic dressings.

Strophanthus as a Hypnotic and Antipyretic.

Dr. Boyd reports (*Brit. Med. Journ.*, June 18, p. 1373) that in a case where there was acute heart failure, consequent upon suppuration and exhaustion, the administration of tincture of strophanthus not only improved the cardiac action, but also produced marked hypnotic and antipyretic effects. The antipyretic action of the drug had been previously mentioned, though incidentally, by Professor Fraser.

Carduus Marianus.

Mr. George Foy (*Med. Press*, p. 492) calls attention to the properties of *Carduus marianus*. He states that this plant is now being received with professional favour in France, where the tincture and alcoholic extract are both being prescribed. He remarks that the extract is a useful adjunct to aloes, since it possesses cholagogue properties.

Remijia ferruginea.

The physiological action of *Remijia ferruginea* has recently been investigated by Messrs. Pinet and Duprat. In a note on the subject communicated to the Biological Society they state that the drug acts chiefly on the medulla oblongata, and that it causes a considerable increase of respiratory movements and of cardiac pulsation. The preparations used were a watery and a spirituous extract of the root, the aqueous being the most active. Both extracts were acid to litmus paper. (*Brit. Med. Journ.*, June 4, p. 1236).

Fluorides of Ammonium and Iron.

The fluorides of ammonium and iron are recommended in the *Practitioner* (p. 413) by Dr. G. Lucas for the treatment of hypertrophy of the spleen. The former salt is prepared by saturating a solution of hydrofluoric acid with ammonia, and allowing the mixture to evaporate over quicklime. The fluoride crystallizes in hexagonal prisms, which dissolve readily in water, forming a colourless solution. The strength of the solution used by Dr. Lucas is 4 grains to the ounce, of which the dose is 5 minims, cautiously increased to 10 or even 20. The doses must be taken after a meal, otherwise the remedy is liable to cause nausea and diarrhœa. Dr. Lucas keeps the solution in a bottle coated inside with wax.

Tinctura Ferri Muriata.

In the *British Medical Journal* (June 4, p. 1206) Dr. C. Bell, of Edinburgh, points out that the tincture of muriate of iron is of much more therapeutic value in the treatment of erysipelas, etc., than the tinct. ferri perchloridi, B.P. It should therefore be remembered by dispensers that "tinct. ferri mur." cannot be regarded as identical with "tinct. ferri perchloridi." Prescribers, on the other hand, who intend the old preparation, containing basic chloride, of the P.E., 1841, and of the P.L., 1851, to be dispensed, should indicate as much on the prescription, since the B.P. gives tinctura ferri sesquichloridi as a synonym of tinct. ferri perchloridi, and if they order tincture of muriate of iron, should in like manner append the letters P.E., 1841, or P.E. 1813, according to the preparation intended, the first named, "*Ferri muriatis tinctura*," being a preparation of the red oxide, and that of the latter, "*Tinctura muriatis ferri*," of the black oxide of iron. The dispenser is bound to be guided by the present Pharmacopœia unless the physician indicates otherwise.

Tertiary Alcohols.

As the result of a number of observations Dr. Shapiroff states that tertiary alcohols differ in their physiological action from primary alcohols in exercising a depressant instead of a stimulant influence. Dimethylethylcarbinol was found to diminish the blood pressure, paralysing the vasomotor centres, but without exerting any direct action on the heart (*Lancet*, June 18, p. 1256). The action of trimethylcarbinol was found to be similar, but less marked and slower. According to another Russian observer, Dr. Simanovski, the latter compound is capable of being used advantageously as a soporific, the dose for an adult being from ten to twenty drops. Trimethylcarbinol was first prepared by Butleroff by the action of zinc methyl on oxychloride of carbon, and also by its action on chloride of acetyl.

Muscale Buttons.

A rather risky personal experience as to the physiological effects of "muscale buttons," a "fruit" chewed by Mexicans and Indians for purposes of intoxication, has been put on record by Dr. Briggs, of Dallas, Texas (*Med. Bull.*, May, p. 144). The "buttons" are described as being about two inches in diameter, half an inch thick, and covered with minute prickles, and as being probably derived from a species of cactus. They are said to be eaten by the Indians six to ten at a time for the sake of the beautiful visions and oblivion from trouble they produce, the eater be-

coming unconscious after a short time, and remaining so for two or three days, during which time he is believed to have intercourse with the spirit world. Dr. Briggs ate only one-third of a "button," but in fifteen minutes arterial tension was manifest, and in forty-five minutes his pulse had increased to 120 and his respirations to 30 per minute. Immediately afterwards the pulse went up to 160, it seemed difficult to breathe sufficient air to maintain life, and further observations were prevented by unconsciousness. Upon partial recovery he sought help from a medical colleague, who treated him with aromatic spirit of ammonia and whiskey in large doses, every few minutes, the first dose being administered about one hour after eating the "button." In about half an hour relief was experienced, and after six or eight hours, with the exception of malaise and depression, he had recovered his normal condition. Dr. Briggs considers the "fruit" should be further investigated, but betrays a disposition to leave to some one else a continuation of the personal experiment.

Large Dose of Morphia.

In the *Boston Medical Journal* (May 12, p. 443), Dr. Lemen reports a case in which a powerful man, aged thirty-eight years, attempted to commit suicide by taking a large dose of morphine sulphate. The salt was poured from a bottle on to the palm of his hand, and then "eaten down," the quantity swallowed being estimated at thirty-six grains. Fifteen minutes afterwards the man drank a fluid drachm of spirit of chloroform. About two hours and a half seem to have elapsed before medical aid was brought in, when the respirations were six per minute, pulse sixty-eight, the pupils "pin-hole," and the patient cyanotic. Attempts to administer tartar emetic having failed, as the reflex act of swallowing could not be excited, three successive twenty-minim doses of fluid extract of belladonna were administered hypodermically, after which the current from eighteen cells of a Macintosh battery were applied. Next apomorphia was injected in three doses of one-sixth of a grain at half-hour intervals, but as this did not provoke emesis an attempt was made to wash out the stomach. Subsequent treatment consisted in continuation of the current, general stimulation, and the administration of large doses of citrate of caffeine. Seventeen hours after ingestion of the poison the patient vomited, and could be aroused sufficiently to be made to walk with assistance, from which time he gradually recovered. Dr. Lemen states that there can be no doubt that the entire quantity of thirty-six grains of morphine sulphate remained in the man's stomach at least five hours before any of it could possibly have been eliminated.

Poisoning by Nutmeg.

A case of poisoning by nutmeg is recorded in the *British Medical Journal* (p. 1085), in which one nutmeg had been eaten by a patient as a cure for diarrhœa. It caused him to become giddy, stupid and very drowsy all next day. The narcotic properties of these seeds, and of others of the same natural order, do not appear to be generally known, and seem worthy of investigation.

Ferment of Protoplasm.

The curious observation has been made by M. Fokker (*Comptes Rend.*, civ., 1730) that if a portion of tissue be taken from any part of the body of a recently killed healthy animal, and introduced with precautions necessary to prevent its contamination by microbes into a sterilized liquid, it is capable of converting sugar into acid and starch into glucose. This he attributes to the action of the protoplasm, since the fermentation goes on when the most minute microscopic scrutiny fails to reveal the presence of microbes. When the production of acid has reached a certain stage the fermentation stops, but upon neutralizing the liquid it recommences. The only difference detected between the fermentative action of protoplasm and that of microbes was quantitative, that of microbes being greater, it is suggested, in consequence of their power of multiplication.

Cork.

The *American Druggist* for this month contains an interesting article on the uses of cork, taken from *La Nature*. It is generally known that the coarse powder of cork is used, glued on paper, for protecting fragile objects, but it may not be so widely known that the finer powder constitutes what in France is called "liégerie," or "subérine," used as baby-powder instead of lycopodium, and that an insecticidal preparation known as "zifa" is made of cork powder impregnated with phenol. Spanish black, which is said to be one of the finest and most indelible blacks known to painters, is likewise stated to be made from carbonized cork.

Liquefaction of Ozone and Ethylene.

Herr Olszewsky reports that at the temperature of oxygen boiling under atmospheric pressure (−181·5° C.) he has succeeded in liquefying ozone (*Monatshefte*, viii., 69), it having been left as a dark blue liquid upon allowing the oxygen from ozonized oxygen to pass from the liquid to the gaseous state. In determining the boiling point of pure ozone, which was found to be −106° C., liquefied ethylene was used, which, in contact with ozone, exploded violently. The solidification of ozone has not yet been effected. In the same apparatus, using liquefied oxygen as a refrigerating agent, ethylene was solidified at a temperature of −169° C.

Sulphurous Acid in Snow.

The results of the examination of snow taken from different places in Munich and its neighbourhood, by Herr Sendtner (*Chem. Rep.*, June 12, p. 137), would seem to indicate not only that snow has a considerable faculty for absorbing sulphurous acid from the atmosphere, but that the absorption goes on continuously for some time. Snow taken and examined on one and the same day from a spot south of the old churchyard gave per kilogram 25 mg. SO_3=20 mg. SO_2; from a courtyard near the chimney of the Hygienic Institute, 32 mg. SO_3=25·6 mg. SO_2; and from the yard of the gasworks, 60 mg. SO_3=48 mg. SO_2. These figures show the influence of neighbourhood to fires. It was ascertained that on the day snow fell sulphurous and sulphuric acids were present in it in fairly equal proportions, but on the second day almost all the sulphurous acid had been oxidized to sulphuric acid. As to the accumulation, it was found that snow taken from different parts of the city on the day it fell contained—expressed as SO_3—7 to 8 mg. per kilogram; on the fourth day 32·8 mg.; on the sixth day, 40·6 mg.; on the eighth day, 48·4 mg.; on the tenth day, 62·2 mg.; and on the fourteenth day as much as 91·5 mg. Snow taken from a district free from factories only showed 7·8 mg. of SO_3 after fourteen days. This great absorptive power towards sulphurous and sulphuric acids is considered of great practical interest as explaining the destructive influence of snow upon marble statuary.

Falcaria Rivini.

A cornfield weed new to Britain has recently been detected in Kent, in the neighbourhood of Westgate-on-Sea. It is *Falcaria Rivini*, Host., an umbelliferous plant which is well known on the continent as a cornfield weed (*Journ. Bot.*, p. 182). The plant bears a general resemblance to *Cicuta virosa*, and, indeed, belongs to the same section of the Umbelliferæ. The generic distinctive features are the less marked calyx teeth, the dilated disk with an undulated margin and small central stylopodium, and the leaves with elongate lobes which are cartilagineo-serrulate. The fruit is oblong, with nearly pentagonal carpels, and the bracts both of the involucres and involucels are numerous, and the flowers polygamous.

Digitalis Monstrosities.

During the last few years digitalis appears to have been more subject to the formation of monstrous flowers than formerly. This week two specimens have been forwarded in which the terminal flower of each raceme presented almost the appearance of that of *Lilium auratum*, being open, funnel-shaped and three and a quarter inches in diameter. In one, judging from the number of anther-bearing stamens and of stamens turned to petals, the terminal flower must have been formed by the abnormal development of six ordinary flowers in one. The calyx lobes formed a kind of involucre below the flower. The ovary was furnished with an opening in the centre of the stigmas, and on slitting the side of it open was observed to contain a tuft of tiny leaves occupying the centre. The apparent pericarp consisted of the flattened and united carpels, in which some seeds were developed. The most remarkable feature in the monstrosity is the fact that whereas the usual inflorescence is centripetal, the abnormal flower, although forming the terminal bud, opened first, and was fully expanded whilst the remainder of the flower-buds were pursuing their ordinary mode of development, the largest being below, and those immediately beneath the abnormal flower being small and unopened. The specimen above described, which was sent by Mr. J. P. Balkwill, is stated by him to be only one of five, the others being developed similarly at the apex of distinct racemes, all five being borne on one individual, other plants in the neighbourhood not being similarly affected. In some of the five the ovary appeared to consist of fewer carpels and to present nearly the usual appearance. Mr. T. Padwick, of Red Hill, also sends specimens developed in the same abnormal way, a large open flower being developed at the apex of each raceme. The determinate inflorescence and the appearance of the large terminal bud at an early period are facts that are the less easily explained because the leaves are not opposite in digitalis, and it cannot be compared with the curious interrupted blossoming of the flower-heads of *Dipsacus* in which the capitulum is practically a condensed cyme. Possibly a microscopical examination of the structure of the stem and flower might throw light on the anomaly.

Leefe Herbarium.

English botanists will be glad to learn (*Nature*, p. 159) that the valuable botanical collections of the Rev. J. E. Leefe, hitherto one of the principal authorities on British willows, have been presented to Kew Herbarium, so that his fine collection of salices will now be available for purposes of reference.

NOTE ON THE ACTION OF ZINC CHLORIDE ON CASTOR OIL.*

BY C. R. ALDER WRIGHT, D.SC., F.R.S.

Castor oil has, as is well known, a somewhat peculiar constitution as compared with other oils and fats. Whilst, like these, it is a threefold ether of ordinary glycerol, the acid radical present is of a character different from that of palmitic, stearic, oleic, linoleic acids, etc., in that it contains more oxygen; so that the various acids of oils and fats may be distinguished as belonging to the several families—

$C_nH_{2n}O_2$ —*e.g.* Stearic acid $C_{18}H_{36}O_2$: Palmitic acid $C_{16}H_{32}O_2$.
$C_nH_{2n-2}O_2$,, Oleic acid $C_{18}H_{34}O_2$.
$C_nH_{2n-4}O_2$,, Linoleic acid $C_{18}H_{32}O_2$ (according to earlier experiments, $C_{16}H_{28}O_2$).
$C_nH_{2n-2}O_3$,, Ricinoleic acid $C_{18}H_{34}O_3$.

Accordingly, the glyceride of ricinoleic acid (the main constituent of castor oil) differs in numerous physical and chemical characters from the glycerides of the other commonly-occurring fatty oils and acids, more particularly in its specific gravity and solubility in alcohol and other menstrua. Inasmuch, however, as ricinoleic acid belongs (like oleic and linoleic acids) to the series of non-saturated substances, therein differing from stearic acid and its homologues, it possesses, in common with the former, the property of becoming polymerized by contact with certain agents—of which nitrous acid or materials generating it is one of the best known—and thereby altered in physical condition to an extent depending somewhat on the nature of the polymerizing agent, and the extent and duration of its action, etc.

Whilst experimenting in conjunction with Dr. Alexander Muirhead upon actions of this class, it was observed that zinc chloride in concentrated solution, or as fused hydrated crystallized salt, possesses a most marked thickening and solidifying action upon certain oils, and more especially upon castor oil, so that under suitable conditions this latter is converted into a horny or gristly indurated mass, which, when freed from zinc chloride by thorough washing with water, is capable of various useful applications, more especially as an ingredient in mixtures intended as covering and insulating materials for electric leads, etc. According to the proportion of zinc chloride used and its concentration and the temperature employed, the degree of solidification and induration effected can be controlled at will, the consistency of the product varying from a somewhat thicker and more viscid or semi-solid oil up to a tough, leathery, cartilaginous mass, resembling rasped horn. The most effective treatment consists in evaporating down zinc chloride solution until the boiling point rises to near 175° C., at which temperature the degree of hydration is not far from that corresponding with the formula $ZnCl_2,H_2O$. This concentrated fluid is then cooled to about 125°, and well intermixed by agitation with one-third its weight of castor oil at about the same temperature. The oil rapidly becomes converted into a thick clot, which separates from the fluid zinc chloride in lumps resembling bullocks' liver in appearance, but becoming a mass of nearly white cartilaginous shreds when digested with water and vigorously agitated therewith. The zinc chloride used is practically all recovered, the majority in the form of hot fluid separating spontaneously from the clot and ready for immediate use over again, and the remainder in the form of aqueous solution washed out from the clot and simply requiring evaporation down to the proper strength.

The cartilaginous shreds thus obtained differ much in their general physical character from the original uncon-

* Read before the Society of Chemical Industry. From the Journal.

verted castor oil, being practically insoluble in the various menstrua in which the latter dissolves. The glyceridic character, however, is not wholly destroyed; thus notable quantities of impure glycerol can be obtained by long-continued boiling with alcoholic potash of the shreds, previously completely freed from all traces of unconverted oil by repeated digestion with carbon disulphide.

AMYL ACETATE.*

BY HENRY TRIMBLE.

This compound ether has recently come into use for manufacturing purposes without attracting any scientific attention. Its value depends on the excellent solvent power for pyroxylin which it possesses. Good soluble gun cotton will dissolve in it until a jelly is formed and the vessel may be inverted. On this account it has become valuable to the manufacturer of celluloid, and to the manufacturer of certain kinds of lacquer for coating brass and copper. These two industries are consuming enormous quantities of this solvent, and the probabilities are that the use of it has not fairly commenced.

The employment of acetate of amyl, or pear oil, in the manufacture of artificial fruit essences has long been known, and for this purpose it has commanded a high price, so high indeed as to exclude the possibility of its general use as a solvent; but for the above mentioned industries it can be made commercially pure to answer the purpose as well as the highly purified and more agreeably smelling compound. Two patents have been taken out in England during the past three years bearing on this subject. One on account of its property of dissolving gun cotton, the other on a method of manufacture. In the former the inventors claimed the solution to be valuable for the making of varnishes, and that "when 200 parts nitro-cellulose are mixed with 600 parts acetate of amyl a mass of doughy consistency is obtained, which can be used for any purpose for which celluloid is used. With the addition of castor oil, china clay, and a small proportion of certain essential oils, a compound suitable for the production of artificial leather may be produced."

Several methods of manufacture have been prepared, but the one most common in the United States consists in heating in a lead or glass retort a mixture of acetate of sodium or calcium, sulphuric acid and fusel oil.

The ether distils at 137° C., has a specific gravity at 15° of ·876 and is almost absolutely insoluble in water. Its solvent action is not confined to gun cotton, for it readily dissolves tannin, fixed and volatile oils, resins and camphors, and may become a valuable solvent in pharmacy in addition to the several uses it already possesses.

* From the *American Journal of Pharmacy*, June.

THE LANCET ON ADULTERATION.

In an editorial article dealing with the subject of proposed legislation affecting adulteration the *Lancet* for Saturday last has the following passages:—

"Of much greater importance is the question of drugs. The patient is practically at the mercy of the dispenser, and the dispenser depends on the merchant, who may or may not be the manufacturer. The manufacturer commands the situation, for the dispenser cannot analyse every drug which he receives. So it happens that, although most manufacturers and dispensers are honest and careful, any individual patient runs the risk of losing all the benefit of medical treatment through the imperfection of the drugs administered to him. The only standard that can be set up is evidently that of the British Pharmacopœia, and even this must be used with discretion, for some drugs are so unstable that it is impossible to keep them for any time without deterioration. It would be for the public benefit that all important drugs should be frequently analysed by some impartial chemist, but in many cases a warning instead of an immediate prosecution would satisfy justice. The adulteration of quinine is one thing, the defective strength of hydrocyanic acid quite another.

"The real remedy for the present uncertainties and irregularities of the law can only be found in a new and efficient Food and Drugs Act, framed on the basis of the present. We are prevented by limits of space from stating in sufficient detail our ideas of the Act as it should be. But a few of the salient points may be sketched. The Act should be not less wide than it is now, and ought to include in its purview all adulterations of food or drugs, whether noxious or merely fraudulent. The powers of the central authority should be considerably strengthened, and it should be able to compel the enforcement of the law. A large number of local authorities do their duty thoroughly, and it would be unwise to interfere with them; but others do nothing, or next to nothing. In many places no analyst is appointed, and in others no work is found for him to do. Such authorities must be coerced if the public is to be protected. Opinions will differ as to the best way of securing the administration of the law, but one way is obviously possible. Having compelled the appointment of efficient public analysts in every district, the Local Government Board might have power to insist that a sufficient number of properly selected samples should be sent for analysis. If this duty were systematically neglected, the board should be able to appoint their own inspector, and to charge the offending district with the expense. The regulations for the collection of samples require thorough revision. We quite agree with Dr. Bell, of Somerset House, that the inspector should have the power to enter premises and select his own samples, dividing them into portions, and paying for them as at present. Sometimes, as in the case of beer, large samples are required, and there is in all cases a risk that the vendor, knowing the inspector or his envoy, or guessing at the object of the purchase, may substitute a pure for an adulterated article. All articles of food and medicine should be included under the Act, whether subject to excise duty or not. There need be no conflict between the public analysts and the excise chemists. The main duty of the latter is the protection of the revenue; but an analytical department is necessary for this purpose, and we see no reason why the Government chemists should not continue to act as they do now as referees in disputed cases. Their powers should be more accurately defined, and some arrangement should be made with regard to perishable articles, such as milk, the analysis of which can never be quite satisfactory unless made upon a fresh sample. Finally, the new Act should contain a carefully drawn schedule in which the principal articles of food and drugs were defined, and limits of purity assigned, With regard to drugs this can easily be done by referring to the British Pharmacopœia as a standard. Food will occasion more difficulty, but none that need be insuperable after the experience that has been gained in the last few years. Milk, butter, and beer are the articles which have given rise to most controversy. In this and our last week's article, we have considered the last two, and we have often stated our views in regard to milk. To the public analyst is at present assigned the impossible task of ascertaining how much water has been added to or how much cream removed from the milk, and as milk is sometimes naturally very poor, he is compelled to take a low standard of purity. The Act might properly provide that milk should be held to be adulterated if it did not contain as much as 3 per cent. of fat and 9 per cent. of solids not fat, or if it contained any substance foreign to milk. The offences of watering and skimming could then be detected with certainty, and the public would be secure of getting good if not very rich milk. At present the limits used by most public analysts are $2\frac{1}{2}$ per cent. of fat, and $8\frac{1}{2}$ per cent. of solids not fat, which represent a very poor milk.'

The Pharmaceutical Journal.

SATURDAY, JUNE 25, 1887.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

ADULTERATION.

THE subject of adulteration is one that must always have an especial interest for pharmacists, not only because of the vast importance of ensuring the purity and good quality of the articles they have to deal with in the ordinary course of their business, but also because the practical familiarity with chemical manipulations which they are expected to possess may often be brought to bear with advantage in the detection and exposure of the fraudulent practices which are so frequently had recourse to for the sake of meeting competition in various branches of trade. In regard to ordinary articles of food and of domestic use, some form of sophistication has become so general, and the fact is so little heeded by the great mass of the public, that the existence of a Food and Drugs Act and the appointment of public analysts are inadequate for its prevention. In many cases it may indeed be undesirable to interfere with practices that have for their object the provision of low priced commodities, for with certain limitations as to such practices being free from objection on the ground of prejudice to health they find their justification in the demand for low priced articles which is an almost universal characteristic of the present time. The production of substitutes for various articles of daily consumption has in fact become a branch of industry of no mean importance, and there is much reason for believing that the result has been in the main advantageous to a large class of the community. But while giving full weight to considerations of this kind as furnishing a justification for the supply of oleomargarine as a substitute for butter, and for the admixture of chicory with coffee, it cannot be admitted that there is a shadow of excuse for the sale of these or similar articles under the names of the genuine articles for which they are substituted by the dealer. It is to this aspect of the matter that attention requires to be directed, and there are now before Parliament several bills, the object of which is to prevent the systematic deception that is practised in regard to several articles of food. We have eminent testimony to the fact that ordinary beef fat, or even kitchen grease, can be prepared in such a manner as to constitute a useful and wholesome article of food of such a character that it can be used as butter, and very often cannot be distinguished from butter except by experts. In like manner the admixture of chicory with coffee furnishes a material that can be sold at a low price, which satisfies the demand of a large class of consumers, and is, at the same time, free from any injurious qualities. To the sale of these and similar articles, no kind of objection can be raised; but it is a scandalous fact that they should be sold as butter and coffee. The frequent prosecutions that take place under the provisions of the Food and Drugs Act, however, prove that this is being done in many instances, and there is good reason for believing it to be done very much more generally than is suspected. The action that is taken under the Food and Drugs Act in prosecuting for such offences may indeed be regarded as altogether disproportionate to their extent. In the case of coffee, moreover, there is the further evil to be borne in mind, that the toleration of the sale of a mixture of coffee and chicory when declared to be such, opens the door to a form of sophistication that may be as prejudicial to the purchaser as total substitution. So long as a mixture may be sold without specification of the proportions, it may as well be nine-tenths chicory as nine-tenths coffee, without infringing the letter of the law, and it has actually been found that such "mixtures" vary in their proportions to an enormous extent, and without any relation to the prices at which they are sold.

But admitting the desirability of putting a stop to the sale of mixtures and substitutes under names they have no claim to,—and we cannot conceive that to admit of being disputed, either from the point of view of the consumer or of the tradesman who desires to supply his customers with what they ask for,—there is still the very difficult question as to the mode in which any legislative provisions for that purpose are to be enforced. In looking through the successive returns of the public analysts throughout the country, the failure of the present Act is plainly apparent from the almost absurd paucity of cases inquired into. The fact is, that while local authorities are indisposed to put the law in force with vigour, individuals rarely take advantage of the opportunity it affords them for having commodities analysed for their own satisfaction. We have no sympathy with the motives which now and then lead to spasmodic raids at the instigation of a public analyst desirous of occupation or notoriety. Such proceedings are quite abnormal and inconsistent with the spirit of the Act, but very much of the work that has been done under it has been of this character, and it yet remains to devise a mode of procedure by which the services of efficient public analysts may be rendered continuously available to protect the interests of the public and really repress adulteration. In the last two numbers of the *Lancet* attention has been directed to this subject, and while taking credit for

having been the means of suppressing to some extent the more noxious form of adulteration which was rife prior to 1851, it is admitted that the administration of the existing Acts is so irregular as to leave much to be desired. As an amendment of the law it is suggested that the powers of the central authority should be considerably strengthened, and it should be empowered to compel the enforcement of the law. We are very much disposed to agree with this idea as representing the only likely mode of making any Adulteration Act useful. But then there is a further serious difficulty as to the standards of purity to be adopted. In many cases this appears almost insuperable, for while there are natural objections to the setting up of arbitrary standards, the adoption of natural standards would often involve the necessity of taking such a wide range that practically the result would be to legalize the lowest quality of some articles. For instance, milk is notably a case in point, and there can be no question that milk of unquestionable purity is sometimes below the standards that have been adopted for deciding whether water has been added or not.

In regard to the subject of drugs, while agreeing in the main with the views expressed by the *Lancet* as to its importance, we cannot acquiesce in the suggestion that the dispenser who has entrusted to him the welfare of patients would be justified in depending upon the merchants or manufacturers from whom he obtains his drugs, or even preparations, for their purity or good quality. His duty is rather to be faithful to the patients, who, as the *Lancet* says, are practically at his mercy, and that involves the capability of being in a position to vouch for the character of every article he dispenses. The plea that he cannot analyse every drug that he receives is inconsistent with the responsibility appertaining to his work. It is, we conceive, the business of the dispenser to do so, and as much for the sake of his own reputation as anything else. Pharmacists should, we think, be especially tenacious on this point, for upon it hinges entirely their claim to a rate of remuneration different from that which would be suitable in the case of a vendor of ordinary commodities.

The resolution adopted at the recent meeting to carry the Chemists and Druggists' Trade Association on for twelve months can scarcely be regarded in any other light than the expression of a belief that there is a need of such an organization on the part of the small number of persons present, and as regards the conditions essential for its maintenance the resolution appears somewhat inconsistent with the inexorable logic of fact. To our apprehension the most essential condition of being a representative body has still to be supplied by an extension of the number of members far beyond the 1400 who have expressed themselves willing to support the Association. The suggestion that in future greater reliance should be placed upon voluntary work manifested but a poor appreciation of the services that have been rendered in the past by the members of the Executive Committee. All the work that has been done has been upon the voluntary system, for it surely cannot have been intended that the payment of travelling expenses is to be regarded as remuneration for the time and labour bestowed upon the conduct of the business. But perhaps the most ominous indication is to be found in the fact that out of a body of some 14,000 registered chemists only 1400 appear to think that they have any interests worth the contribution of 10*s.* 6*d.* a year for the maintenance of an association intended for their benefit.

* * *

Mr. James Hargreave, the well-known chemical manufacturer, has for several years past been engaged upon the construction of a hot-air engine in which the energy of the fuel consumed shall be much more completely converted into motive power than is the case in the steam engine. It is now announced that his efforts have been so far crowned with success that he is able to produce 30 indicated horse-power from a consumption of two gallons of common coal tar per hour, or at a cost, at present prices, of about three-halfpence per hour. This, it is claimed, "is the highest efficiency ever obtained by actual practice in any form of thermodynamic engine, and also the least costly." The fuel, however, is not necessarily coal tar, but may be petroleum, or other liquid hydrocarbon, or coal. The combustion, which is too complete to allow of the emission of smoke, is described as being carried on in a small but intensely heated chamber, the fuel being forced in under pressure.

* * *

Among the eminently select group of persons who have been recipients of Jubilee honours we notice that a knighthood has been conferred upon Dr. A. B. Garrod, who has been for many years an honorary member of the Pharmaceutical Society.

* * *

The death is announced of Dr. Karl Damian Ritter von Schroff, Emeritus-Professor of Pharmacognosy and Pharmacology in the University of Vienna. Dr. v. Schroff was born in 1802 at Kratzau, near Reichenberg, in Bohemia. In 1830 he became Professor of Theoretical Medicine in Olmütz University, but five years afterwards removed to Vienna, where he established a considerable reputation through his investigations in materia medica. He retired in 1870.

* * *

We regret to notice in the *Australasian Journal of Pharmacy* the report of the death of Mr. William Johnson, who for the last twenty years has held the appointment of Analytical Chemist to the Victorian Government. Mr. Johnson was a pupil in the School of Pharmacy, Bloomsbury Square, during the session of 1845, when he gained certificates in Organic Chemistry and Practical Pharmacy. He was for some time in business in Liverpool, and after his emigration to Australia he took an active part in founding the Pharmaceutical Society of Victoria, and he was one of the original members of the Pharmacy Board of that colony.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

June 15, 16 and 17, 1887.

Present on the 15th and 16th.—Mr. Carteighe, President; Mr. Gostling, Vice-President; Messrs. Barnes, Blunt, Bowen, Corder, Fletcher, Gale, Gerrard, Greenish, Linford, Ransom, Symons, Tanner, Taylor and Thresh.

Present on the 17th.—Mr. Carteighe, President; Messrs. Barnes, Blunt, Bowen, Corder, Fletcher, Gale, Gerrard, Greenish, Linford, Ransom, Symons, Tanner, Taylor and Thresh.

Dr. Greenhow was present on the 15th and 16th on behalf of the Privy Council.

MAJOR EXAMINATION.

15*th.*—*Four* candidates were examined. *One* failed. The undermentioned *three* passed, and were declared qualified to be registered as Pharmaceutical Chemists :—

Gibbs, Sydney .....Eastbourne.
Sansom, Frederick James .....Barrow-in-Furness.
Webber, James Wilkey .....Taunton.

16*th.*—*Five* candidates were examined. *Two* failed. The undermentioned *three* passed, and were declared qualified to be registered as Pharmaceutical Chemists :—

Andrews, Edward Arthur .....London.
Clubb, William Herbert .....Liverpool.
Lang, John West.....Southport.

MINOR EXAMINATION.

15*th.*—*Twenty* candidates were examined. *Eleven* failed. The undermentioned *nine* passed, and were declared qualified to be registered as Chemists and Druggists :—

Bishop, George Henry.....Southampton.
Cole, Vincent Theobald .....London.
Cross, Arthur Richard.....Shrewsbury.
Driffield, Robert .....Spilsby.
Escritt, Harold Teal .....Driffield.
Foot, William R. Whiteway ...Totnes.
Gardner, Frederick William ..Newark.
Gould, William Emanuel .....Twickenham.
Thomas, John Evan.....St. Clears.

16*th.*—*Twenty* candidates were examined. *Ten* failed. The undermentioned *ten* passed, and were declared qualified to be registered as Chemists and Druggists :—

Gray, William Edwin .....Pickering.
Griffith, Martin Luther .....Weston-super-Mare.
Hanslow, Charles Edward .....Woodford.
Harry, Joseph .....Swansea.
Hart, Jane .....London.
Hobbs, Harry .....London.
Hucklebridge, Wilfred.....London.
Langford, Frederick Charles ...London.
Loveluck, Griffith David.....Taibach.
Marsh, William Henry .....Old Catton.

17*th.*—*Twenty-four* candidates were examined. *Nine* failed. The undermentioned *fifteen* passed, and were declared qualified to be registered as Chemists and Druggists :—

Mitchell, John Albert.....Bradford.
Nicholls, Charles .....Wellington, Som.
Payne, William .....Wendover.
Rideal, Frank .....Hyde.
Southam, Stanley.....Manchester.
Tharp, Arthur .....Croydon.
Thomas, Lewis.....Bristol.
Tothill, Mortimer A. Legett ...London.
Vause, John Edward .....Swansea.
Walder, Frank.....Arundel.
Walklett, George James.....Oxford.
Westmoreland, William Hy. ...Salisbury.
White, Thomas Henry .....Whitby.
Woodward, Moses Mellor .....Nottingham.
Young, Edward Francis.....Portishead.

PRELIMINARY EXAMINATION.

17*th.*—Certificates by approved examining boards were received from the undermentioned in lieu of the Society's examination :—

Babst, Robert Vaughan .....Middlesborough.
Butler, William Barber .....Cromer.
Coulson, Thomas .....Leicester.
Felce, Howard .....Kettering.
Gaziello, Marius .....London.
Greaves, William Abraham ...Ironville.
Polley, Thomas E. .....London.
Roberts, Thomas Livingstone...Haverfordwest.
Rogers, Ernest Henry.. ... .Liverpool.
Saltmer, George .....Darlington.
Strawson, Vincent Valentine Latham, Liverpool.
Taylor, Alfred .....Morriston.

Chemists and Druggists' Trade Association of Great Britain.

A Special General Meeting of the members of this Association was held on Friday, June 17, at the Inns of Court Hotel, Lincoln's Inn Fields, Mr. Cross (of Shrewsbury) in the chair.

The SECRETARY read the notice convening the meeting, and also a list of gentlemen who had sent letters of apology for not being able to be present.

The CHAIRMAN said, as President of the Association, he could not help feeling a certain amount of regret at having to preside at a meeting called to consider such a resolution as was about to be proposed. That such an Association, representing not only a select few, but chemists and druggists throughout Great Britain, should, after a comparatively few years, have to consider at a special meeting whether it was expedient to wind it up or not was a great misfortune to the trade throughout the country. He well remembered before the Association was formed how the Pharmaceutical Society was considered by some to be the Society of only a few, and people excused themselves from joining it because they said the doors were not wide enough. Thereupon it occurred to a few chemists and druggists that an Association should be formed on a completely democratic basis, which might include the whole of the chemists in the country. At one time it appeared that their expectation would be realized, for a very large measure of success had attended the Association during its existence. It might be that it still had years of prosperity to go through, but he must say when he had put into his hand an intimation that a resolution would be moved by two past-Presidents, such as would presently be brought forward, he felt that those who had most experience in the matter had formed an opposite conclusion. They were all agreed, he believed, that the need for such an Association was as great now as ever, and it seemed to be a piece of folly that it should be allowed to slip out of existence; but it had much better do so unless it were really representative of those it professed to serve, and unless sufficient funds could be provided to carry it on in a proper manner. They did not want to have to do as they did in the past, and as he had been sometimes ashamed to do, to make special appeals for funds on every occasion. They wanted to go forward with real power and weight or else not at all: they had only weakened the cause of those they professed to serve if they could not act as well as speak. Unless they could continue the Association as a representative, solvent and powerful Association it had better be dropped. He hoped there would be a full and free discussion, the benefits of which would not be confined to those present, but would be appreciated

by the trade throughout the whole country, and he, as Chairman, should endeavour to be quite impartial in the matter.

Mr. THOMAS BARCLAY (Birmingham) said this meeting was the result of what had taken place at the meetings of the Executive of the Association and of the Urgency Committee. At these meetings it was found impossible to carry on the work of the Association vigorously unless they had an income of at least £1000 a year. The Executive had felt for some time past that cases might arise which would require a large amount of money, and they would be obliged to allow such cases to go by default, because they had not funds at disposal to carry them forward vigorously, and so the interests of the whole trade would be damaged. They had been living for some time past from hand to mouth. A clear note had been sounded to the trade, that they must have £1000 a year as a minimum if they were to do the work expected of them. An appeal had been made and 1400 gentlemen offered to subscribe to the Association as the result. At the last Executive meeting he opposed a resolution for winding up the Association, because he felt that 1400 was not such a bad number after all. At an earlier stage of their history only about 1200 had responded to an appeal for a 5*s.* subscription, and he thought that 1400 offering to subscribe 10*s.* showed some advance, but he was outvoted by a majority of the Executive, though only a narrow majority, the numbers being seven to six. He then wanted a further appeal to be made, but his friends around him felt that they had appealed and appealed until they had humiliated themselves, and that they had no right to place themselves in that position. He still hoped against hope, and they had spent some money in advertising; three notices had appeared in the various trade journals stating that this meeting would be called to wind up the affairs of the Association, and he had hoped that during the interval the number of subscribers would come forward, but he was sorry to say that during the interval the number responding was only something like fifty.

The SECRETARY said it was only twenty-six.

Mr. BARCLAY said it appeared therefore that through the indifference of the trade, not from hostility to the Association, there was not the desire for a trade organization which there ought to be to enable it to work successfully. He was glad to see so many around him who had supported the Association from the first. There were about eight gentlemen present who were members of the Executive in 1876, and they had pinned their faith to it, had given their work to it, and were present to-day to give an account of their stewardship, and he felt that they had a record of which they need not be ashamed. Mr. Radley, who was one of the founders, had kept by the Association all the way through. He moved the original resolution, that it was desirable for the protection of the trade that an Association should be formed, and on those lines they had acted steadily during all these years. On more than one occasion they had been able to protect the trade in emergencies, and had done a deal of good work. They had not been long in existence before they had to defend some of their members from prosecutions under the Adulteration Act, and the trade might be proud to look back to that time when scientific witnesses, such as had never been seen before in any trade prosecution, presented themselves in court and helped them to win that case after an appeal. The young Association won its first laurels on that occasion. Then came a fight with a much larger adversary, the Apothecaries' Society, in which also they were ultimately victorious, and won for the trade vested rights which would certainly have been lost had the Association not been in existence. In that very hotel he remembered seeing the venerable witnesses who were brought up to give evidence in the Court of Queen's Bench, and it was a thing to be proud of that the trade had sufficient energy to be able thus to successfully defend itself. The Association had also been very successful with the Government Departments. When it was thought necessary to stamp apothecaries' weights and measures there was a great deal of difficulty, and the Association, by going to the Board of Trade Department, was the means of getting a document sent out by the then President, Mr. Chamberlain, instructing the Inspectors of Weights and Measures that where the local authorities determined to put the Act in operation due notice should be given of their intention, and that this should be done before the Inspectors were authorized to visit the shops in the district. That was in June, 1880, and it saved chemists from being very much harassed. Again, with regard to the Inland Revenue Department and the question of the Patent Medicine Stamp, a meeting was held in London and a deputation sent to Somerset House, who saw the Commissioners. After a long interview it resulted in a memorandum being drawn up by the Association which had been at the service of all the members, and which gave clear instructions how every chemist could keep within the four corners of the Act, a most difficult Act to understand; and a further concession was obtained, the Commissioners agreeing that any chemist who felt in doubt whether his preparations required a stamp or not, should receive information if he sent up to the office. Again, the Medical Acts Amendment Bill was introduced into the House of Commons by Lord George Hamilton, and it contained provisions intended to put down counter prescribing. If that Act had passed no chemist would have been able to prescribe without being liable to a prosecution, but the Associatian had an interview with Lord George Hamilton, and after petitioning and interviewing members the result was the Bill was withdrawn. Again with regard to the Dental Act introduced by Sir John Lubbock, the Association was able to get the interests of chemists protected, and those who were practising dentistry were exempted from the operations of the Bill. Again, with regard to the Trade Marks Act, many marks had been removed from the register which would have operated seriously against the trade, such as "menthol," "extract of malt," "Persian sherbet," and a host of others. But unfortunately funds were again lacking, and although the Executive placed their services unreservedly at the command of the Association, they had not the funds to carry out the work, and it had to be dropped. No doubt the trade would have benefited very materially by this time if this work had been continued. All this work had been done on a 5*s.* subscription. They had spent £3000 in law, and he did not think that any one could say that a penny of it had been wasted, looking at the record of prosecutions and defences. But they felt that they could not go on in this way; they were crippled for want of funds and it was better that the trade should understand that there was no Association at all, rather than that it should be leaning upon a crutch which would give way in the first emergency. It was better for everyone to rely upon himself than to be looking to an Association which could not really do the work. The Pharmaceutical Society had been in existence for forty-five years and had only some 3500 members. The Pharmaceutical Conference, during its first few years, only obtained 258 members, and therefore seeing that they had promises from 1400 he felt that there was still life in the Association, that a great many people wished it to live, and he thought it a great pity that these 1400 who were anxious to organize themselves and carry on the work and act as a nucleus if any emergency should arise were not able to do so. He well remembered a statement of Mr. Richard Reynolds, in his address as chairman of the first meeting held in Birmingham. He then said concerning the Association that if defence, and not defiance, were to be a leading principle, there would be a considerable irregularity in the work to be done in different years. That he believed to be

the real state of the case. The trade just now was in a very bad condition; all kinds of voluntary associations were suffering, and people declined to give money to everything they possibly could. As had been said by the editor of the *Chemist and Druggist* no one could brand this Association as a failure, and perhaps the very completeness of its success had ruined it. The Editor of the *Pharmaceutical Journal* also said, when an appeal was made that the Pharmaceutical Society should have a trade protection department, that apart from the great difference between the work of the Society and that properly appertaining to such a body as the Trade Association, the experience of the latter body had not been so favourable as to excite any keen desire to assume its functions. That no doubt would militate against any further efforts in the same direction. As to the necessity for such an Association, he would only say that chemists and druggists were subject to penalties under the Poisons Act, under the Adulteration Act, under Lord Campbell's Act, and under the Apothecaries Act, and every man had now to contend with the opposition of the stores, which was a question which ought now to be faced. All the members of the Executive had felt that if their hands had not been tied they ought long ago to have taken up that question. The thing was now working in such an outrageous manner that he thought public opinion would come to the rescue of the chemists. As an illustration of the hardships they had to suffer he might say that he knew one case in which a store had been started, and a man who was only fit to put up shutters, and who had been employed for such work by a neighbouring chemist, a man who got drunk continually, was supposed, because his name was on the Register, to give responsibility and position to other persons so that they might carry on a large business. Where was the protection for the public in such a case? That kind of thing was not to be supported. But if that was to be stopped they would have to put their own house in order before they could ask the Government and the country to help them. They ought to be rid of branch shops; there ought to be no shops managed by men who were not registered. They ought to do away with the executor clause, except giving a limited time to wind up, and to make it a personal business altogether. They should do away with wholesale chemists being allowed to carry on retail sales unless they were registered. In large businesses it worked all right, but there were many men in large towns who carried on business ostensibly as wholesale chemists who were drysalters, and who sent out poisons in small quantities. That was not fair; but if they were to put themselves right, and make this a personal business, they might go with fairness to the public and to the Government and ask to have some protection, and that in consequence of the examinations and all their responsibilities under the Acts of Parliament they should have a *quid pro quo*, and some protection against the general public dealing in the articles which they only were properly qualified to sell. These various difficulties under which they lay would, he felt sure, become more and more important when the Association was out of the way; chemists and druggists throughout the country would determine to build up an association, and it would simply result in a stronger, more powerful, and more representative body coming into existence. He could only say if such were the case he should be very happy in any way he could to further the success of the Association. He concluded by moving:—

> "That the Chemists and Druggists' Trade Association of Great Britain be forthwith wound up, and that the Finance Committee be directed to take all necessary steps to that end; that the Treasurer be directed to hand over the surplus funds, if any, remaining in his hands, after satisfying all the liabilities of the Association to the Benevolent Fund of the Pharmaceutical Society.

Mr. HARRISON said Mr. Barclay had made the matter so clear that the Association must be wound up that he had very little to say, but, like Mr. Barclay, he felt that they did not for one moment wish to intimate that the necessity for the existence of such an Association had in any degree diminished. He believed the necessity for it was as great to day as ever, but they did not find the chemists and druggists throughout the country appreciate that; their numbers had dwindled down to such a small proportion, and the funds in a similar ratio, that they were utterly unable to proceed on the lines laid down, and it came therefore to two alternatives; one which had been before them a considerable number of years was a large increase in members, and the other was to raise the amount of subscriptions. They had tried again and again by various means to increase the number of members and failed, and they recently tried what could be done by larger subscriptions, and in that also they had failed. It was perfectly true that nearly 1400 came forward and said they were willing to continue with the Association and subscribe ten shillings, but that meant an income of £700 a year only to begin with, and they had to take into consideration that those who had come forward had been specially appealed to. They all knew from their study of voluntary societies that after the first year, unless something extraordinary happened, you might usually look for a shrinkage of members, and they felt it was utterly impossible to work an Association like that on £700 a year. No one had greater faith in voluntary work than he had, when you could get it; but it was utterly impossible to work such an Association on the voluntary principle. A letter had been published within the last few days in which it was recommended that the voluntary work of the Association should be largely increased. That letter only showed, the writer being a man of large business experience, how utterly those in the trade, outside the Executive, failed to grasp the amount of work which had been done. Mr. Barclay had shown what had been done in defence of prosecutions, but he had not told them as he meant that during the ten years they had given advice in no less than 5000 cases. It was a matter of fact that they had given advice in 500 cases every year. Now, could a Secretary be found who was prepared to give advice in 500 cases each year, and give all that time for nothing? It would take a man more than twelve months to learn the duties of the office, and be able to give that advice promptly when required, and after he had learned the work he would be displaced and a fresh Honorary Secretary called in. The matter was utterly impossible, and only showed more clearly than anything else how utterly the members failed to appreciate the work which had been done for them. Mr. Barclay had referred to some of the important work they had done, for instance, with regard to the Trade Marks Act, but in that they went further than he had indicated, for they had established with the officials of the department a thorough *entente cordiale*; so far that if they raised an objection to any trade mark the officials refused to allow it to be registered until they had had a further communication with them on the subject, and they admitted that the Association was of the greatest possible use to them. Chemists and druggists never made a greater mistake than when they allowed work like that to collapse for want of funds. Reference had also been made to the fact that all voluntary societies were suffering just now for want of funds, and he knew that to be the case; there was a very great depression in trade; but they also suffered from something else, namely, that there was no very great danger at the present moment imminent—they had done the work a little too well. They were in a similar case to a fire insurance company, which had had no fire in a town for a considerable length of time. He was told that where fires were of very rare occurrence fire policies were allowed to lapse to a very great extent, and he was told that companies found nothing in-

crease their policies so largely as to have a fire occasionally. They could not very well go round to their friends, the analysts, and ask them to institute prosecutions, but he felt convinced that the results would have been in their favour if they could have had a long series of prosecutions throughout the country under the Patent Medicines Act, the Adulteration Act, or the Apothecaries Act. The roll of members would have been largely increased, and instead of being there to wind up the Association they might have been there to extend the sphere of its usefulness. But they had to face the fact before them that only 1400 men were prepared to come forward and remain members, and under those circumstances it was utterly impossible to go on. His friend, Mr. Barclay, was of a more sanguine temperament than himself, but he had now come to the same conclusion, and that being so he thought it strengthened their case very much. He greatly regretted the result, but still he thought the best thing to do was to die and be respectably buried, because the day possibly was not far distant when chemists and druggists might rise up as one man and endeavour to form a new association to carry on the work they were doing. He was quite sure the necessity still existed, and that they would all feel it so before a very long period had elapsed. He seconded the resolution, not with pleasure, but with satisfaction, feeling that it was the right thing to do.

Mr. WYLEY said he wished to approach this subject without saying anything which could be construed as casting blame on the present Executive, but they were in the unfortunate position that the Association would have come under the notice of the Official Receiver except for the generous response which had been made to the circular they had issued. Looking back he felt a great deal of gratitude was due to the members of the present Executive and the officers who had so long borne the burden and heat of the day, and done such good work for the Association, but he felt that they lived in bad times; in all classes of the community it was found necessary to cut down expenses, and above all he believed it was wise to live within one's income. For that reason he had taken the liberty, for the purpose of starting discussion, to write a letter to the *Chemist and Druggist* last week, in which he started the idea that if possible it would be well to try to work the Association on more economical principles, by extending the voluntary system. There were dozens of chemists in England at the present time who devoted a great portion of their leisure time to some philanthropic, municipal, or political work, and if some gentlemen could be found who would devote a few hours per week to the work of the Association, he felt sure that the expenses might be very much cut down. He was far from wishing to cast any blame on their worthy Secretary, or to say that the salary he received was too large for the work he had done, but when they looked at the balance sheet of last year, and saw that £339 was spent in salaries of the Secretary, etc.; that the Auditors' charge was twelve guineas; that the office expenses were a heavy item; that £46 was spent in reporting, and that the postages were very heavy—though he could understand that, as several circulars were sent to the trade—looking at those things he could not help thinking that they were really spending more than their income, and that the principle of voluntary work might be very largely extended. In every district it would be possible to find local secretaries, men of ability, who knew the trade, and who would collect subscriptions and work up the Association generally. At the present time, no doubt, there was a great feeling abroad that the Association was doomed, and was going to be wound up. He knew this from experience, for gentlemen had said to him they did not intend to subscribe any longer because the Association did not do as much good as they expected. There was a certain amount of apathy in the trade, but it would be a great pity to wind up the Association, because it would be so difficult to start it again. Every effort should be made to keep it on its legs and if possible to put it on a sound financial basis. A certain percentage of the income ought to be spent in working expenses; 15 or even 20 per cent. might well be spent in management. He did not want to detain the meeting by going thoroughly into the figures, and of course, as Mr. Harrison had said, he as an outsider did not know the amount of work that had been done. He had no wish to detract from the work that had been already done voluntarily; he knew that the Local Urgency Committee in Birmingham had devoted a great deal of time to the work, and if that could be extended they might still have a strong and powerful Association. It was admitted on all hands that they must have a strong Association, which would take up all cases which came under their notice; and if it were known that chemists would be protected in all cases except fraud, an enormous number of new subscribers would come forward. To test the feeling of the meeting, and feeling strongly that it was most undesirable to break up the Association which had done so much good work in the past, he would propose the following amendment:—

> "That six members of the Executive and six elected from the general body of subscribers be appointed as a committee with the view of reorganizing the Association on a more economical basis."

Mr. MACKENZIE said though a member of the Executive he could not agree with his colleagues in this matter, and go in for winding up the Association without another effort. He had heard the arguments of Mr. Barclay and Mr. Harrison, and he thought the meeting should pause before coming to a decision that the Association should cease to exist. Before hearing the amendment he had noted down that he would like a committee appointed—five representing England and one Scotland—to consider the matter. He thought the arguments which Mr. Barclay had used were the strongest he could use for the continuance of the Association for the defence of chemists generally. They had heard of a city being spared for the sake of five, and he would say for the sake of 1400 he would spare the Association. Fourteen hundred would still stand together as a very good nucleus indeed of continuity, which, when an emergency came, would be prepared to act. He held also that if they broke the continuity of their existence they would do more than could be redeemed in a considerable time afterwards. He would like the Association carried on with the distinct understanding that at all events if they were not so energetic and prepared to come to the House of Lords with all disputed cases, still they should form a nucleus round which members of the trade could rally. With 1400 members they would have an income of £700, and they might go on with that. They had not yet faced the question of cutting down the expenses, but this was one of the first questions which ought to have presented itself to practical men. If there was not sufficient for carrying on the Association on the basis on which they had hitherto carried it on, they ought to do with smaller expenses,—a smaller Executive would perhaps be adequate. Of course it was a good idea to have representation, and in better times it would still be admirable, but at the present it might be dispensed with to a very large extent and could be made a reason for not retaining the services of the Secretary as hitherto. They might get an Assistant Secretary for less than £100 a year, and by a smaller Executive, say of half-a-dozen men, who knew the whole working of the Association, and whose knowledge was worth a great deal, they might still continue. No doubt they lived in bad times, which affected them all more or less, and some very heavily; but the moment it became an acknowledged fact that they had ceased to exist as a trade association, things would become worse. He asked them to consider well, before coming to a vote, how desirable it was to have a committee appointed with a view to continuing the Association at a reduced expenditure.

The CHAIRMAN said he did not wish to intervene personally in the debate, but he wished the meeting to have all the information which was before the Executive, and what Mr. Wyley had said reminded him that two officials, who had done work for the Association, the Treasurer and the Hon. Secretary, had both written resigning their offices in case the Association were re-organized.

Mr. LONG said if Mr. Wyley had not moved this amendment he should have done so himself. He had been on the stump in his neighbourhood, and he thought they ought to go on. They ought not to acknowledge such a defeat. He should say, if they had not strength enough to do much good, do not kill the patient, but let him live as long as he could. Many chemists in his neighbourhood had agreed to go on, and he believed if everyone would go round, his own neighbourhood and solicit his neighbours they would get a good response. The circular had been sent round but people received so many circulars they would not pay much attention to them. There was an immense amount of apathy, and the constant cry was, What did the Association do? He always said in reply, What have you done for yourselves? They knew very well that if all the chemists had come into the Pharmaceutical Society, instead of standing aloof, they would have got a splendid Act of Parliament, and if all the chemists would come and support this Association, a 5*s.* subscription would be ample. When people told him they could not afford it he said, Why? it was only a penny a week, and if necessary he would go round and collect it himself. He had met with a great amount of sympathy and also with a great amount of apathy, but they would never prosper as a body until they stuck together. One gentleman said he would subscribe if they would prevent the stores dispensing. He told him the best way to do that was to subscribe, and he thought they ought to make a vast effort to induce other chemists to join. He did not think that effort had been made. Mr. Barclay spoke about fighting the question of the stores, and really the decision was an absurdity. A more rotten judgment was never delivered than that about the lawfulness of the stores dispensing. The first thing the Lord Chancellor said was that this was an artificial person, but the only artificial persons he knew of were in the Marylebone Road, under the charge of Madame Tussaud. Then the Lord Chancellor said a company could not be examined. You had only to ask each member individually, and if they were not qualified it was an illegal conspiracy, and they heard a great deal about conspiracy in the present day. The next absurdity was to say because they could not comply with the law they were at liberty to break it. He did not think if the matter were put forward in a forcible manner it could be sustained for a moment. He begged leave to support the amendment.

Mr. CLARKE (Gravesend) said he felt very earnest about the continuance of the society, and he believed that if an effort were put forth by every individual member they would meet with a fair response. He believed the society was exceptionally fortunate in the Secretary, and to let a society of eleven years' experience go for want of a little extra struggle would be a great pity. He knew what voluntary work was himself to some extent and was willing to do anything he could. To let the society go and lose all the prestige they had attained when they wanted everything they could have in that way would be a great mistake. He believed these 1400 gentlemen, and he was one of them, would willingly make the subscription for the first or second year one guinea instead of 10*s.* if necessary, and he felt certain that out of the 1400—and he was surprised there were so many—there were many able and willing to assist further, and there would be no difficulty in getting an income of £1000 a year. He hoped the meeting would pause before coming to a final conclusion, because if they broke up they would have to begin all over again. He had seen some references to another institution being founded, but it would not represent the trade at large, but the Secretary and Executive. Everything depended on the Secretary, and though he had not the pleasure of knowing Mr. Haydon he had seen what work he had done and fully appreciated it. He was sorry to hear of the resignation of the Honorary Secretary and of the Honorary Treasurer, and hoped that if they saw a supreme effort was being made throughout the country they would reconsider their decision.

Mr. ALLEN said he rose with some hesitation to support the amendment because of the remarks which had fallen from two past-Presidents, who had proposed and seconded a resolution which really meant that the Association must die. The remarkable part of it was that every word Mr. Barclay and Mr. Harrison had uttered only convinced him that the Association could still live. If they had been proposing a resolution that it should still go on he could not conceive how they could have put the case more strongly than they had done. He was perfectly at one with both those gentlemen, that there was as great a need of the Association actively carrying on at the present moment as ever. He was perfectly convinced that many of the things of which they spoke needed the intervention of an association of some kind. He was also convinced that a defence association of some kind must exist in their business. With regard to the Trade Mark Act, certainly an organization of some kind should be in existence to watch that one thing alone. He could understand that, coming there and finding what a small number had attended in response to an urgent appeal of such an unusual nature as it was, the Executive, after ten years' hard work, should feel dispirited; but that was not anything unusual in any matter which was for the interests of chemists. The response had certainly been rather of a negative character, and with an income of £700 a year he did not see how the Association could possibly go on as it was now, but he should really like to consider some alternative proposition by which a smaller Executive could carry it on. He knew there was something behind which, perhaps, ought not to be discussed, but he was certain that nothing which was to a certain extent of the nature of private enterprise could be put before the country with the weight of that which had an elected committee however small. He hoped there was some life in the old dog yet.

Mr. HAMPSON said he was extremely unfortunate a short time ago in not being able to attend a meeting of the Executive when they had this grave question before them, whether they should recommend the Association to continue its existence or whether it should be decently interred. The voting on that occasion was extremely narrow, and Mr. Barclay, the valiant champion of dissolution to-day, was then on the other side. He should support the amendment or something equivalent to it, and his first reason was that they should not lose the services of the present Secretary. His second was that he believed the Association would still live if they were at all in earnest. The promised income was over £700, and he was told they might live respectably if they had a thousand. Surely with a little extra exertion they could get £1000. It had been said time after time that it was undignified to appeal to the wholesale trade, but the wholesale trade had been their friends in the past, aud he was quite sure they would still remain so. It was to their interest that the Association should live, and that the poor unfortunate chemist should not be too much badgered, but should be protected in the future as in the past. He was quite sure without any indecent handing round of the hat they would be prepared to give something more than the 10*s.* 6*d.* subscription. But even with that alone, and a certain number of guineas which would come in, £1000 could be obtained. A great deal had been said upon the impropriety of killing an Association which was not yet dead, but

they were called upon by Mr. Barclay, who was really the father of it, to kill it outright that very afternoon. He took exception to that act which they were asked to perpetrate. He would not say it was indecent on his part, but at any rate it was unexpected that the very man who in early days had worked so hard for it should now wish to put it out of its painful existence. He appealed to him to stay his hand for a short time and let them have another attempt at life. Times were bad, but they would not improve the times by separating and not sticking together for self-protection. It was a shame they were not much stronger. Even the much respected working men banded themselves together for self-protection, but an educated body, sometimes spoken of as a profession, was unable to stick together and raise £1000. It seemed to him positively astounding and he would not believe it.

Mr. HART (Manchester) said he felt sure that if the Association were allowed to die they would make a grand mistake. They had at all events some little life to foster, and if it died the whole thing would have to be gone through again. His friends in Manchester told him that under no circumstances was he, if he could help it, to allow the Association to lapse. There were only forty-one replies to the circular from Manchester, but it must be remembered that people were pestered to death with circulars, and if they wished it to live they must have a personal canvass. He had drafted a few ideas on the subject, but they were much to the same effect as had been suggested by Mr. Wyley. He felt quite sure the trade would make a great mistake if they allowed the Association to die out. Mr. Barclay had given very excellent reasons why it should be continued, and he was very much astonished when he moved his resolution, because it did not at all tally with his speech. He felt quite sure that he only did so as an act of duty to the Executive, being put down to do it, not because he was convinced. If the Association were reformed it must be first of all on a reduced expenditure, and he felt quite sure they might rely on the services of Mr. Barclay in the future as in the past, and though he had moved the resolution he did not think he meant it.

Mr. GLOVER said he should like to show the necessity for such an Association by giving the particulars of a case in which he had been himself interested, and which he had written down. He proceeded to read certain details of a case of prosecution under the Apothecaries Act, but was called to order, and the Chairman ruled that he could not allow details of personal cases to be gone into.

Mr. JONES said he was a member of the Executive, but he should support the amendment. He had voted at the Executive for the Association to hold on. But how could it hold on when it could not get funds? It was true that a personal canvass would do good, and he could say that, because he had done a little himself in that way. Chemists of course, as a class, were an unmovable sort of people, unless there was something stirring going on, but at the same time they liked some representative of the Association to call on them. They liked to see some one now and again from the society. If they allowed the Association to drop, they would be attacked on all sides, for if people attacked them before, they would do so twice as much afterwards. He wished Mr. Hart had canvassed Manchester, as he had promised at the Executive.

Mr. HART said there was a formal resolution passed, asking him to do it, but when the minutes were published, no mention was made of that resolution, and consequently he felt he would be going about without any authority.

The SECRETARY said he would answer that at once, because it was impeaching the character of the office. Mr. Hart, at the last meeting but one of the Executive, suggested that he should be allowed to collect the Manchester subscriptions, and it was agreed that he should do so. There may have been a formal resolution, but so far as his memory served him, it was simply a minute, which appeared on the minutes of the meeting, and he did not think it was of sufficient importance to put in the trade journals, that a gentleman residing in Manchester was going to collect the subscriptions. Mr. Hart had perfect authority from the Committee to do it, but he now came and said because that was not published in the trade journals he was not authorized to canvass. If that was what was meant by a personal canvass the less they had of it the better.

Mr. JONES said he went to canvass, and the result was fairly satisfactory, and if the Association were carried on he should be prepared to go on canvassing. They wanted more members. One gentleman said he was surprised to find 1400 come forward at 10*s.* 6*d.* each. That was not to be laughed at. He agreed with Mr. Mackenzie that a smaller Executive might do, but with regard to the figures that had been read he thought they were not those of last year, but the year before. Last year the expenses were very small, because the Urgency Committee did a great deal and saved expenses. With a smaller Executive, made as representative as possible, and with the expenses cut down, he felt certain they would be able to carry on the Association. He firmly believed that without the assistance of the Association they would be very much harassed. It was all very well to carry an Act of Parliament to say nobody should sell poisons; but what did they care about selling poisons? You could not make a fortune at selling poisons. They ought to look at the grocer who was selling patent medicines at store prices.

The SECRETARY said he was anxious that the meeting should not be misled with reference to this question of personal canvassing; the last speaker said he had canvassed——

Mr. WYLIE asked if this was in order. They did not want a discussion on canvassing, and he thought personal matters should be left out.

Another MEMBER said he was very sorry that the meeting had not heard Mr. Glover's case in full.

Mr. ANDREWS supported the amendment. Much of what he could and would have said had already been put before the meeting in better terms, but he hoped gentlemen would understand the amendment before them, namely, that six members of the present Executive and six chosen by the society at large should meet together and discuss amongst themselves how the Association could best be carried on in the future with more voluntary effort and less expense. With £700 income they could not do very much work, but they could live and carry on, unless something startling occurred, which was very likely to be the case, as the Apothecaries' Company appeared to be very active, and inclined to attack them in the most vital point, that of counter prescribing. If such a thing occurred there would be no difficulty with regard to funds. He believed he could have got a great many names, but he was met with the objection that the Association was going to be wound up, and of course under those circumstances canvassing was carried on under great difficulty. He was told that London was not sufficiently represented, and he thought if these twelve gentlemen could see their way to making an honorary secretary for London, with whom gentlemen can communicate in case of difficulty, that would have a tendency to remove the feeling that this was only a Birmingham Association.

The CHAIRMAN said he could not allow the discussion to conclude without a word or two. It had given him a great deal of pleasure to find that nearly everyone had spoken so kindly of the work done in the past by the Association, and it was very pleasant to hear so little blame attached to those who had carried on the voluntary work in the past. But he must say that a feeling of another kind came across him when he felt how im-

possible and almost impracticable the amendment was; for as far as he could see it was impossible to carry on the Association, unless something very different turned up. Look at the meeting itself, when there was a question of this importance to be debated, and see how easily they could count the few people present. Did that look like going on? He was afraid it did not, and when he looked at the statistics of the question, he found that in the largest city of the world, in which 1200 chemists carried on business, only 209 came forward to say they would subscribe 10*s.* 6*d.* a year towards helping those who wished to protect them. In another large city where 182 chemists resided, 63 came forward after a considerable canvass had been gone through; in another town with 82 chemists 13 only voluntarily joined the society; in another town there were 97, of whom 16 said they would join; there were 213 in another city, out of which 31 said they would join; in another 235, out of which 41 sent in their names; in another out of 90 only 19; in another large town of 41, 12 came forward; out of another large town 7 out of 143; and out of a whole country, a nation in itself, with 780 chemists carrying on business, only 31 sent answers to the circulars. It might be that they were pestered to death with circulars, but it did not look like carrying on. He should be glad if the meeting could prove otherwise. But he only rose for the purpose of explaining the vote he should give for Mr. Barclay's motion. Of course they could raise £1000; they had raised sufficient money from time to time, but how had it been done? By making every possible effort all round, imploring their fellow tradesmen to defend themselves, and when that did not prove sufficient they lived on the money which wholesale firms had been good enough to give them. Could they go on honestly and be said to represent the calling if they lived on such ephemeral support as that? The meaning of the resolution was that it was far better to let the Association die, and to let the greater need become apparent for its resuscitation. Then the chemists and druggists would rise as one man and say they would have an association, for they might depend upon it when they really felt the need they would support it. He was very sorry to have interrupted Mr. Glover, but he would point out to him that it was impossible to discuss private matters there. If Mr. Glover had simply given an outline of what he had to say, no one would have objected to hear him, but when they saw a large sheet of foolscap, closely written, it naturally made them think of the time which was going to be consumed, and if they listened to one private explanation another would be sure to crop up. He agreed that Mr. Barclay and Mr. Harrison's statements were very powerful in favour of the amendment, but, on the other hand, the gentlemen who supported the amendment had spoken with equal force in favour of the motion, for they had, one after the other, got up and described the very methods which had been adopted in the past. They had left the room after each annual meeting firmly resolved in their own minds they would carry out those methods, yet by the time the next annual meeting came round, unless there was some scare meanwhile, they found themselves poorer than ever. They were all grateful to the 1400 who had sent in their names, but to them, and to them alone, they would have to look for permanent support. When the time came, and chemists themselves felt the use of an association, and they must feel it soon, they would come forward and support the Association, and not only support it with just temporary subscriptions, but take care that it did not die in their day and generation.

Mr. SMITH said in the first place circulars had been sent round by Mr. Haydon intimating that the Association was going to be wound up unless they subscribed 2*s.* 6*d.* That naturally frightened them, and some friends of his sent the 2*s.* 6*d.* in the first place, but the second circular went into the fire and was never responded to, because they said, What was the use of subscribing to a society that was bankrupt? And this was to some extent natural. The game of funk which had to a certain extent been played had frightened the chemists. The amount represented by 1400 persons who had promised 10*s.* 6*d.* each was not what might have been got if the Assciation had showed a bold front and a little more go. It looked like being wound up, and the chemists naturally said, Why should we support it? But very probably if other tactics had been pursued more than 1400 would have come forward. He did not see why the local secretaries of the Pharmaceutical Society, who had any sympathy with the Association, should not be asked to do all they could and use what influence they had to enable the Association to go on.

Mr. WALKER said it seemed to be the idea of some gentlemen, that the members of the Executive were so sure that the society would die, that they would rather strangle it than it should linger on. Although Mr. Barclay was his trade opponent he was glad to call him his friend, and the greatest credit was due to him for the work he had done for the trade, and if he were prepared to strangle his own child, knowing the child was going to die, they might be very sure that the child was in a very bad way. It should not go abroad that the Executive were desirous that the Association should die; on the contrary, they had turned over in their minds all the schemes which could be proposed for keeping it alive. But they failed to see the possibility of its continued existence, and it was certainly more in sorrow than in anger they had come to the conclusion they had. He was glad that Mr. Wylie had come forward with his amendment, but he feared that if he and others who supported him had had the privilege of being on the Executive, they would not have brought it forward. All the methods they recommended had been tried, all the suggestions which could possibly be made about voluntary efforts being increased and expenses diminished had been made, and the result seemed to be, that no responses came to the circulars, however urgently they were worded, and therefore they assumed that the trade took no interest in the matter. There could be no question that some such society was needed. He was quite sure that the gentlemen present, if they agreed to the amendment, were determined to carry out the promises they had made, and that might have some effect on their neighbours, and if they did so perhaps some further result would be attained, but a solemn warning should be given to them. If after the three or four urgent circulars that had been dispatched the trade would only respond to the noble tune of 1400, it was clear evidence that it took a great deal to shake up the interest of the trade in anything at all. He therefore warned those who proposed the amendment that they were entering upon a heavy task, and he hoped they would be able to carry it out.

Mr. SYMES said after the encouraging words which had been spoken by members outside the Executive he should be sorry to appear to throw cold water on the amendment. It was very encouraging to hear the remarks which had been made, but the figures given by the Chairman were very discouraging. They used to have a large room pretty well filled for their meetings, but to-day there were but a few, although they were all in earnest, and great credit was due to them for coming forward to help the Association; still, the evidence in all directions went to prove that they must have numbers as well as earnest men. They might have large numbers of earnest men who, no doubt, would be willing to pay one guinea, or even two, to keep the Association going, but it was not a question purely of amount, it was a question of numerical strength. One of the towns mentioned which had 200 chemists, 30 of whom subscribed, was, he was sorry to say, Liverpool; but the facts were not strictly accurate, because there were 300 chemists there, and, therefore, only 10 per cent. had come forward. He commenced to canvass, and he thought he should have met with a fair

amount of success, but when it came to such a critical time, he felt it was unfair to collect money if the Association was going to be wound up. There was no doubt that personal efforts would result in a larger number of subscribers, but the same energy must be kept up in getting in the subscriptions year after year, and he was quite sure that they would grow tired, as the Executive had, in trying to keep themselves going by the aid of money obtained by pressure in that way. It appeared that the work of the Association, whatever it had been, unless it came home very close to each individual, did not affect him sufficiently to induce him to subscribe; and therefore, while regretting very much that the Association should have to come to an end, and expressing his sympathy with the 1400 who wished to keep it going, he was very much afraid that the only course would be to wind it up. He believed its influence would continue long after it had ceased to exist, and he could prove that this had been so with regard to the trade marks question. Some time ago he saw the comptroller, who, without knowing that he belonged to the Association, told him that he had been very largely assisted by an Association whose office was at Birmingham. He said that he was not acquainted with the technicalities of each particular calling, and could not always decide whether a trade mark was good, but he had been much helped by this Birmingham Association, which seemed to understand all about it; and he was very sorry they did not communicate now. That was a purely voluntary statement which showed the good work which had been done. They could not have gone on for ten or eleven years without producing an effect which would last some time, but until they had stronger evidence of a proper recognition of the necessity for the existence of the Association, he believed all they could do was to discontinue the work. In due course no doubt there would be a reaction, pressure would be put upon them in consequence of some prosecution, and the result would be that some other association would be formed, if the work was not otherwise done. He had made these remarks as an explanation why, against his desire, he should have to vote for the Association being wound up.

Mr. BARCLAY said he had been very much pleased with the discussion. It was very gratifying to every member of the Executive to hear the flattering testimonials given to the usefulness of the Association, and to see the strong desire which existed not only there, but outside, amongst a large section of chemists and druggists, that the Association should continue to do its work. He only wished he could see his way to the work being carried on vigorously, because he knew the trade would suffer unless it had a representative organization. But he would say in reply to Mr. Wyley and others, that every suggestion they had offered for making the Association more vigorous and increasing its funds or diminishing its expenditure had been considered over and over again. They had asked the Local Secretaries to take up the matter, vigorous appeals had been made at the annual meetings, asking them whether they could not get more subscribers, and so on. With regard to the voluntary Hon. Secretary, Mr. Harrison had already answered that suggestion; they wanted not only a secretary who would give time, but a man who had the capacity and who would make it his business—who would think about it and practically nothing else; and who had the whole work at his fingers' ends. It was impossible to get an Honorary Secretary who would do this work, and it was impossible to cut down the expenses of the Association if they were to do the work on anything like the lines on which it had been carried on. It was impossible in a large meeting to go through the accounts and canvass each item, but every one could be thoroughly defended. The expenses of the office and Secretary were £339; and what was that to keep the books and attend to all the *minutiæ* of the business? They had heard there were 5000 answers to questions, and besides that there were loads of correspondence and an enormous amount of work in keeping the whole thing going. £339 was nothing for such work. Then there was the auditors' fee; they would have deserved reprobation if they had not spent it. They had had the first accountants in the town to audit the accounts, and then they felt that their financial position was as clear as noonday, and they had obtained that advantage for £12. He did not think anything of any association which had not good auditors; it was always open to suspicion, and if they had followed a different course, instead of praising the Executive they might have been bringing them to book for some lapse which might have led them into a large deficit. Then the reporting had been spoken of; but it was of the utmost importance that they should have clear reports of legal proceedings which took place in the police courts, because they never knew when a case was going to be appealed, and necessarily, therefore, the reporting expenses were considerable. They could not be cut down, and if they only knew the amount of reporting which had been done they would not find fault with the expenditure. The expenses of the Executive came to about £90 in the year. They had not met often; the members had not insisted on meeting, but had been ready to come when asked. They had not been called together except in great emergencies, and so the expenditure had been kept down. To have an Executive Committee of twenty-four men from Scotland and all parts of England, and only to pay £90 for it, was, he thought, very cheap at the money. They might reduce the Executive and make it a small one, but it would not then be representative; it would only be a small syndicate, which would not represent the popular opinion of the country in any great question affecting the general interests of the trade. Mr. Hart said he could get 150 names in Manchester, but they had only received 41. He wished the 150 had come; and they would have all rejoiced to find that there was one town standing by them. Something had been said about London, the great metropolis, and the place where they were accustomed to look for light and leading. London had done very well in this matter; they had 209 promises at 10*s.* 6*d.* from London, whilst at Glasgow, on a similar occasion, after the whole trade had been appealed to, they only got 140 at 5*s.*

Mr. ANDREWS remarked that that was no criterion of what might be done.

Mr. BARCLAY said he wished they had some opportunity of testing that. If they could adjourn the meeting, or do anything which would give the trade another chance, he should be only too glad. If Mr. Harrison would agree to it, he should be quite willing for the resolution and the amendment to drop, and let the whole thing stand over for, say a month.

Mr. LONG: Until after the Jubilee, and have a Jubilee appeal.

Mr. BARCLAY said the resolution might drop, and a resolution something of this sort might be passed:—"That in the opinion of the meeting it would be a disaster to the trade that the trade organization should fall to the ground, and that the Local Secretaries throughout the country be requested to organize a canvass of their respective districts, and send in within a fortnight, or a month, a list of the members who would be prepared to pay 10*s.* 6*d.* a year in case the Association went on." Mr. Hampson, however, who had had a great deal of experience, suggested what were they to do for money in the meantime.

Mr. CLARK said the meeting might guarantee it.

Mr. BARCLAY said that would settle that difficulty. He supposed they would require £100.

The SECRETARY: More than that, if circulars are to be sent to the trade.

Mr. LONG said there was no necessity to have more circulars; let the members do it themselves.

Mr. BARCLAY remarked that the members must be asked to do so. If their friends present, representing

the trade journals, would guarantee that every member of the trade should have a copy of the proceedings, they need not spend money on circulars. Some one had said that he had been speaking against his own resolution, but he spoke more emphatically now. If the meeting were of opinion that the Association should go on, and would send a manifesto out to the country requesting the Local Secretaries to canvass the members in their districts, he felt quite sure that the Association would not only go on, but go on more vigorously than ever. If Mr. Wyley would withdraw his amendment, and Mr. Harrison would agree to withdraw the motion, and then a resolution were passed such as he had indicated, and the meeting pledged itself to raise the sum of £150 to pay the expenses if need be, they might all go home happy.

Mr. SYMES feared they would not get another meeting in a month.

Mr. BARCLAY said it was not necessary. If the 1400 were made up to 2000 by the extra canvass, no doubt the Executive would feel justified in going forward.

The CHAIRMAN asked Mr. Barclay if he would feel justified in going on, if they got up to 2000.

Mr. BARCLAY said one would think the Local Secretaries were going to put their heads together and take care not to send up a single name beyond the 2000. He took it if they got 2000 they would probably get more. They would either get below the number or above it; either the trade would rise to the position or do as it had done in the past, give a negative response.

Mr. MACKENZIE pointed out that under the rules the subscription was 5*s*. They could not continue the Association and over-ride the rules.

Mr. HARRISON said Mr. Barclay had appealed to him to consent to withdraw the motion, but he did not see how that could be done. The meeting was called to consider that very motion, and it must be voted upon; they could not withdraw it and submit something entirely different. He would ask Mr. Barclay if he thought it a prudent thing to do. After the months of perpetual canvassing they had had, after a meeting had been called with ample notice to take into consideration the expediency of winding up the Association, what did they find? A number of earnest men, whose presence he gladly welcomed, had come forward, but were there a sufficient number to warrant them in carrying on the Association? They required at least 2000 and they had about fifty present. It might be taken for granted that those who were thoroughly in earnest had come, and he saw nothing in the number attending the meeting, nor had he heard anything in the arguments used, to warrant him in acceding to Mr. Barclay's request, even if it were in order to do so. Not a single suggestion had been made which had not been already acted upon, and much as he regretted being driven into this position he did not see any way out of it, consistent with the satisfactory conduct of the business. He would submit to the Chairman that the resolution must be voted upon.

The SOLICITOR (Mr. Glaisyer) said the meeting was called to consider the expediency of winding up the Association, and to take such action thereon as the meeting might determine. It was quite open to them to adjourn for a month if they thought fit.

After a little further discussion as to the best course to adopt,

The CHAIRMAN put the amendment, which was carried by 23 votes to 6.

Mr. HAMPSON said before the Chairman put the amendment as a substantive resolution he would move an amendment to it, which he thought would best meet the circumstances of the case, viz. :—

> "That this Association be carried on for twelve months at a subscription of 10*s*. 6*d*. per annum, and that the Executive Committee be requested to continue their efforts to sustain it."

That would leave the Executive with a free hand.

Mr. ALLEN seconded this amendment.

Mr. BARCLAY said he should heartily support it.

Mr. MACKENZIE hardly thought this was such an amendment as could fairly be put against the one already carried.

Mr. HAMPSON said if Mr. Wyley's amendment were carried out, they would have to appoint a Committee to alter the rules, to call another meeting to receive the report of the Committee, and so on; all of which involved expense. If they decided to carry on, they must at once begin to collect money, and let it be known that they intended to live.

Alderman MALTBY (Lincoln) said this was a much more practical motion than the former one, and he should support it.

The amendment was then put and carried by 24 votes to 2. On being put as a substantive motion it was agreed to *nem. con.*

Mr. BARCLAY moved a vote of thanks to the Chairman, which was seconded by Mr. HARRISON, and carried unanimously.

The CHAIRMAN in acknowledging it, said he could only hope that the resolution which had been come to would be carried out to a successful issue.

Proceedings of Societies in London.

BRITISH PHARMACEUTICAL CONFERENCE.

A meeting of the Executive Committee was held at 17, Bloomsbury Square, on June 16, at 4 p.m.

Present—Mr. Atkins, President, in the chair; Messrs. Attfield, Benger, Carteighe, Davies, Gerrard, Plowman, Williams and Woolley, Dr. Thresh and Mr. W. A. H. Naylor, Hon. Gen. Secs., and Mr. W. H. Ince, Assist. Sec.

The minutes of the previous meeting were read and confirmed.

Letters regretting inability to attend, were read from Messrs. Barclay, Conroy, Dott, Groves and Umney.

Mr. Woolley reported that the Local Committee had obtained permission to hold the ensuing Conference Meeting in the Owens College, Manchester; that a number of beds had been secured at the Grand and Victoria Hotels; that arrangements had been made to hold the Reception and Conversazione at the Grand Hotel, and for the members to visit the Exhibition and Botanical Gardens at Old Trafford, and that it had been decided to take the members and friends on the Thursday to visit Matlock, which is the centre of an exceedingly picturesque locality, and possesses ample accommodation for entertaining large parties of visitors.

Mr. Benger also spoke of the arrangements at Manchester being in a forward state, affording every promise of a successful gathering.

Dr. Attfield proposed, and Mr. Williams seconded, that the general arrangements submitted by the deputation from Manchester be adopted, and that the details be left to the Local Committee, in correspondence with the General Secretaries.

A suggested list of officers for 1887-8 was considered, and the resignation of Mr. W. H. Ince, the Assistant Secretary (who is leaving England shortly) was accepted.

It was announced that the following donations had been received, and the thanks of the Committee were accorded to the respective donors:—Report of the Illinois Board of Pharmacy; the Pharmaceutical Register, from the Pharmaceutical Society of Great Britain and the Pharmacy Board of Victoria; the Calendar of the Pharmaceutical Society of Ireland; Proceedings of the American Pharmaceutical Association; the Proceedings of the Chemists' Assistants' Association; Een Benzoek aan 'slands Plantentuin te Buitenzorg, by J. F. Eijkman.

Letters of thanks for Year-Books were read from several pharmaceutical societies and libraries.

An application from Mr. W. Elborne (Owens College) was then read, for the sum of £5 for a further research on "Strophanthus and Strophanthin."

Proposed by Mr. Benger, seconded by Dr. Thresh, and carried unanimously that the grant should be accorded.

Thirty-one gentlemen were duly nominated and elected members of the Conference.

UNIVERSITY COLLEGE CHEMICAL AND PHYSICAL SOCIETY.

On Thursday, the 16th inst., Professor A. W. Williamson addressed "A Few Words on Atomic Motion" to the University College Chemical and Physical Society. Referring to the atomic theory as the landmark from which he started in his remarks, he defined atoms as the present limit to all efforts to break up matter, and called attention to recent attempts made to decompose atoms, but did not enlarge upon these as being beyond his subject. Physicists, he said, have put forward several hypotheses concerning molecular motion, but although the motion of atoms has been observed in an infinite number of cases, yet this subject has not occupied so much attention as he ventured to think it is predestined to occupy as a matter of fundamental importance. Atomic motion, however, has been studied in some of its phases, and the very basis of the explanation of all chemical reactions he considered to be a recognition of the fact that atoms move either singly or in groups. Thus, for instance, the formation of a precipitate on the mixing of two solutions of different bodies is a proof of an atomic movement having taken place. This movement has been regarded as due to a predisposed affinity between two atoms, but Professor Williamson in his remarks gave reasons in support of another theory. In the accepted explanation of diffusion of gases, molecules are regarded as being in a state of constant motion, and, therefore, it is quite probable that atoms may have an inherent motion apart from outside influences. In the manufacture of ether by the action of sulphuric acid upon alcohol, the first reaction that takes place is between one molecule of alcohol and one of acid, and in the case of ethylic alcohol, one of the atoms of hydrogen of the sulphuric acid is replaced by an ethyl group, with a consequent formation of ethyl-sulphuric acid. In the second part of the reaction, another molecule of alcohol is introduced, and now the opposite interchange occurs. The ethyl group which had formerly replaced an atom of hydrogen in the sulphuric acid is now replaced by an atom of hydrogen from the hydroxyl of the alcohol, causing a re-formation of sulphuric acid. This fact, then, disproves any predisposed affinity, as the character of the change is altered according to the quantities of the ingredients entering into the reaction. If this be so, why, Professor Williamson asked, should the principle not hold good in other cases? Then he went on to assert that he considers in all reactions, that a counter reaction also occurs, except, perhaps, where precipitates are formed, in which case the bodies are nearly out of contact, and so any reversing change is retarded. But in a reaction represented by the equation $KNO_3 + HCl = HNO_3 + KCl$ he considers that under suitable conditions a reverse movement of the atoms would take place, resulting in the re-formation of the original nitre and hydrochloric acid. Further, he supposes that in all cases both decomposing and reproducing changes take place, but that the motion of the atoms is more rapid in the decomposition change than in the reproduction. Professor Williamson moreover supported his theory by discussing the condition of substances in solution, asserting that by solution a change is effected in the constitution of a body. Dry chlorine gas has no effect upon litmus, but in the presence of water the vegetable colouring matter is bleached. This bleaching action of chlorine water he suggests is due to an atom of hydrogen in a molecule of water being replaced by an atom of chlorine, forming hypochlorous acid, the nascent hydrogen combining with another atom of chlorine. In all cases of solution Professor Williamson says some such change goes on, and that even a solution of salt in water may be regarded as the formation of sodic hydrate and hydrochloric acid, as shown by the equation $NaCl + H_2O = NaHO + HCl$, although it is difficult to find evidence in proof of this. If, however, the atom of sodium be replaced by the ammonium group, some support is given to this view, as on boiling a solution of ammonium chloride evidence is obtained of the presence of free ammonia, and even when the acid is in excess, a perceptible quantity of ammonia is obtained in the distillate. Professor Williamson also gave other examples of solution which he considered to afford clear and unmistakable evidence of atomic motion in the effecting of solutions, thus a solution of oxide of magnesium in hydrochloric acid, when evaporated to dryness, readily yields up its hydrochloric acid. Again, when ferric chloride is heated to dryness, hydrochloric acid gas passes off, leaving a residue which consists mainly of the oxide of the metal with a slight admixture of the salt. Professor Williamson concluded his address with a few final remarks as to the nature of atoms, but here, as he said, the borderland of imagination was reached.

Parliamentary and Law Proceedings.

Supposed Poisoning through a Mistake.

The Leeds Borough Coroner (Mr. J. C. Malcolm) held an adjourned inquest on June 15, touching the death of Sarah Ann Parry, aged 24.

The Coroner said that a *post-mortem* examination of the body had been made and a portion of the contents of the stomach forwarded to Mr. Scattergood, who would analyse it.

The following additional evidence was given:—

Elizabeth Dixon, said that for three years she had known the deceased very well. She was with her last Friday morning, in her own house. Deceased told her that she was about to buy two pennyworth of pennyroyal, as she had a pain in her inside. She had a bottle on the table, and it was the same that the poison was found in afterwards. There was a label on it, bearing the name, "Mr Smith, chemist, Beeston Hill." Witness had seen the bottle at deceased's house many times before, and her son had often bought pennyroyal for the deceased in it. She and the deceased left the house together, and witness went to a shop for flour. She saw the deceased go into the shop of Mr. Slater, chemist, and come out again. When witness arrived home she saw the deceased in the doorway, just on the point of falling. She ran up and caught her, and the deceased said that she had drunk the contents of the bottle, and it was not pennyroyal but poison. She said that it had been given to her by a lad of 16 years of age, with black curly hair. Witness gave her some water, and a little brandy, and the deceased said that her legs were stiff, and had gone dead. She remained with the deceased until she died. Deceased had taken pennyroyal very often, and on the morning in question she was cheerful and in good spirits.

By the Jury: That was the only bottle she had ever seen in the deceased's house. Deceased said that she had drunk out of the bottle, and was sure that she was poisoned, as she had taken pennyroyal too often to be mistaken. Deceased had always formerly got the drug from Mr. Smith, whose name was on the label, for about six months.

Annie Foster, deposed that she had been a very intimate friend of the deceased's, and last Friday she had breakfast with her in her house. The deceased told her that she had a dreadful pain in her back, and that she was about to buy some pennyroyal. Deceased had not any money to buy flour with, and witness lent her a 2*s.*-piece. Later on in the morning she was fetched in to see the

deceased, and found her suffering dreadfully. She heard the deceased tell Mr. Shirley, surgeon, that she had been to Mr. Slater's shop, and had been served by a boy.

By the Jury: She looked in all the cupboards, but could not find any suspicious-looking bottles.

Emma Lavinia Bellwood stated that she saw the deceased last Friday standing in the doorway looking ill. She asked her if she was ill, and deceased said that she was much worse, her legs being dead. She got her some water, and deceased told her that she had taken some pennyroyal, but it must have been poison. She had got it at Mr. Slater's shop, and a boy had given it to her. She then went for a doctor.

Elizabeth Pollard, a widow, said that on Friday morning last she went into Mr. Slater's shop, and as she was coming out a young woman was going in. She heard her ask for twopennyworth of pennyroyal. A young man was serving in the shop. Since then she had heard of the death of the deceased, and her description answered to that of the young woman she had seen in the shop.

Police-sergeant Chapman stated that he received information of the case, and at once went to make inquiries. He visited Mr. Slater's shop, and saw the assistant, Arthur Clay, who said that he had heard of the death of the deceased. She had been to the shop for twopennyworth of pennyroyal, and had a bottle bearing the label of Mr. Smith.

Inspector Sykes, the coroner's officer, said that he went to Mr. Slater's shop on Monday night last, and bought twopennyworth of pennyroyal, in order to have it analysed. He gave notice that no more of the drug had to be used. He saw Clay, who said that he had put a label on the bottle, and had wrapped it up in a red bill.

Mr. John Slater, chemist, of Malvern Road and Beeston Road, stated that Arthur Clay had been in his service for about fourteen months. The young man had attended principally to the Beeston Road shop. He had tincture of nux vomica which was kept among the other tinctures, and not anywhere near the essence of pennyroyal. He had no strychnine at all, and had only had about one drachm in the Malvern Road shop during the twenty years he had been in business. Strychnine was a colourless liquid, and nux vomica was brown. Strychnine was a preparation of nux vomica. "Vermin killer" was the only drug he had that would have produced the same effects as those observed. There was no bottle missing from the shop. On Friday last he went to the deceased's house, and Mr. Shirley gave him a bottle and asked him what it contained. He said it was like pennyroyal, but after he had tasted it he said that it was strychnine. It was a one-ounce round-shouldered bottle. He saw a woman go out of his shop on the morning in question, and went in and asked Clay what he had sold her. He said that she had been for 3*d*. of pennyroyal. He asked Clay, after the death, why he had not put a label on the bottle, and Clay said that he had done so. He looked in the till, and saw that there was no silver, only copper.

The Coroner said that he would not call Clay then, as he knew what he would say, but would give him time to consider it, and hoped he would tell the truth.

The inquest was adjourned until the 24th inst.—*Yorkshire Post.*

Action against a Chemist for Negligence.

At the Leeds County Court on June 15, before his Honour, Judge Greenhow, Mary Birch, dressmaker, wife of John Birch, of 9, Springfield Place, Woodhouse Hill, Hunslet, sought to recover from A. Wood, chemist, Church Street, Hunslet, £16 5*s*. as damages for injury sustained by reason of the defendant's negligence in supplying a compound called tincture of steel instead of tincture of myrrh, the plaintiff, it was alleged, being caused illness by taking the wrong medicine.

Mr. Foster conducted the case for the plaintiff, and the defendant was represented by Mr. Warren.

It appeared, according to the case of the plaintiff, that on November 10 last, the plaintiff was indisposed owing to a cold, and determined to procure some tincture of myrrh in order to attempt a cure. She sent to the defendant for the drug, and took a dose of a teaspoonful of what she was supplied with, sweetening it with sugar. She experienced a different taste to what she had been accustomed to with myrrh, and went to the shop and inquired what she had been served with. She was told "Tincture of steel," and thereupon left the premises. A few moments later, however, she was taken very ill and rendered speechless until the Friday night following. An illness of six weeks' duration supervened, plaintiff vomiting frequently and suffering from fits. During this time the business suffered, and at least £15 was lost in this manner. Plaintiff was so ill that she was confined to bed, and had to be attended by Dr. Nicholson.

Evidence was called in support of the plaintiff's case; and Mr. Warren, in defence, argued that when the plaintiff's messenger came to the shop she asked for a pennyworth of tincture of steel, and she was supplied with the article. He (Mr. Warren) believed that a label was placed on the bottle, but shortly afterwards plaintiff came into the shop and asked what the defendant had sent her. He replied, "Tincture of steel," and she said she required "tincture of myrrh." She received the drug, and went away. A printed label, bearing the words "tincture of steel," was placed on the bottle she received first.

After hearing witnesses for the defence, his Honour ultimately gave a verdict for the plaintiff for 15 guineas and the costs.—*Yorkshire Post.*

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Unfair Competition.

Sir,—In criticizing my remarks on this topic two correspondents have objected to my use of the word "luck" in referring to the manner in which many of the Society's certificates are obtainsd. But they have unduly magnified the extent to which my words were intended to apply. I was thinking of those who had received little or no pharmaceutical training during pupilage, and who had depended upon the scanty stock of facts and outlines of principles, gained during a limited period of "study" under an "irregular" teacher, to fit them for acquiring certificates. No accusation against the examiners was meant or implied. I believe they perform their difficult work in an efficient manner, but yet I feel sure ill-prepared men often pass. I presume that those who gain a certain percentage of marks must be passed, and some skilful teachers take great pains to acquire a knowledge of the examiner's idiosyncrasies in questioning and prepare their men accordingly. Will anyone venture to assert that success gained in the examination room after a three months' course of preparation, unprefaced by any previous study of the necessary subjects, but so arranged that the probable interrogations are guessed at (after comparing former candidates' experience) and carefully worded replies framed and used as notes by examiners, can be dignified by any worthier phrase than "mere luck"? That such instances occur is notorious, and considerably less than three months often suffices for ignoramuses with extra good memories to deceive the examiners. But my meaning should be

quite evident without any illustration, and, besides, this is quite a side issue not at all affecting the main point under discussion.

Mr. Ebbutt's sympathy with the youths who scramble for facts is highly praiseworthy. But what is the use of scrambling for what is beyond reach? Encourage "scrambling" for facts by all means, but do not let this serve as an excuse for the non-performance of one's duty. I contend that facts, duly organized, should be placed before these youths in a systematic manner by all pharmacists professing to instruct apprentices in the methods of their business.

Again, Mr. Ebbutt asks that the sphere of the Pharmacy Act be extended. Does he really suppose that we should benefit much were examined men alone allowed to retail drugs? Is it unreasonable to fancy that as great evils as now are would then exist? Those who depended least upon the sale of drugs would retail them at an extremely small rate of profit, and others would invest in the lowest priced (and most adulterated) goods. Then we should find adulteration on the increase, more stringent preventive Acts would be called for, public analysts busier than ever, and, as is now the case to some extent, the more conscientious dealers would suffer by the constant worry in greater degree than the unscrupulous. But the public and their representatives are not likely to grant any such monopoly, fortunately. It is both unnecessary and undesirable, whilst the demand for it is most absurd. The only reason that is urged for endeavouring to deprive the grocer of his right to deal in drugs is that he is not examined. And, I would ask, how does that fact at all affect the question as matters now are? How much more than the grocer does the average druggist know, really know, concerning all that he retails? Are the Society's qualifications alone sufficient guarantee that all their possessors hereafter sell is what it ought to be? All do not verify the quality of each drug and chemical before sale, and I maintain that such as do not are not entitled to higher remuneration than the unexamined grocers, and have as little right to look for any monopoly in their business.

Mr. Davis points out a direction in which we may help ourselves greatly, but it is one way only. The modification of conduct is of yet greater importance than the acquirement of culture, and should precede it. "When the character is defective, intellect, no matter how high, fails to regulate rightly, because predominant desires falsify its estimates," and until we all conscientiously perform the duties, the promise to perform which is implied by the assumption of the titles of "chemist and druggist" and "pharmaceutical chemist," we need not depend upon culture to elevate our business position.

I fear that the ideals of the founders of our Society are yet far from being realized, but I still have faith in the ultimate triumph of good.

Sheffield. JOHN HUMPHREY.

"AMORPHOUS COCAINE."

Sir,—In last week's Journal you have criticized a recent paper of mine on "Amorphous Cocaine" (*Pharm. Journ.*, April 23, 1887), and as I object to nearly every point in the criticism I shall, with your permission, reply *seriatim*.

I. You say, "In the paper recently contributed to this Journal by Dr. Stockman, the peculiarity of what is termed amorphous cocaine was attributed to the solubility of the crystallizable alkaloid in hygrine . . . This opinion has been arrived at by Dr. Stockman from a study of the physiological action and chemical relations of what is termed amorphous cocaine, but he gives no account of the experimental grounds upon which the opinion is based."

I gave in my paper the following experimental grounds, which are both chemical and physiological:—(1) Benzoyl-ecognine was obtained from amorphous cocaine in the same way as from crystallizable cocaine. It is described as being obtained both amorphous and crystalline, and I state distinctly that "chemically and physiologically it resembles benzoyl-ecgonine."

(2) By boiling amorphous cocaine in a sealed tube with hydrochloric acid the same decomposition products are obtained as from crystalline cocaine.

In my paper I describe this fully, and also how the presence of hygrine complicates matters.

(3) The behaviour of amorphous cocaine when water is added to it is fully described, the reasons are discussed, and certain conclusions are drawn.

(4) I obtained (p. 862, line 3, *et seq.*) crystalline from amorphous cocaine. Since the paper was published I have obtained much finer crystals and in larger amounts.

(5) I describe the physiological action of amorphous cocaine as being similar to that of pure cocaine, with the exception, that the amorphous substance produced great local irritation.

II. In the sentences beginning with "So far," and ending with the words "crystallizable base," you express the opinion that amorphous cocaine cannot be a solution of crystalline cocaine in hygrine, because when it is heated the hygrine, although volatile, is not driven off. This is a very common occurrence when a volatile and non-volatile body are intimately mixed together in a large amorphous mass. There are many examples of this. It is almost impossible to drive off chloroform from an amorphous mixture, while acetic acid is also sometimes hardly to be got rid of, although both these bodies are very volatile, much more so than hygrine. Besides, a certain amount of hygrine is given off when amorphous cocaine is heated, as evidenced by the strong smell which is felt.

III. On Dr. Merck's authority it is stated that hygrine is a "purely imaginary substance." In reply to this I say—

(1) It was obtained *from the leaves* by Wöhler and Lossen, and is described by them (*Liebig's Annaleu*, cxxi. and cxxxiii.).

(2) I state in my paper (p. 862, line 23), that I obtained a few drops of hygrine by distilling amorphous cocaine with water. I also shortly describe its action.

(3) Since the publication of my paper, I have received from Messrs. Howards and Sons specimens of hygrine, prepared by distilling amorphous cocaine in a current of steam.

All these specimens are now in my possession, and agree substantially with Wöhler's and Lossen's descriptions of hygrine.

I may state, however, that like Dr. Merck, I attempted without success to obtain hygrine from the leaves. It is probably present in very small amount.

IV. You say, "it seems clear that before Dr. Stockman's suggested explanation of the nature of amorphous cocaine can be accepted the existence of hygrine must be established, and its capability of dissolving crystallizable cocaine demonstrated."

The first part of this sentence I have answered under paragraph 3, and the second part was answered in my paper (p. 861, line 48), where I state that "Cocaine is extremely soluble in hygrine."

My paper was the outcome of a great deal of work on the subject. Every point was carefully investigated and confirmed, and I still hold to the opinions which I have expressed in it.

University, Edinburgh. RALPH STOCKMAN.

T. F. Walker.—Peziza repanda, Wahl.

T. H. Powell.—Claytonia perfoliata.

A. G. Rickarby.—Lathyrus Nissolia.

J. C. Lloyd.—The solution contains sulphur, chiefly in the state of potassium sulphite.

Civitas.—Ribes aureum.

Six Years.—In the future arrangements made by the Council no doubt a reasonable regard will be shown for existing interests.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Pollard, Schweitzer, Elborne, Alcock, Barclay, Redbourne, Perls, Johnson.

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